

**CHANGING TRENDS IN CINEMATOGRAPHY AND ITS  
IMPACT ON AUDIENCE WITH SPECIAL REFERENCE TO  
FILM DEVDAS (1936-2002)**

**A Thesis**

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## **Abstract**

As the presentation of visuals deals with so many important aspects of human life we feel there is a need for further research on these aspects. In our understanding there is also a scope to find out the correlations between “visuals — technology — memory — emotions”.

This study examines the relationship between visual presentations and technology advancements in this industry throughout time. The first thing that comes to mind when thinking about the role of science and technology in the development of visual perception.

From paintings to photography, black and white to colour, and digital to high definition, the evolution of visual communication has been intriguing.

As contrast to cognitive content information, which includes facts about the genre, temporal content structures, and spatio-temporal content components, visual approaches in films have an interpretative function.

We're looking for information on how lighting and other parts of cinematography generate different kinds of sensations, emotions, and moods. In a nutshell, it's how we react to and interpret the information we take in. Short-term and long-term memories are addressed in the film's imagery. Analysis of the film's various content pieces showed distinct memory performance profiles based on the amount of time after encoding of those parts. We will examine the effects of evolution and scientific development on visual communication and what the future of cinema holds as a result of this discovery. Brain activity, short- and long-term memory, and other aspects of cognition are all affected by visual stimuli.

For the individual art-viewer, the images give a unique and immensely satisfying experimental zone. Film studies focused on the psychology of film and how images affect human mind, as well as how young viewers' behaviours

differ from those of older viewers. The study will focus on each of the technological breakthroughs in the filmmaking process and cinema theory that led to the discovery of new visual presentation ideas on screen. Lighting and technical improvements may be used to create pictures that are linked to emotions, according to a new research. For our study, we plan to conduct a poll to gather the opinions of notable cinematographers, camera and film manufacturers as well as experts in the field of film criticism as well as students and professors at a number of prestigious film schools and film clubs.

Visuals are intended to offer a window into our culture. The desire to see the "real in reel" is now within reach thanks to modern media since we are born into a world of three-dimensional (3D) images and accurate colour. Thus, we are driven by a need for realism in film and television. We can only hope that the images and sounds we see and hear now will endure into the future in various forms of meta-data that represent humanity and our planet as a whole. I feel that with digital film production, a cinematic experience that is a realistic portrayal of a wonderful situation is not too far away. Also, new technological devices and their production processes might benefit from the findings of the study.

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## ABBREVIATIONS

M&E industry	Media and Entertainment industry
BLS	The Bureau of Labor Statistics
CU	Close-up
CAGR	Compound Annual Growth Rate
DIPP	Department of Industrial Policy and Promotion
DLP	Digital Light Processing
DP	Director of Photography
ECU	Extreme close-up
ELS	Extreme Long Shot
FDI	Foreign Direct Investment
FICCI	The Federation of Indian Chambers of Commerce and Industry
GPS	Global Positioning System
HMI light	Hydrargyrum medium-arc iodide light
HDTV	High Definition Television
LS	Long shot
MS	Medium Shot
MLS	Medium Long Shot
MPS	Moral Premise Statement
OTT platform	Over -The- Top platform
OTS	Over the shoulder shot
Ultra HD	Ultra-high definition
VR camera	Virtual Reality camera
VFX	Visual Effects

## **Chapter 1: Introduction**

### **1.1 Background information of media industry**

In the Indian media and entertainment (M&E) market, the EY FICCI report, 'The Age of Customer A.R.T. – Acquisition retention and transaction,' released today, reveals an increase of approximately 9 percent over 2019. The M&E industry is forecast to hit an INR2.4 trillion by 2022 with a CAGR of 10 per cent, based on its current trajectory.

Although the two big sectors of TV and print have held their position, digital media has overtaken entertainment filmmaking to become the third most significant segment of the M&E market in 2019. The sales of digital subscription more than doubled from 2018 levels and the sales of digital ads rose to 24%. The sector continues to expand faster than GDP mainly due to the rise of subscription business models and the attractiveness of India as a destination for content creation and post production.

The rapid proliferation of mobile access is enabling on-demand, anytime-anywhere content consumption nationwide. With a population of 1.3 billion, a tele-density approaching 89% of households, 688 million internet subscribers and nearly 400 million smartphone users, India's telecom industry is poised to become the primary platform for content distribution and consumption. India ranks as one of the fastest-growing app markets globally, where entertainment apps are driving significant consumer engagement. Online gaming retained its position as the fastest growing segment on the back of transaction-based games mainly fantasy sports, increased in-app purchases and a 31% growth in the number of online gamers to reach around 365 million.

Ashish Pherwani, Partner and Media & Entertainment Leader, EY India, stated, "The M&E sector witnessed a surge in content consumption as digital infrastructure, quantum of content produced and per-capita income increased in 2019. Driven by the ability to create direct-to-customer relationships, the sector firmly pivoted towards a B2C operating model, changing the way it measured itself. As entertainment and information options grew and choice increased the era of consumer Acquisition, Retention and Transaction (ART) redefined the media value chain leading to the emergence of many new trends and strategies across content, distribution, consumption and monetization."

“The corona virus outbreak will have a significant adverse impact on the sector, the situation is still evolving both in India and many parts of the world, the scale of the impact cannot be estimated immediately,” he added.

Uday Shankar, Vice President, FICCI and Chair, FICCI Media and Entertainment Division, said, “Riding the wave of exponential progress made towards digital accessibility and adoption, the M&E industry has been a forerunner of a dynamic and aspirational India. New products and business models are being imagined to capitalize on the rise in media consumption. Global players are recognizing the need to build India-centric offerings. The coming years are likely to usher in greater innovation in content formats, means of dissemination, and business models.”

### **Mergers and Acquisitions in M&E**

While the number of deals increased to 64 in 2019 from 41 in 2018, the overall deal value was much lower at INR101 billion as compared to INR192 billion in the previous year. This was largely due to the absence of big-ticket deals with only four deals crossing the US\$100 million threshold. The highest amount of investment was made in television, followed by digital, radio and gaming. Deal activity was spearheaded by new media such as digital and gaming, which witnessed 54 of the 64 deals in 2019, however, in terms of deal value, the share of traditional media segments such as TV, radio and film exhibition was 63%.

### **Trends**

The digitization of content and ongoing innovations in technology will continue to drive growth and force changes in the media and entertainment industry. Publishers and broadcasters alike will continue to experiment with new revenue streams, particularly to reap the benefits from digital subscriptions and online advertisements.

### **Key findings**

#### **Television:**

Broadcast television will continue to experience significant changes as television continues to be more interactive and customized for viewers. In recent years, the mandated change to digitized broadcasting coupled with the recession diminished broadcasters’ revenue—the decrease in program spending led to layoffs and a decline in employment. According to media research group IBIS World, “Relaxed ownership regulations will likely lead to further consolidation and additional layoffs because the

broadcasting spectrum is limited and no new stations can be built.” Job growth for radio and television broadcast announcers is expected to be slower than the average, and for broadcast and sound engineering technicians about as fast as the average for all occupations through 2020. Reporters and correspondents will have heightened competition in the hunt for work as employment for them is predicted to decline moderately by 6 to 8 percent in the coming years.

The consolidation of broadcast networks has decreased the need for experienced reporters, announcers, and technicians, and many will seek work in stations with medium and smaller markets, which means newcomers to the field will face more competition. Many radio stations are also relying on voice-tracking or “cyber jacking,” which enables announcers to pre-record their segments rather than airing them live. This reduces the staff that’s needed during air time for editing material and doing other off-air technical and production work.

On the positive side, the growth of Internet radio stations may create new opportunities for broadcast professionals. Internet radio stations have lower startup costs than land-based radio stations, and it’s relatively cheap for them to identify and reach their target demographic and listening audience. The DOL also forecasts that the increase of national news and satellite stations will increase the demand for more local radio and television stations. As the DOL described it, “Listeners want localized programs with news and information more relevant to their communities. Therefore, to distinguish themselves from other stations or other media formats, stations are adding a local element to their broadcasts.” The increased demand for online news and podcasts may also create some new employment opportunities for media and entertainment workers.

The TV industry grew from INR 740 billion to INR 788 billion in 2019, a growth of 6.5%. TV advertising grew 5% to INR 320 billion while subscription grew 7% to INR 468 billion. Regional channels benefited from the New Tariff Order as their consumption increased by over 20% in certain cases. General entertainment and movie channels led with 74% of viewership. On the back of several key announcements by the central and state governments such as Article 370, the Citizenship Amendment Act, and a general election, the news genre witnessed a growth to almost 9% of total viewership, up from 7.3% in 2018. In sports cricket

emerged as the big winner in 2019 as it accounted for over 80% of the sports viewership, up from 70% last year, due to the ICC World Cup.

### **Key insights**

Television will remain the largest earner of advertising revenues even in 2025, approaching INR570 billion. Viewership of regional language channels will continue to grow and reach 55% of total viewership in India as their content quality improves further. Content viewed on smart TV sets will begin to reflect that consumed on mobile phones, providing a window for user generated content companies and other non-broadcasters to serve content on the connected television screen.

### **Print**

The publishing industry has experienced a decline in advertising revenue and drop in readership over the past few years, in part due to the recession and also due to the increased availability of free online content. The growth of e-books is expected to continue and online publications and services will offer the most opportunities for employment. The Bureau of Labor Statistics (BLS) predicts that editors will see little or no change in employment growth in the coming years, with only a 1 percent growth rate through 2020. Online media will offer some job opportunities but the continued decline in demand for traditional editing jobs in print newspapers and magazines will offset the overall employment growth in the publishing industry. Writers and authors will also experience slower-than-average employment growth during the next few years.

Despite a 3% revenue degrowth at INR 296 billion, print continued to retain the second largest share of the Indian M&E sector. Circulation revenues increased by 2% to INR 90 billion as newspaper companies tactically increased prices in certain markets. Advertising revenues fell 5% to INR 206 billion in 2019 as AdEX volumes fell by 8%. Margins improved as newsprint cost measures were implemented and companies benefited from the reduction of newsprint prices.

### **Key insights**

2019 witnessed a significant growth in digital news consumers over 2018 when 300 million Indians consumed news online. Most large print companies had a defined digital business, with two companies crossing INR1 billion in digital revenues. Digital

subscription, though nascent, has increased as several publications have put digital products behind a paywall.

### **Digital media**

In 2019, digital media grew 31% to reach INR 221 billion and is expected to grow at 23% CAGR to reach INR 414 billion by 2022. Digital advertising grew 24% to INR 192 billion driven by increased consumption of content on digital platforms and marketers' preference to measure performance. SME and long tail advertisers increased their spending on digital media as well. Pay digital subscribers crossed 10 million for the first time as sports and other premium content were put behind a paywall. Consequently, subscription revenue grew 106% to INR 29 billion. Digital consumption grew across platforms where video viewers increased by 16%, audio streamers by 33% and news consumers by 22%.

### **Key insights**

By 2020, OTT subscription market will approximate 10% of the total TV subscription market (without, however, considering data charges). We estimate over 40 million connected TVs by 2025, which will provide a huge opportunity for content creators to reach family consumers. Better bandwidth will drive large screen consumption. By 2025, 750 million smart phone screens will also increase the demand for regional, UGC and short content, creating a short video ecosystem that can create significant employment. The battle for content discovery will intensify and move to the unified interface.

### **Films**

The film industry will have moderate growth in the next few years. An increase in distribution channels for motion pictures and an expanding global market will be the key contributors to growth. The Bureau of Labor Statistics forecasts that producers and directors will experience about 11 percent growth in employment through 2020, which is about as fast as the average for all professions. The public's demand for more movies and television shows, and the increasing demand from audiences overseas for American-made movies, will heighten the need for producers and directors.

Production companies are also experimenting with new methods for content delivery, such as online television and with mobile devices, which could open up more jobs for

producers and directors in the future. More independent films are expected to be made in the next few years, and self-employed producers and directors will directly benefit from this, with 16 percent job growth by 2020. Film and video operators and camera operators will experience slower than average job growth in the next few years. Camera operators will see little or no job growth because of the increased use of automatic camera systems. Overall, competition for jobs will continue to be intense as there are usually more people interested in broadcasting and motion picture work than there are jobs to fill.

The Indian film segment grew 10% in 2019 to reach INR 191 billion driven by the growth in domestic theatrical revenues and both rates and volume of digital/ OTT rights sold. Domestic film revenues crossed INR 115 billion with Gross Box Office collections for Hindi films at INR 49.5 billion – the highest ever for Hindi theatricals. Overseas theatricals revenues fell 10% to INR 27 billion despite more films being released abroad primarily as films with superstars didn't perform as well in 2019. 108 Hollywood films were released in 2019 as compared to 98 in 2018. The gross box office collections of Hollywood films in India (inclusive of all their Indian language dubbed versions) grew 33% to reach INR 16 billion. As single screens continued to reduce, the total screen count decreased by 74 to 9,527.

### **Key Insights**

Digital rights continued to grow in 2019 with an increase in revenues from INR 13.5 billion in 2018 to INR 19 billion in 2019. Digital release windows shortened with some movies releasing on OTT platforms even before their release on television. In-cinema advertising grew marginally to INR 7.7 billion in 2019 as multiplexes and advertising aggregators started signing long-term deals with brands. Seventeen Hindi films entered the coveted INR 100 crore club in 2019, which is the highest ever. Interestingly, six movies made it to the INR 200 crore club in 2019, as opposed to three in 2018. The future will be driven by immersive content (technology and VFX rich) experiences to drive theatrical footfalls and some genres of films could migrate to home viewership only. We can expect to see creation of a segmented Hindi-mass product for the heartland at low ticket prices.

## **History**

The Indian Media and Entertainment (M&E) industry is a sunrise sector for the economy and is making high growth strides. Proving its resilience to the world, the Indian M&E industry is on the cusp of a strong phase of growth, backed by rising consumer demand and improving advertising revenues. The industry has been largely driven by increasing digitization and higher internet usage over the last decade. Internet has almost become a mainstream media for entertainment for most of the people.

The Indian advertising industry is projected to be the second fastest growing advertising market in Asia after China. At present, advertising revenue accounts for around 0.38 per cent of India's gross domestic product.

## **Market Dynamics**

Indian media and entertainment (M&E) industry grew at a CAGR of 12.25 per cent from 2011-2017; and is expected to grow at a CAGR of 11.6 per cent to touch Rs 2,032 billion (US\$ 31.53 billion) by 2020 from Rs 1,308 billion (US\$ 19.46 billion) in 2016. The industry provides employment to 3.5-4 million people, including both direct and indirect employment in CY 2017.

The number of newspaper readers in India has increased by 38 per cent between CY 2014 and CY 2017 to reach 407 million. India is one of the highest spending and fastest growing advertising market globally.

## **Recent development/Investments**

The Foreign Direct Investment (FDI) inflows in the Information and Broadcasting (I&B) sector (including Print Media) in the period April 2000 – September 2017 stood at US\$ 6.86 billion, as per data released by Department of Industrial Policy and Promotion (DIPP).

- The Indian digital advertising industry is expected to grow at a Compound Annual Growth Rate (CAGR) of 32 per cent to reach Rs 18,986 crore (US\$ 2.93 billion) by 2020, backed by affordable data and rising smart phone penetration.

- India is one of the top five markets for the media, content and technology agency Wavemaker where it services clients like Hero MotoCorp, Paytm, IPL and Myntra among others
- After bagging media rights of Indian Premier League (IPL), Star India has also won broadcast and digital rights for New Zealand Cricket upto April 2020.
- Total number of Mergers and Acquisition deals increased to 63 in FY17 from 58 in FY16

### **Government Initiatives**

The Telecom Regulatory Authority of India (TRAI) is set to approach the Ministry of Information and Broadcasting, Government of India, with a request to fastrack the recommendations on broadcasting, in an attempt to boost reforms in the broadcasting sector. The Government of India has agreed to set up the National Centre of Excellence for Animation, Gaming, Visual Effects and Comics industry in Mumbai. The Indian and Canadian Government have signed an audio-visual co-production deal to enable producers from both the countries exchange and explore their culture and creativity, respectively.

The Government of India has supported Media and Entertainment industry's growth by taking various initiatives such as digitizing the cable distribution sector to attract greater institutional funding, increasing FDI limit from 74 per cent to 100 per cent in cable and DTH satellite platforms, and granting industry status to the film industry for easy access to institutional finance.

- a. Indian media and entertainment (M&E) industry grew at a CAGR of 18.55 per cent from 2011-2017; and is expected to grow at a CAGR of 13.9 per cent to touch US\$ 37.55 billion by 2021 from US\$ 22.75 billion in 2017.
- b. The next 5 years will see digital technologies increase their influence across the industry leading to a sea change in consumer behavior across all segments
- c. The entertainment industry is projected to be more than US\$ 62.2 billion by FY25
- d. With intent of ushering in an era of conversational computing, Microsoft has released an artificial intelligence chatbot known as Ruuh for Facebook

Messenger. This messenger is exclusively available for India. This Chatbot having sense of humour like Human beings. Ruuh is available only in English It can draw the painting, identify the images etc.

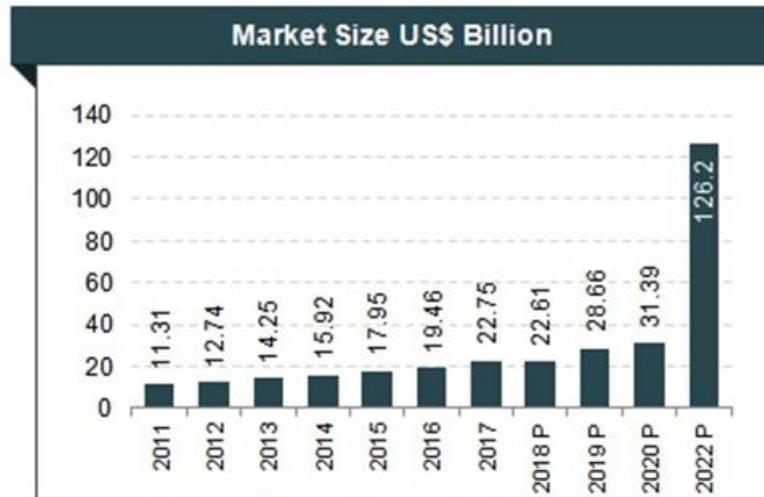


Figure 1: CAGR - Compound Annual Growth Rate, P – Projected

#### Trends:



BIG Cinemas, a member of Reliance ADA Group, is a major film chain with over 250 films across India, the USA and Malaysia, divided between Reliance Media Works Ltd and Reliance ADA. It recently started 3D and 6D technologies after leading the IMAX experience in India and is the first cinema chain to show films in all three formats. The first megaplexes in the world are also launched.



Tips were two brothers - Mr. Taurani and Mr. Ramesh S. Tauranis – who envisioned the Golden Dream A huge concept was discovered in a small shop located in Lamington Road's crowded wholesale market, the heart of the Bombay music industry. In 1975, the Taurani Brothers sold LP's to three of India's largest corporations – HMV, Music India & CBS (Long Playing Phonograph Records). By 1977, they became the largest distributors in Western India for these firms.



NDTV is an Indian commercial television broadcast network created by Radhika Roy and Prannoy Roy in 1988. NDTV is an Indian commercial television network.

NDTV is an acronym for New Delhi Television's initial name. New Delhi TV is one of India's top television stations and has offices and studios across the world. The heart of the group is its three national news networks, NDTV India (Hindi), and NDTV Profit (Business News).



PVR is India's largest and most luxury film and retail company. The company redefined the way entertainment in India has been consumed since its establishment in 1997. The film circuit currently runs 462 screens at 104 venues in 44 cities across India. The affiliates range from India's biggest bowling chains, 'PVR bluO' to

Mistral's two casual restaurants and PVR leisure Mr Hong. The film distribution company for non-studios/independent foreign films in India is part of the PVR Pictures group. The corporation also sponsors independent film makers under the banner 'Management Directors Rare' and cultivates and disseminates foreign film culture around the world.



The TV Today Network, along with Network 18 and NDTV, is one of India's leading English- Hindi news networks. It is included in the BSE and NSE news chains: Aaj Tak (Hindi), Headlines Nowadays (Germany), Tez (Hindi), Business Today (Germany) and Dilli Aaj Tak (Hindi). For twelve consecutive years, Aaj Tak received the Indian TV Academy Award for Best News Channel. In USA, UK and Continental Europe, Aaj Tak is open. Headlines today was the English news channel of the network and the channel is for urban young people. Tez is a Hindi headlines, while Dilli Aaj Tak is a local news channel to the capital of New Delhi.



HT Media began in 1924 with Mahatma Gandhi's opening of the flagship Hindustan Times. Today HT Media has expanded into one of the largest media firms in India. Hindustan Times and Hindustan were produced by an editorial team famous for its content, creativity and honesty (Hindi newspaper through a subsidiary Hindustan Media Ventures Ltd).



A leader in Indian media, Sri Adhikari Brothers (SAB) has been in many stages of development in the past 25 years. It is immensely useful for the community to be involved in the form of a production house in the past and as a broadcaster. Not only in the development of content, but through the creation of a light mood-centered television brand, SAB TV, is the community very well experienced. The group has always succeeded in seeing the demand gap that leads the way in this region.



ZEEL is one of Indian's most important TV, Radio and Film firms. Zee Entertainment Enterprises (ZEEL). It is one of the biggest Hindi programmatic producers and aggregators in the world with a huge library that contains more than 120,000 hours of television content. ZEE is the world's biggest Hindi film library with rights to more than 3,500 film titles from leading studios and legendary film stars.



Eros International (Eros) is a leading Indian film industry player. It was founded by Mr Arjan Lulla in 1973 and has its headquarters in Mumbai, India. The organisation manufactures, acquires and distributes Indian-speaking films in various formats around the world, including theatre, TV and streaming media. In Eros, there are more than 2,300 films, plus an extra 700 movies that are subject to streaming rights.



Balaji Telefilms was incorporated in 1994 and in that time has redefined Indian TV space. The shows such as Hum Paanch started strongly, and in the late 1990s and 2000s the business soared to unparalleled heights. Balaji is also responsible for the satellite boom in India. The Hindi TV and Hindi General Entertainment Channel output was pioneered in content from Balaji and was popular for over a decade, with blockbustern shows like 'Kyunki Saas Bhi Kabhi Bahu Thi' and 'Kahaani Ghar Ghar Ki' featuring unheard-of TRPs. Since the company was founded, the content of Hindi, Tamil, Telegu, Kannada and Malayalam has lasted over 15,000 hours. In the late 1990s, Balaji also joined the film industry and produced and distributed a variety of films.



One of India's leading entertainment networks is Multi-Screen Media, also called Sony Entertainment Televisions Pvt Ltd or SET India Pvt Ltd. It has produced famous shows since its launch in 1995 that have attracted wide publics. SET has always felt the pulse of the crowd and delivers a bouquet of shows for all ages. SET has over 42 million homes, including the US, the UK, Africa, the Middle East, Europe, Canada, Australia, New Zealand, Singapore, Nepal, Bangladesh, the Maldives and Malaysian countries, as well as 300 million audiences around the globe.

SET is part of the network of networks spread between Multi Screen Media Pvt Ltd and Discovery Communications India through The One Alliance - a joint venture (JV).



In 1970 the studio of Yash Raj Films (YRF) began as a film-making unit from India's veteran film industry Mr. Yash Chopra. It has become stronger in the past four decades and today has become one of the enticing Indian film catalogues, some of the top grossers in the entertainment industry.



In seven languages Star India broadcasts over 40 channels across different categories, including soap, reality, news and video. Every week it touches over 600 million visitors in India and 100 other countries. Star Gold, Channel [V], Star World, Star Movies, Star Utsav, Life OK, Movies OK and Star Plus are included on the network's channel portfolio. The latter are the general entertainment channels India No.1. Star India has a leading regional presence, including Star Jalsha, Star Pravah, Asianet, Asianet plus, Suvarna and Vijay. A variety of affiliate channels is also available.



Dish TV, India's founder and first housekeeping channel, is an organisation based in Zee Entertainment Enterprises, which is the largest medium and general TV network in the industry. Dish TV is the biggest DTH company in Asia and will become one of the world's leading DTH networks.

## **Trends in Cinematography and its impacts on audience:**

### **1.2 Introduction to the basic terminology of filmmaking**

#### **Animation**

In its commonest type animation consists of a series, each subtly different from the preceding one, of still photographs. The illusion of motion is created when the whole series is presented in rapid succession. This is the way to make the most famous cartoons. It is also possible to use marionettes or other solid objects instead of draws, whether the subject is rotated to achieve the desired movement in the film or subtly rearranged between the subsequent exposures. Computer can also be created for animated films.

#### **Camera**

The camera is the filmmaker's fundamental instrument. It is basically a light-tight enclosure, fitted with a shutter, for a precisely regulated duration, to allow light through the opening of the lens. Even a movie camera has a device for moving the image in one direction (frame at a time).

#### **Camera angle**

The perspective that the camera takes its subject from. A "high" angle is the camera's view of the subject; a "middle" angle is the camera's position on the same level as that of the subject, i.e. looking directly at the subject; a "low" angle is the view of the subject by the camera.

#### **Close-up**

A camera shot close to the subject just fills the field of view on the screen the theme which is also the face of the star. CU, or CS Abbreviated (for close shot).

#### **Continuity**

It takes continuity in time and in space to feel as though the action on the screen is flowing seamlessly and continuously. The continuity of motion, course and setting can be transmitted across time and space.

For instance, if an actor's medium shot lights up a cigarette that we cut in close-up, both his hands and facial face ought to be identical, and there is a shift in action. When the cavalry chases the Indians from left to right on the screen and then a shot of the Indians from right to left appears, they seem to have turned and have rushed to

battle. If a medium shot displays a side view of a hurdler leaping forward with his left foot, the next shot should indicate his left foot from the front. Continuity of action is frequently sacrificed in documentaries, while continuity of direction - for clarification - is ensured by the distortion of the original film.

So the BBC World War II shows that the Allies moved from left to right to face the Germans who first moved from right to left and then from left to right. This continuity was accomplished by printing some images backwards and found appropriate to simplify the plot.

### **Credits**

The name list and features of the people working in film making. It also occurs at the start of the movie.

### **Cut**

The editor effect is achieved by linking together the two images so that one image is replaced immediately on the frame by the instantaneous transition from one shot to the other.

### **Depth of field**

The scene in front of the focus lens is characterized by two distances along the lens axis. The area between these two distances is the field depth. For e.g., consider that an object to be photographed is 20 feet from the lens while the lens is centered on, so other objects 15 to 5 feet away will also be in an appropriate sharp focus. Inverted field depth (opening) and focus length are equal to the lens opening (opening). In other words, the narrower the openness and the shorter the lens focal length the deeper the area.

### **Dissolve**

This transitional system is called a dissolve if one picture fades out when a second one is lost. The old picture will vanish, and the two ones will remain on the screen for a while.

### **Documentary**

A documentary film usually shows incidents which (1) occurred in actual fact, (2) probably if the camera had not been there, and (3) not rehearsed and no paying actors involved. It's a record of incidents for actual people. It varies from news film because

the filmmaker has a more impartial history than the effect of those events on people's actions and feelings, including the most famous. There is also almost always a journalistic "angle" in documentary films. Although several variations exist, films are generally filmed with small crews of two or three, sometimes less than an hour long and almost always taken on plain, compact 16mm cameras.

### **Dolly or Dolly shot**

A punch is a lightweight, wheel-mounted cart that mounts the camera for portability and dolly shooting. Often referred to as a tracking screen or a truck shot, a dolly-shoot turns out when the dolly is pushed. The dolly may be equipped with a device to raise and lower the camera, suitably called a crane a crane shot ends in the camera up or down as it runs

### **Double exposure**

The other is superimposed by two images that occur on the screen at the same time.

### **Editing**

Film editing (or "cutting") is a method of collecting and organizing photographic images to forge a coherent whole by the assembly, trimming or extending of photographs, creating or interrupting motion, creating and linking the viewer to a scene, contracting or extending the film editor. His is an act of synergy: the whole film is more than the sum of its elements from his effort.

### **Establishing shot**

A medium or long shot usually defines the time and location for a series of film, or adds a significant aspect or character to the plot.

### **Exposure**

Photo-sensitive surface lighting process. Increasing the intensity of lighting or the duration of the light striking the photo sensitive surface results in increased exposure. Exposure control and subsequent processing allow the filmmaker control over the tonal values of the image and thereby control over the film's optical texture.

### **Extreme close-up**

This is an intense example of the close-up shot, abbreviated ECU or ECS. Only the actor's eyes or mouth may contain such a shot.

### **Fade-out/Fade-in**

The slow demise of a picture in the dark on a projector is called a dissipation. The opposite result on the screen of a picture that steadily emerges from obscurity is a decline. These effects can be achieved by adjusting the camera exposure or by printing the film in the lab.

### **Fast motion**

If an incident, say, is shot at 24 frames per second (natural sound speed) and then projected at the same rate, then it appears at normal speed on the screen. The screening time is just five seconds after being shot at half normal speed (i.e. 12 frames per second) and estimated at normal speed. The activity filmed thus seems to be accelerated. This impact is known as fast movement.

### **Film**

Motion Film is a thin translucent ribbon with a clear material with normal perforations on one or both sides with the ability to produce optical images by using a sensitized coating. International feature film standards set a number of ranges of sizes, with varying combinations of image surface and perforation from 8mm to 65mm width and 70mm broadness.

### **Filter**

A transparent or translucent unit with only specified features mounted in front of the lens to transfer light. A red filter, for example, passes only red light, which gives an odd redness appearance in the last frame.

### **Frame**

A single picture on a strip of film.

### **Grain**

There is no optical illustration as infinitely divisible shades of light and shadow, the picture can be seen as dots when closely inspected. Since there are several of these points - known as grain - the picture, which seems to be composed of continuous shadings seen from a regular distance. The image is considered to be "grainy" when the grain becomes big enough to be clear under normal conditions. That may be either because a limited photo region (whereby any grain of grain is appropriately expanded) is overly enlarged or because of the excessively grainy feature of the film used.

## **Lens**

A lens is an ensemble of glass transparent components, normally designed to concentrate the light on a plane behind the back of the lens. The light flowing through the lens on a camera tracks the image on the surface, as displayed on the screen. The lens can accept light from various angles. Lens can accept light. The acceptability angle can be large or narrow. A wide-angled lens allows a comparatively broad angle of light –35 degrees or more. Then the film registers a broad vision. Just a small field of view accept a telephoto lens. Far artefacts appear close as recorded in the video. Somewhere between the two ends of broad angle and telephoto lenses, a "natural" lens falls the focal length of the standard lens is generally used to provide an imagery comparable to the view of the unwelcome eye. The focus length needed for this is different from the film size used. It is important to note that.

## **Montage**

Montage means recording. French means montage. This term is often used to describe the style of movies made in the twenties and thirties by Eisenstein and other Russians. Their ideology held that publishing was the fundamental element in the movie, and that they always practiced it quite intellectually and abstractly – from a vain politician to a pawn or troops firing crowds to a bull being slain. The juxtaposition or conflict of these pictures was meant to create a new (whatever evident) thought in the viewer's mind. The technique led to visually and emotionally amazing films. They have seldom come to the crude extent of the examples they have provided. Hollywood also uses the montage or assembly sequence to mention part of a film that is quick to edit (though constant dissolution can have a slow effect) and elliptical to action. These sequences are often used to connect a long period or a rapid series of events, but have been used for cosmetic or emotional effects more recently.

## **Motion**

It is worth recognizing that in a moving image there are only three potential kinds of movement:

1. Object motion
2. Camera movement
3. Break motion.

## **Motion**

The cut is important for film movement. It has a feeling of movement and can only edit a rhythm of film, lyric, tension or shock. Dull, bland, and nonliving may be the same badly edited video. Some of the finest editing uses complex and stylish connections of all three types of movements.

## **Negative**

For technological purposes the film used in the camera is always negative; in other words, the colour white and vice versa appears on black artefacts. The shadows are turning into luminous regions and illuminated areas into shades. If a negative with another negative image is photographed, the effect is positive and natural. Any films have a negative influence (whether in black and white or colour).

## **Pan**

Pivoting of the camera from left to right (or vice versa) while shooting.

## **Scene**

In the film, a phrase inaccurately used. Few scripts for filming are split into 'scenes.' Scene can be a tableau, a place, or an action; favorite words are shot and series but a love scene is always spoken of.

## **Screenplay**

The contents of a script are detailed and are divided by the screenwriter into numerical sequences. A film may be original or adapted from a short story, book or play.

## **Sequence**

In the completed film a number of shots which together present some cohesive action such as a dialogue, a battle, a chase, and a journey are generally referred to as a series.

## **Shot**

The fundamental division of a movie. Generally, it consists of a single camera run as seen in the finished movie. The length of a shot can vary from frame to frame.

## **Slow motion**

If an incident is shot more quickly than usual and is later scheduled at normal pace, it takes longer than in fact on the computer. This is a slow movement phenomena.

**Splice**

The joint between two strips of film; also the act of joining two pieces of film.

**Take**

A simple firing of the camera.

**Tilt**

Result of a camera pivoting vertically while shooting, causing the horizon in the picture to rise or fall.

**Wipe**

Two shots editing impact. The first shot is progressively bordered by the second shot in a visible line, from top to bottom, from side to side or nearly in some other fashion.

**Zoom lens**

A zoom lens can be constantly adjusted between "wide-angle" and "telephoto," with a mid-way "natural" characteristic. A zoom lens can replace a variety of fixed lenses, making them more flexible yet costly. Moreover, "zooming" the lens, i.e. by shifting a camera with the fixed lens forward and farther from the subject by adapting the focus length from the images to a wide angle or vice versa. This is called zooming out and zooming in.

**Black and White Movie**

Inventions of Lumière's brothers, a filmmaker (from which we have the term cinema) worked better in the Edison and Dickson cinematography. On 28 November 1895, the Lumiere brothers who invented the movies began screenings for the Parsian public of short films (very short one or two minutes long).

On July 17, 1896, in the Watson Hotel in Mumbai, cinema was seen for the first time by the Lumiere brothers in India. It was just six months after their first Paris performance.

Therefore, Indians, including the European or American film industries, have over 100 years of experience. The first performance was just a show with a sequence of visuals, moving scenes and little more, but it opened a long line of films produced by talented Indians. India today is the nation that makes the largest number of feature films annually.

The earliest display of moving images was in India in 1896, as described above. However, no indigenous film making took place for the next fifteen years. The first film based on a novel was made by N.G.Chitre and R.G. Torney in Bombay. This was a film based on a Holy Mann's life in Maharashtra, PUNDALIK, which was released in 1912.

Costs were not the only consideration deciding which movie stock a film production would use in the 1930s and 1940s. Hollywood Technicolor used it all, so that the most serious plays are mostly black and white: Citizen Kane (1941), The Little Foxes (1941), the whole noir genre etc.



It is really interesting to note, because you can do a lot of things, black and white can just be as subtle as colour. Firstly, it's neither black nor white: it's all the gradients in between. And silver. And silver. And beiges. And beiges. And so on. And so forth. When you go and a paint shop to inquire for black the clerk will give you 50 colour chips after he has been laughing at his naivet : jet black, deep-space black, Hollywood's blacken Frederick, midnight blue... White has even more differences, if any, and grey is almost endless.

The colour in glamour filmmaking is black and white. These actors who only need last names Garbo, Bogart, Bacall, Gable, Dietrich are most well-known in black and white are the most beautiful icons of the screen.



**Picture: Shri. V.Shantaram**

### **Golden Age of Indian Cinema**

In the 1950s, film historians called the Golden Age of Indian Cinema to this glorious era. Authors and individual filmmakers have produced works by strictly adhering to the established film conventions. Mahatma Gandhi and Premier Nehru have showed a strong vision for the newly independent country over the past 10 years, and many great Urdu poets and authors collaborated with filmmakers to create a film that would make sense from a social point of view. No wonder the 50's are still seen as the finest time in Indian filmmaking, and generations of Indian filmmakers have been deeply inspired by the age, which no other decade has ever since.

The best directors of the time, including Mehboob Khan, Bimal Roy, Raj Kapoor and Guru Dutt, brought new depth to established themes. They drew on the wide spectrum of cinema stories, but brought to them a personal vision. The films of the late 1940s , 1950s and early 1960s were lyrical and powerful and dealt with themes including the exploitation of the poor by rich landlords (DO BIGHA ZAMEEN, 1953), the importance of sacrifice and honour (MOTHER INDIA), survival in the big city ( BOOT POLISH, 1954) , untouchability (SUJATA, 1959) , the changing role of the woman (Mr. and Mrs.55, 1955), urban vs rural morality (SHREE 420, 1955), nature

vs nurture (AWAARA, 1951), dilemmas faced by modern Indians (ANDAZ,1949), materialism vs spiritualism (PYAASA, 1957) and the importance of destiny (CHAUDHVIN KA CHAND, 1960). These films show a complex and sophisticated mix of characters, plots, ideas and morals.

### **Some New Trends**

Several dramatic changes occurred in Indian cinema in the early years of the 21st century. In 2001, the Indigenous Government finally proclaimed cinema a 'industry,' and it was no sooner that the incremental 'enterprise' of film and media industry began. The Federation of the Indigenous Chambers of Commerce and Industry (FICCI) and the banks, insurance firms were convinced to finance the sector. Also during this time was the decrease in active reliance on support from the 'underworld' of Bombay.

The rapid growth of multiplexes and digital cinemas in multiplex theatres, first in underground and later in major cities such as Bangalore, Hydravad, Ahmedabad and Pune, was perhaps the biggest impulse for shape in the industry. Multiplexes have theatres of all sizes with a different view, for in most cases they are part of shopping centres. In multiplexes and streaming cinemas, small budget movies may thus be released. In such multiplexes, ticket prices are far higher than in single screen theatres, thereby attracting families in the highest middle class.

This has led to so-called "multiplex" films that are small budget experimental films on topics barely covered in commercial film. The phenomena of multiplexing has allowed young directors such as Nagesh Kukunoor (Hyderabad Blues, Bollywood Calling and Iqbal), Sudhir Mishra (Hzaron Khawaishen Aisi) and Anurag Kashyap (Black Freitag). In such theatres have been released small low-budget movies such as Being Cyrus, Mixed Doubles, Jogger's Park and others. At the end of 2005, in around a hundred multiplexes in urban India, at least 300 screens were available.

The opportunity for low-budget films at the box office led young filmmakers both in mainline and in parallel traditions to introduce fresh and audacious subjects.

Some problems have been discussed in feature films such as homosexuality, old age (Cyrus Being), HIV-AIDS (My Brother Nikhil), live-in-relationships (Salam-Namaste), communication with the physically and mentally impaired (Blatric, Iqbal), religious fundamentalism (Bombay), nationalist history (Mangal Pandey: The Rising).

### **Stunt Film or Action Movie**

The stunt and adventure action movie was another common genre beginning in the silent period. JB H Wadia and his brother Homi Wadia from Wadia Movietone were the moviemakers who were primarily responsible for popularising the stunt film. They became kings of this kind and began with the TOOFAN MAIL (1932) railroad thriller which had many sequences of fighting on the roof of a train in movement. The Wadia liked Hollywood and were influenced specifically by American serials, Western comedy. The queen of the forties action film, Fearless Nadia, was their most popular actress.

Not everyone was attracted by the stunt movie and the adventure action movie: educated class people saw it as populist, obscene and corrupting. This film division is why publishers and manufacturers only see movies in two major categories: « class films and mass films ». It was presumed that the higher education groups desired more significant from the cinema, whilst the poor regarded the cinema as pure entertainment.

### **Animation Films in India**

Today, when US companies do wonderful work with 3D CGI, India still clings to 2D technology. Musical instruments are modelled using 3D industrial animation tools, then animated by US software for patented algorithmic animation, while the Indians only battle 2D software. 2D software takes and scans the frames drawn by an artist with difficulty and generates a model for each character.



**Picture: Avatar (2009)**

However, the projected \$50 billion industry attracts Indian animation companies. The best companies in India, including Tata Elxsi, UTV Toons, Crest Communications, Unilazer, Toonz Animation India Ltd and Digital Canvas, are busy packing agreements with companies around the US. Companies like pent media Graphics Ltd. They support smaller animation companies, including Disney and Warner Brothers, through the contracting of some of their overseas ventures (WB).



**Picture:Lion king (2019)**

Past interested in Indian animation. Dadasaheb Phalke wrote in 1912 the first Indian animated movie, followed by a 40-year hiatus. The Films Department set up a cartoon

film unit in 1956 to allow the students to train Clair Weeks, the veteran Disney Animator. And Ram Mohan, one of his first pupils, started UTV Toons.



In 1997 Mohan, who already spent two decades in the Film Division, worked in partnership with United Studios, a UTV Group division, in spinning out an entertainment company. In 2000, the company, originally known as RM-USL Animation, was renamed UTV Toons. Today, Mohan is known to be a "Father of Indian Animation" as one of Indians' biggest 2D animation firms.





### **Cost Factor**

The production of one hour of animation in the U.S. costs a prohibitive \$400,000 to 500,000. Maybe this is why studios look out for outsourcing.

The COO of UTV Toons, the UTV Software Communications Ltd division said that To lower prices, the majority of studios in the West have contract work with countries like Taiwan and the Philippines. In India there can also be as little as \$20,000 per episode – pretty much costly. Whether top animation companies such as Disney and WB actually seek outsourcing to India, even though many claim to run projects for them, remains uncertain.

Take the Pentamedia Graphics Ltd. case of Chennai. Started with the sale of CD titles and business presentations by the parent company Pentafour Software and Exports Ltd. For Excalibur it was a breakthrough for the group to be a popular project with Griboullie, France. Other foreign ventures such as The King and I were subjected to the organisation in 1999 by WB. "Initially it was difficult to stick with the external animation programmes, as India had no place at all in comparison with international complexity," says Pentamedis's Chandrasekaran. Sandbad: Behind the Veils of Mists from Improvis Corp. was used as a springboard by Warner Project.

The business today produced \$2.123 million in sales in the third quarter. 'A filling stone was the joint collaboration between 3dMaxMedia Inc. and Chandrasekaran, the U.S., to produce high-end visual video services using cutting-edge Internet tools, movies and TV media. Because of the apparent cost benefit, big studios in Hollywood

and Europe last year outsourced \$300 million in operation to India. 'While the 20-minute animated special effects sequence in India costs approximately \$75,000, studios in The USA charge \$150, 000,' K.Chandra Shekar says, head, Tata Elxsi(P) Ltd. The Animation Company.

Oversea studios, including those in the United States and Canada that usually outsource their animations from Australia, Philippines, Taiwan and Korea, are now moving more and more towards India.

### **Maturity**

Though still mature, animation companies are throwing the classic outsourcing paradigm into their ring son and this is credited with creating the 'Indian software industry,' until the recession occurs, of course. "If a company can maintain a desirable quality of its production at a low price, it can assume that Hollywood films will be made," said Chandrasekaran. While most companies have slowed down in last year, the industry in India has shown itself to be one of the best.

In India, however, the gap between cities and rural publics is wider because the transforming ideals and new heroes seen on the screen do not mirror the national social realities. The company is divided up into 'A' and 'B' and 'C' classrooms, as did Karan Johar, the other Indian Director. The settlements of 'A' class, the towns of 'B' marginally smaller and the towns of 'C' villages and rural areas. A woman in a village is a wife, a mother a woman, a woman a girlfriend, but a friend a woman? There is no way. This is their belief, and therefore they were brought up, not taught, so they don't understand such a word. The company in 'C' schools was even less than anywhere else than the company in the KUCH KUCH HOTA HAI film of the director Karan Johar. Karan Johar says that making a universally marketable Indian film is still the hardest thing to do.

Every Indian movie simultaneously juggles various genres and topics. A seamless conversation can be accompanied by a violent action scenario in which a mother says that her son is never deceptive, and a scene of comics directed by one of the film's secondary characters can accompany this interaction. The Indian film is made distinctive specifically by this combination of genres. The Multi-genre film was called the "masala" in the 1970s and 1980s. The word arises from the thought that the Indian

cinema provides a range of tastes, like a curry cooked with various spices or Massala. But this combination and matching was not always the rule.

### **National Film Development Corporation (NFDC)**

The National Film Development Corporation was established by government in 1975 with the main aim of promoting quality socially-destined films. Its roles include the importation and exportation of feature films, the distribution of raw films, cameras and other equipment for production imported from outside Germany and the exhibition of films in existing and new NFDC cinema halls, loans and grants to quality movies, research and development to improve film production, etc.

The NFDC also has responsibility for collaboration with film producers at home and abroad. One example of this is the involvement of NFDC in producing the iconic "Gandhi" movie with Indo British Films.

Sub-titling films is another of the main activities of the NFDC, where the requisite facilities in Pune have been built. It has also opened offices for the promotion of Indian films on the international market in New York, London and Hong Kong. Facility for film videotaping is also available in the NFDC. It has branch offices in various countries.

In 1973 the Film Festival Directorate was created under the responsibility of the Information and Broadcasting Ministry to organize national and international film festivals and send Indian films to take part in international festivals.

### **Film Awards**

Since 1953, national film festivals have been held to attract producers, directors, artists and technicians. Every year all critical film workers are honoured. One of the prestigious awards for Indian Cinema production is the Dada Saheb Phalke Prize. The Prize is awarded according to the decision of two national juries who examine the films submitted for judgment. The Golden Lotus (Swarna Kamal), and the Silver Lotus (Rajat Kamal) are the National Award's largest.

The medals are issued in conjunction with cash prizes and certificates. In addition to national awards, state awards still exist. The Center for Child Film (CFS) - Most of India's children's films are made by CFS, an autonomous body established in May 1955. The Company has made long films and short films like marionetta and

animation films over the last 45 years. Her films are shown in schools and institutions of social services and in handheld, rural cinemas. CFS also organizes children's film festivals. Other events include

NFAI was set up in 1964, Pune, to capture, classify, register and save films for special screening and study. The NFAI was designed for the purposive of the film industry. It promotes the dissemination of a balanced movie culture among the people and film studios.

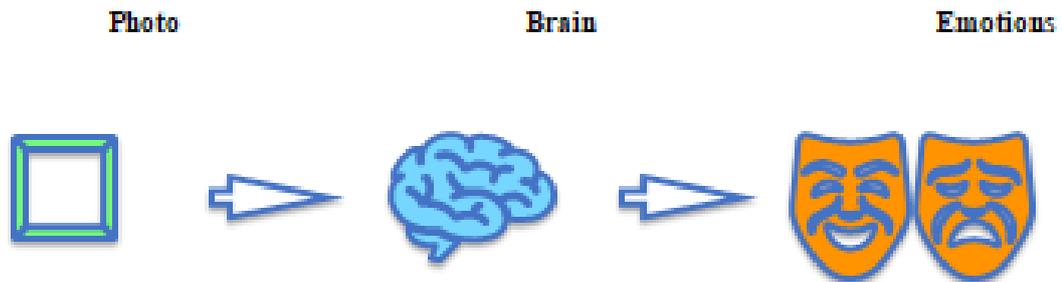
### **Motivation**

1. We live in interesting and entertaining times. No longer can we complain about boredom when we carry our entertainment around with us. Our viewing screens fit into our pockets, purses and office bags, to offer entertainment during our free time. Indians are consuming media and entertainment (M&E) content in rapidly increasing amounts and in a pattern that is drastically different from even a few decades ago. From an era where media was consumed via print (newspapers), audio (radio) and later video (TV) during fairly set hours (mornings and late evenings) and usually in family or group settings, we now consume M&E any time and from any device. From a time when the family or maybe even the neighborhood clustered around a TV set, the pendulum has swung towards individuals watching content of their choice, on devices of different sizes, in a setting that could vary wildly the bedroom or on the bus to/from work.
2. While the spotlight usually focuses on the smart, portable devices that are responsible for this transformation, the unsung hero behind the scenes is storage. Advances in storage technology that produced powerful, light and robust flash memory led to computers becoming smaller and lighter. Portable devices released users from their desktop computers and their fixed TV sets. With the rate of smart phone and internet penetration, it is no wonder that the M&E industry is undergoing a digital disruption. Today TV viewing is happening, but not necessarily on TV.
3. This is not the only place that storage is making a difference. On-demand media streaming services are gaining in popularity, serving up a range of viewing options that include movies, documentaries, serials, sitcoms, standup

comedy and more. And audio isn't far behind with music streaming services, as well as digital radio stations that connect users to their preferred listening content. Supporting millions of concurrent viewers, each doing their own thing, requires a powerful technical infrastructure at the heart of which is high-performance, high-capacity and failsafe storage.

4. It is not just the large M&E houses that are benefiting from advances in storage. Producing M&E content has become much easier, thanks to cloud-based video hosting services. Anyone with a smart phone camera and an internet connection can create and upload content to video sharing websites. Artists no longer have to wait to be discovered; they can produce content to showcase their talent on a small budget, upload it, share it on social media and wait for it to go viral. Expert home cooks no longer cook for just friends and family they have monetized their talent with cooking channels online that allow them to reach a global fan following.
5. Some statistics indicate that more 300 hours of new videos are uploaded to YouTube every day. Using a simplified calculation, this translates to more than 3 petabytes (3000 TB or 3 million GB) per day! That much storage is added everyday on just one popular hosting service! How do online video sharing websites scale so much daily? It is thanks to storage technology that works steadily and efficiently behind the scenes to store and serve up content, to be shared and viewed from any corner of the globe.
6. Storage technology has been evolving at an incredible pace, packing more and more into smaller and smaller devices. Today there is a range of high performance and high capacity options that can be mixed and matched to fit most budgets. Flash and HDD drives can be combined in a manner that suits the content and cost requirements. And with the evolution of cloud hosting services, M&E enterprises don't necessarily need to develop their own infrastructure.

## Visuals are Associated to Human Psychology



Psychology is the study of human behavior, interaction, and mental processes. Film, in essence, is behavior projected onto a screen. An increased ability to analyze psychological components in films will enable students to enjoy and understand films on a deeper level. It will also give them the tools to see each new film as more than just a form of entertainment, but as source material for examples and models of every type of human behavior that can be portrayed. Film is a hugely popular medium and a multi-billion dollar industry because movies communicate to a wide audience. By analyzing the psychology behind films, students will understand how films communicate and the messages they convey.

The psychological issues and theories will be studied through the process of film analysis. It is divided into four areas of analysis:

- 1) Using psychoanalysis to analyze film,
- 2) Psychological science fiction in film,
- 3) The psychology of the Western film genre, and
- 4) The psychology of fantasy in film.

The perspectives of psychology and media studies will be taken in the interpretation of the films and in the analysis of how film reflects and shapes psychological themes. Topics that will be covered include: Freudian themes, Jungian Archetypes, mind control, psychic powers, memory and memory disorders, dreams and dream symbolism, the American frontier mythology and the archetype of the Western hero, and psychological symbols from mythology, fairytales, and fantasy literature, as represented in films. The work of various directors may be viewed, including Hal

Ashby, John Ford, Spike Jones, Miloš Forman, Michel Gondry, George Stevens, Christopher Nolan, Mike Nichols, and Guillermo Del Toro.

One can learn the process of film analysis – breaking down the elements of films and discussing the psychological issues they depict. Through this process, one can increase both their knowledge of psychological theory and of film-making technique. And also it will impart a deeper understanding of how films create lasting and meaningful impressions on viewers through their portrayals of psychological issues.

### **1.3 Film Theory**

To comprehend how films relate to the actual world, other art forms, individual viewers, and society as a whole, film theory offers theoretical frameworks that date back to the 1920s and challenge the formal basic features of motion pictures. In spite of the fact that these three fields are connected, it is important to distinguish between cinema theory and other forms of film criticism and history. Despite the fact that film theory has its roots in linguistics and literary theory, it has also developed independently and in parallel with the field of cinematic philosophy.

#### **Specific theories of film**

**Apparatus theory** Psychoanalytic film theory was popular in the 1960s, but in the 1970s, Marxist film theory, semiotics, and psychoanalysis became the dominant paradigm in cinema studies.

**Auteur theory:** An auteur, like a novelist or a playwright, is a creative individual who exerts a great deal of personal and creative influence over the final product of a collaborative project. The phrase is widely used to describe filmmakers or directors that have a distinct style or a particular focus on a certain topic.

**Aesthetic Cognitivist film theory** is a view of art's importance that sees it not only as a means of entertainment or emotional release, but rather as a means of gaining insight.

**Feminist theory** is a theoretical, literary, or philosophical expansion of feminism. Gender disparity is the focus of this study. Anthropology and sociology, media studies, psychoanalysis, eco-feminist studies, home economics, literature, education,

and philosophy are some of the subjects that are examined in this book. Feminist theory has a tendency to concentrate on gender inequality as a topic of study. Discrimination, objectification (particularly sexual objectification), oppression, patriarchy, stereotyping, art history and contemporary art, and aesthetics are some of the topics that are often discussed in feminist theory.

**Genre studies** Genre theory is an academic discipline that analyses genre theory as a part of general critical theory in a wide range of academic fields including the humanities and the social sciences.

**Linguistic film theory** may be described as a kind of cinema theory that focuses on how movies are interpreted via an examination of its aesthetic qualities.

**Marxist film theory** Cinema theory is one of the earliest. In the 1920s, Soviet filmmakers like Sergei Eisenstein used cinema to convey Marxist ideology. Heavily edited films like Jean-Luc Godard's would use subversive parody in order to raise awareness of the class struggle and spread Marxist ideology. There have been many developments in Marxist cinema theory since these specific origins, and it is currently used to refer to any kind of power structure or connection in a moving picture text.

**Psychoanalytic film theory** evokes the ideas of psychoanalysts Sigmund Freud and Jacques Lacan in academia. Apparatus and Critical theories are strongly related to the concept. The hypothesis is broken up into two distinct parts. "There was a first wave in the 1960s and 1970s, the 1980s and 1990s saw a resurgence in the popularity of the second wave.

**Queer theory** is what we have here is nothing more than an amalgam of queer studies and women's studies from the early 1990s. Those who use the term study and hypothesize about gender and sexual practices that don't fit neatly within heterosexuality. When it comes to sexual desire, this begs the issue of whether or not it is "natural."

**The Schreiber theory** is a method of cinema criticism and theory that emphasizes the role of the screenwriter rather than the director as the primary creator of a film. US National Endowment for the Arts Literature Director David Morris Kipen first used the phrase.

**Screen theory** has been identified with the British publication *Screen* in the early 1970s as a Marxist–psychoanalytic cinema theory in this perspective, filmic pictures are not merely symbols that may be used to encode meaning, but also mirrors in which spectators can become aware of their own subjectivity.

**Structuralist film theory** has roots in structuralism, which in turn stems from structural linguistics. In the same way that languages are used to transmit meaning in communication, films utilize codes and conventions to express meaning in a similar fashion.

We can learn a lot about a nation and its people by watching movies. They begin with the assumption that a film is text, presented by Barthes (1994) and Kristeva (2000). *Devdas*, a film that has received enormous national and international press, is among the many films that have been exposed to this 'Bollywood zed' debate. A subcontinental hero, *Devdas*, has transcended the 'babus', a term for young Bengali men who are referred to as such throughout the film (see Arora, 1995). An worldwide and nationalist discourse has taken hold of the film, which has resulted in difficulties in cross-cultural communication.

As he is familiar with film theories, the researcher would like to use P.C.Barua's *Devdas* (1936), Bimal Roy's *Devdas* (1955), and Sanjay Leela Bhansali's *Devdas* (2002, Hindi) to illustrate how the directors interpreted the original novel and its philosophical and spiritual elements embedded in the *Devdas*' structure.

There has been a lot of discussion over how *Devdas* (1936) and Bhansali's *Devdas* (2002) are both considered to be the earliest examples of "Indian modernism" in film. Bhansali utilized *Devdas* as a metaphor to indulge in auteuristic sensibility for a grandiose mise-en-scene, a large and bold narrative whose struggles are recognised and realistic enough, to immerse his audience; the director achieved this by keeping the spirit of the characters. *Devdas* builds and maintains a metaphor of 'doomed love' in Bhansali's vision, via fresh conflicts of dramatic poignancy set to allegoric songs and staged to the rasa effective theatrical methods provided by cinema's significantly better capabilities for creative articulation than the text.

Filmmakers use visual imagination to produce a cinematic counterpart of their original work. They are free to adapt the book to meet the needs of the screen, as they see fit.

Despite the fact that he had faithfully adapted Saratchandra Chattopadhyay's book for the screen, P.C. Barua reshot the novella's conclusion in his renditions of Devdas. Barua came up with the complete plot for this sequence. It wasn't in the book. This is an unusual praise from a writer to a film director who has made an adaptation of one of his works: "It was an emotional moment for me," Sarat Babu said.

Bimal Roy's depiction of the story's mood, the progression of the protagonist's dark inner world, and his visual aesthetics are so faithful to the original novel that you can only wonder at the masterpiece that you see. Roy and his company have done an excellent job adapting and putting together the plot. Colors, scope, and audio/visual virtuosity aren't quite as impressive as they were in 2002, but they're still better than the original.

Bimal Roy firmly thought that the best way to win over an audience's hearts was via the use of emotionally stirring dialogue, melodies, and visuals. That's a characteristic that stands out in stark contrast to Bhansali's newest Devdas.

There are various changes in Bhansali's narrative because he wanted to differentiate the picture from its predecessors; for example, Devdas returns from his studies in Calcutta (modern-day Kolkata) in the book, but he finishes his studies in London in Bhansali's cinematic version.

It was Bhansali's vision that led him to create this picture. He intended to make this version "larger, better, and more spectacular than any traditional Indian movie". Sarat Chandra's original Devdas is nowhere to be seen in this film. Sanjay Leela Bhansali's Devdas was the only thing on the screen.

The researcher concluded that the original book was adapted, interpreted, and adjusted for the screen, but not in the same way as it was written by the author, based on the aforementioned information. The screenplay for Devdas was written by the filmmakers themselves.

These three film directors are considered "auteurs" under Auteur theory because of their centralization and subjective control over many areas of the collaborative creative production. "In other words, the person equal to an author of a book or a play," according to Auteur theory. The word is often used to describe filmmakers or directors who have a distinct aesthetic or thematic focus. Therefore, Film Devdas could be categorized under auteur theory.

#### **1.4 The Seven Universal Emotions We Wear On Our Face**

We've biologically evolved to wear these expressions regardless of culture. Human facial expressions are one of the most important non-verbal ways we communicate. With 43 different muscles, our faces are capable of making more than 10,000 expressions, many of them tracing back to our primitive roots. Even our smile, some researchers say, evolved from the way primate's show off their teeth to negotiate social status or to establish dominance.

And while each face has its own unique way of presenting emotions, there are a few select expressions that keep popping up, regardless of a person's age, race, language or religion. Below are seven basic emotions that are hardwired in our brains and show up on our faces.

Here's a rundown of those seven universal emotions, what they look like, and why we're biologically hardwired to express them this way:

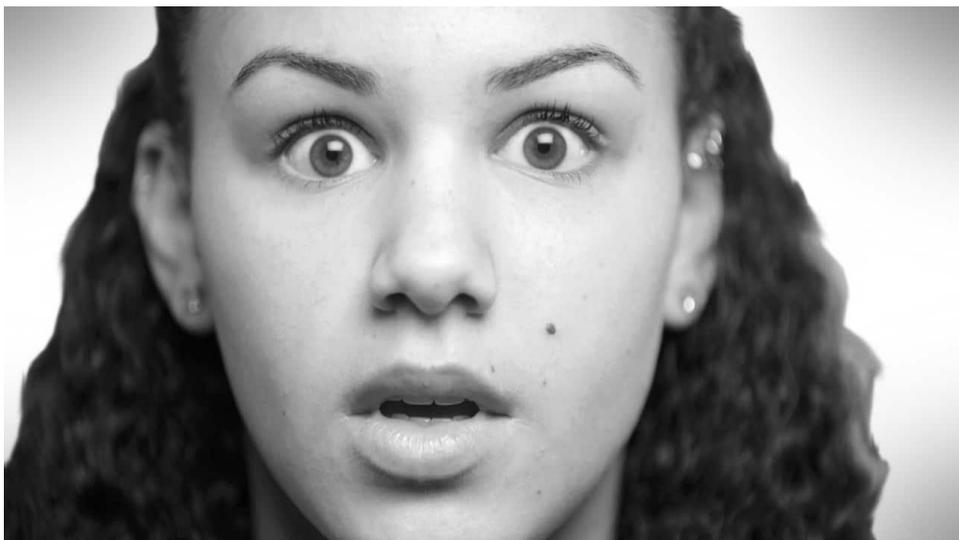
##### **Anger**



Facial movements: Eyebrows pulled down, upper eyelids pulled up, lower eyelids pulled up, margins of lips rolled in, and lips may be tightened.

Anger face works so well because each facial movement makes a person look physically stronger, according to researchers. This face lets the threat know we mean business. It's one of our most powerful emotions and it shows just how expressive the human face can be. This face serves as a warning, whether it's simply to intimidate or to show that a conflict has begun.

## **Fear**



Facial movements: Eyebrows pulled up and together, upper eyelids pulled up, mouth stretched

Each fear-based facial movement prepares us for a fight-or-flight response. This facial expression capitalizes off of the way our bodies work. Widening our eyes opens up our field of vision, letting in more light and allows lets we see the threats around us. The same can be said for our oxygen pathways. Opening our nostrils increases our oxygen intake and helps us prepare to flee or fight.

## **Disgust**



Facial movements: Eyebrows pulled down, nose wrinkled, upper lip pulled up, lips loose.

The disgust face doesn't just show our distaste, it also works to protect us. Wrinkling the nose closes the nasal passage protecting it from dangerous fumes and squinting our eyes shields them from damage.

## **Happiness**



Facial movements: Muscle around the eyes tightened, “crow’s feet” wrinkles around the eyes, cheeks raised, lip corners raised diagonally.

Despite the friendly connotation, researchers believe our smiles might have a more sinister origin. Many primates show their teeth to assert their dominance and lock down their status in their social structure. Some researchers believe it is that non-verbal sign that eventually evolved into a smile.

### **Sadness**



Facial movements: Inner corners of eyebrows raised, eyelids loose, lip corners pulled down.

Sadness is hard to fake, according to researchers. One of the telltale signs of sadness is the inner-brow raise, which very few people can do on demand.

## Surprise



Facial movements: Entire eyebrow pulled up, eyelids pulled up, mouth hangs open, pupils dilated.

While the surprise expression might only last a second or two, the facial movements — particularly the raised eyebrows — allow us to take in our surroundings, shift our attention to another, possibly threatening event, and react quicker. Whether it's a good or bad surprise, the facial reaction is the same.

## Contempt



Facial movements: Eyes neutral with the lip corner pulled up and back on one side.

Although the emotion of contempt can overlap with anger and distrust, the facial expression is unique. It is the only expression that occurs on only one side of the face and can vary in intensity. At its strongest, one brow may lower while the lower eyelid and lip corner rise on the same side. At its most covert, the lip corner might only rise briefly.



Our facial expression database is growing daily; this is a core asset to improving models and learning new behaviors. Today, our database includes millions of labeled images for expression comparison, and it is updated each time a participant's facial descriptors are extracted from an analyzed image or video. All our data is stored securely and anonymously.



nViso Insights software applies psychologist Robert Plutchik's theory of human emotions to interpret the different degrees of primary emotions. Plutchik recognized eight primary emotions, which he explained in a colour wheel and organized in pairs of opposites: joy vs. sadness, fear vs. anger, trust vs. disgust and anticipation vs. surprise. nViso Insights applies the wheel of emotions to sentiment analysis to understand the emotional reactions of individuals and audiences when they're subjected to certain stimuli. This allows clients to better understand their audience's emotional responses in real-time in their natural environment, and adapts or improves their services, products or offers in the moment. A core area where this is most relevant is in personalization, safety and security.

### **Lighting and Facial Recognition**

Another area that lighting has been examined is facial recognition in real spaces. Hill and Bruce's study on the "Effects of lighting on the perception of facial surfaces" documented a series of experiments that tested participant recognition and likability of faces and objects in different positions and lighting conditions. Though termed differently, the researchers used film lighting techniques in the design. They tested what they called 'top lighting' or overhead lighting in film, a "45 degree light" or key light, and 'bottom lighting' or under lighting on positions of faces, or in film terms, the blocking of faces, in profile, full front, and quarter face positions. Results indicated that participants showed more accuracy and likability when viewing subjects with overhead lighting (Hill & Bruce, 1996). This would support the fact that filmmakers use under lighting to put audiences at unease in mysteries and thrillers, and is a part of the Low Key lighting style. They also concluded that "When matching faces, changes in lighting directions pose difficulties" (Hill & Bruce, 1996 p. 1001). This finding is supported by Braje et al. (1998) who studied face recognition of full front faces either was "illuminated" or in film terms in High Key lighting, or with 'cast shadows' or Low Key lighting revealed significant data. "Face recognition was found to be sensitive to the presence of cast shadows and to changes in illumination. Observers were slower and less accurate at matching and naming faces when there was a change in illumination direction" (p. 21).

Again, these findings support why Filmmakers light High Key for comedies for audience comfort and easy recognition and Low Key for mysteries and movies of suspense to make the audience less able to recognize elements of the movie and keep

them on the edge. Together these studies suggest that participants may respond differently to film characters differently when seen in differently lighting conditions. Emotional design explicitly addresses the emotional relationship between the objects and the subjects of design the objects are technologies, and the subjects are technology users. The first section delves into the philosophy and theory of emotional design to provide a foundation for the rest of the book, which goes on to discuss emotional design principles, the design and use of emoticons, and then intelligent agents in a variety of settings. Emotions, Technology, and Design provides a thorough look at how technology design affects emotions and how to use that understanding to in practical applications.

An insight is built on nViso 3D imaging technology. It's the most advanced in the industry; our technology captures the seven dominant human emotions and interprets them into varied levels of emotional engagement. Using highly sophisticated deep learning algorithms to accurately understand human behaviors in real-time, nViso's cutting-edge technology can:

- Continuously and autonomously improve without limits.
- Learn by understanding a customer's emotional response.
- Automatically correlate data points to countless variables.

### **nViso**

Is a leading provider of emotion recognition software that interprets human facial micro-expressions and eye movements captured through video. Its solutions use proprietary 3D Facial Imaging technology with artificial intelligence to track hundreds of different facial points to recognize human emotions.

### **1.5 Visuals and Human Memories Connection**

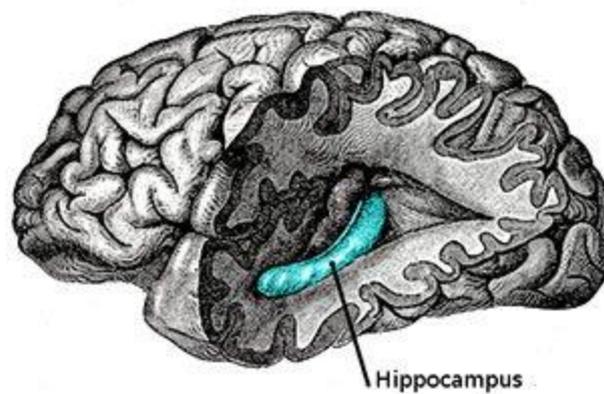
Memories of our experiences connect with one another and they are the basis of who we are as individuals. Memories of our experiences are called autobiographical memories and they rely on a brain region called the hippocampus.

Camera

Photo

Brain

Emotions



Though emotion conveys memory benefits, it does not enhance memory equally for all aspects of an experience nor for all types of emotional events. In this review, I outline the behavioral evidence for arousal's focal enhancements of memory and describe the neural processes that may support those focal enhancements. I also present behavioral evidence to suggest that these focal enhancements occur more

often for negative experiences than for positive ones. This effect of valence appears to arise because of valence-dependent effects on the neural processes recruited during episodic encoding and retrieval, with negative affect associated with increased engagement of sensory processes and positive affect leading to enhanced recruitment of conceptual processes.

“There seems something more speaking incomprehensible in the powers, the failures, and the inequalities of memory, than in any other of our intelligences.”

As captured in this quotation from Jane Austen’s *Mansfield Park*, memory is both resolute and fragile. We are left with durable and lasting traces of many events and yet we can forget other events just moments after their occurrence. Even when we retain memories of past events, they never are exact reproductions of those initial experiences. We remember some pieces of an event but forget others, and the event details we recall often are shaped by our current mindset and molded by thoughts and experiences that have occurred between the original event and the moment of remembering.

Though we are not always aware of our memories’ errors, most of us would not be surprised to learn that memory is not perfect. Many marital squabbles arise due to inconsistencies in how a past event is remembered, and nearly everyone has, at one time or another, struggled to remember when they were last in a particular location or why the person across the room looks familiar. However, many of us nevertheless share the intuition that there are some moments in our lives that have been indelibly preserved: perhaps a wedding day, or the day a baby was brought home from the hospital. William James wrote that “some events are so emotional as to leave a scar upon the cerebral tissues” (James, 1890/1998), capturing this intuition that although memory is not always perfect, sometimes a memory can accurately preserve a moment in time.

It has long been known that experiences that elicit arousal are more likely to be remembered than experiences that do not evoke an emotional response. This emotional memory enhancement has been demonstrated across a range of paradigms and using a variety of stimuli (e.g., Bradley et al., 1992; Cahill & McGaugh, 1995; Kensinger et al., 2002). These enhancements are particularly pronounced for events

that elicit arousal (e.g., Anderson et al., 2006; Buchanan et al., 2004; Kensinger & Corkin, 2003; Talmi & Moscovitch, 2004), and it is believed that the release of stress hormones may play an important role in modulating these mnemonic influences.

In particular, it has been proposed that arousal-mediated enhancement of memory may occur when there is both an arousal-related enhancement in noradrenergic activation, leading to interactions between the basolateral nucleus of the amygdala and other regions important for sensory and mnemonic processing, and also the release of glucocorticoids (reviewed by McGaugh, 2004; Wolf, 2008). Though it might have been assumed that such effects would be too sluggish to modulate memory on a trial-by-trial basis, evidence is accumulating to suggest that arousal-mediated enhancement is likely to occur even when there is a relatively rapid fluctuation between emotional and neutral stimuli.

For example, even when emotional and neutral stimuli are intermixed on a study list and are presented for a relatively short duration (e.g., a few seconds), arousal-related responses, such as galvanic skin conductance, are strong predictors of later memory (e.g., Anderson et al., 2006), and noradrenergic blockade can remove the effects of emotion on memory (e.g., Strange & Dolan, 2007).

In order for a previous event to be remembered, at least three memory phases must occur successfully. First, the event must be recorded by sensory registers and encoded. Second, the event must be consolidated into a stable and lasting representation. Third, the event must be retrieved. There is evidence to indicate that when an experience elicits an arousal response, there are emotion-specific processes that are engaged at each of these stages, enhancing the likelihood that information is encoded, consolidated, and retrieved.

In brief, information eliciting arousal is more likely to be detected and attended (reviewed by Dolan & Vuilleumier, 2003; Kensinger, 2004; MacLeod & Matthews, 2004), increasing the likelihood that the information is encoded. Arousing information also appears to be consolidated into memory more effectively than nonarousing information, as evidenced by the fact that the mnemonic benefit for arousing information (as compared to nonemotional information) tends to increase with longer retention delays.

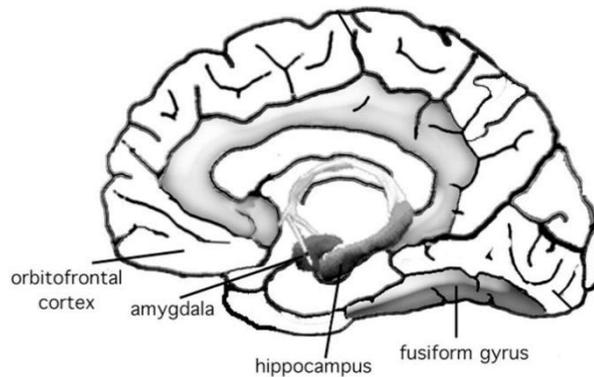
In other words, while nonarousing information is readily forgotten, once encoded, arousing information seems more likely to be established into a durable memory (LaBar & Phelps, 1998). Once stored, arousing information also may be more likely to be retrieved, though there is less conclusive evidence regarding how emotion influences retrieval processes (see review by Buchanan, 2007). Thus, when information is arousing, it is not remembered simply because of the engagement of the same sorts of processes that would enhance memory for more mundane experiences (e.g., enhanced semantic or autobiographical elaboration, additional rehearsal), but rather because of the engagement of processes not typically recruited unless an experience evokes an emotional reaction.

At a neural systems level, the memory enhancement seems to occur because, once active, regions within the affect processing system (e.g., the amygdala and the orbitofrontal cortex) modulate the processing of regions that facilitate the encoding of sensory detail (e.g., regions of the fusiform gyrus) and the consolidation of memory (e.g., the hippocampal formation; see Figure 1). There is extensive evidence that such modulation occurs in animals (reviewed by McGaugh, 2004), and there is increasing support for a modulatory influence in humans as well.

For example, neuroimaging studies have revealed that during the processing of emotional information, there are correlations between the strength of activity in the amygdala and in the hippocampus (e.g., Kensinger & Corkin, 2004), and the strength of these correlations can correspond with the magnitude of the mnemonic boost for emotional information (e.g., Richardson et al., 2004).

There also are often correlations between the amount of activity in the amygdala and the fusiform gyrus (a region important for higher-level visual processing; Iidaka et al., 2001; Vuilleumier et al., 2004), and these interactions boost the likelihood that visual details are encoded into memory (e.g., Kensinger, Garoff-Eaton, & Schacter, 2007; Talmi et al., 2008). Neuroimaging studies, many investigating the retrieval of emotional autobiographical memories, have suggested that the amygdala may modulate retrieval processes as well (reviewed by Buchanan, 2007), perhaps facilitating the mnemonic search process (Daselaar et al., 2007). For example, during retrieval, there appears to be synchrony between the activity in the amygdala, the hippocampus, and the fusiform gyrus (e.g., Kensinger & Schacter, 2007; Smith et al., 2006). There also is increased strength of connectivity between the amygdala and the

hippocampus during the retrieval of emotional information, modulated by activity within the orbitofrontal cortex (Smith et al., 2006). These modulations may lead to an enhanced ability to retrieve the details associated with an episode.



**Picture: Anatomy of an emotional memory**

The memory boost for emotional information seems to occur because affective processing regions (e.g., the amygdala and the orbitofrontal cortex) modulate the processing of regions that facilitate encoding of sensory detail (fusiform gyrus) and memory consolidation (hippocampal formation).

### **Memory Accuracy Depends on Individual Differences in how an Event is experienced**

Although groups of individuals tend to remember some details of emotional events better than others, not everyone remembers the same details of an experience. The sections above already have described some ways in which individual differences in experience can impact emotion's effects on memory for detail. Individuals who find an event to be negative are more likely to retain accurate details of the event than those who find an event to be positive. Individuals who are focused on encoding particular details (e.g., because of intentional encoding instructions, or because of an encoding task that focuses them on those details) also tend to remember those details better than individuals who do not attempt to overcome the attention capture by the intrinsically negative aspects of an experience.

But there are a number of other aspects of event experience that can influence what people remember about an event. For one, being an actor in an event can influence the details that are remembered about that event. For instance, although people around the world remember the terrorist attacks of September 11, 2001, individuals living in New

York tend to retain more event details about the day (e.g., when the second plane hit the building) than autobiographical details (e.g., what they were doing when they first learned of the attacks).

In contrast, individuals further removed from the event locus (those living in California or Hawaii) retain more autobiographical details than event details (Pezdek, 2003; see also Luminet et al., 2004; Smith, Bibi, & Sheard, 2003; Tekcan et al., 2003). Separation of even just a few miles can influence how an event is remembered. Sharot, Martorella, Delgado, and Phelps (2007) queried New York City residents about the terrorist attacks of September 11, 2001. Participants who had been close to the World Trade Center reported more vivid and detailed memories than individuals who were further away, and the individuals who were close to the World Trade Center showed greater left amygdala activation during recall of events from September 11 than did individuals who were further away.

These findings suggest that a person's involvement with an event can be a critical factor influencing the extent of emotion-specific processing evoked during retrieval of the event memories. Note that these findings can be consistent with the proposal that negative emotion is enhancing memory for "intrinsic" details; what a person processes as intrinsic may vary based upon personal experience. For someone in New York, the intrinsic ties to the emotional event may be the event details themselves (e.g., when the plane hit the building); by contrast, for individuals further away, the intrinsic details may be tied to how they learned about the attacks.

Another important factor relates to the resources that an individual has available to devote toward event processing. Individuals who can devote only limited cognitive resources to event processing (either because they are performing a secondary task or because they are individuals with relatively poor cognitive control ability) tend to show much larger emotion-related memory trade-offs than people who can devote more substantial cognitive resources to event processing. With limited resources, people tend to retain the intrinsic emotional aspects of the event but not none the motional contextual details. Thus, after studying a picture of a snake in a forest, they may remember exactly what the snake looked like, but they will almost never remember the forest (Waring et al., in press).

These findings fit well with evidence that attention may be focused relatively automatically on the negative aspects of events (and see Dolan & Vuilleumier, 2003

for evidence), thereby boosting memory for those aspects even when attention resources are limited. In contrast, flexible allocation of attention may be essential in order for event details more extrinsic to the emotional aspects to be recorded and remembered. This fact is likely to explain why the way in which attention is focused during encoding can have such a large impact on the types of details that are remembered about emotional events: Although there are some details that may always be remembered well (perhaps intrinsic details of the negative items), other details may only be recorded and retrieved when attention is directly devoted toward their processing.

The way in which cognitive resources are devoted toward event processing may also be closely tied to individual differences in personality or anxiety level. For example, people higher in anxiety tend to focus more automatically on negative event details, causing them to remember those details better (e.g., Ferguson et al, 2007; MacLeod & Matthews, 2004).

However, they have a harder time remembering the contextual details, plausibly because they cannot flexibly deploy their attention away from the emotional aspects and toward non-emotional event details (Waring et al., in press). People higher in neuroticism also are more likely to dwell on the negative, and tend to have better memory for negative elements than none motional or positive elements of presented information (e.g., Chan et al., 2007). These results emphasize the importance of considering individual differences when examining the ways in which emotion impacts memory, as the degree to which memory is enhanced, or narrowed, likely it not the same across all individuals.

There are likely to be a multitude of other factors that can influence the way in which resources are devoted toward information processing. Individuals who find information particularly self-relevant may deploy resources differently than individuals who find information to be unconnected to their self-concept (discussed in Schechter, Gutchess, & Kensinger, in press), and individuals in a powerless position may process information differently from individuals with power over a situation (e.g., Guinote, 2007).

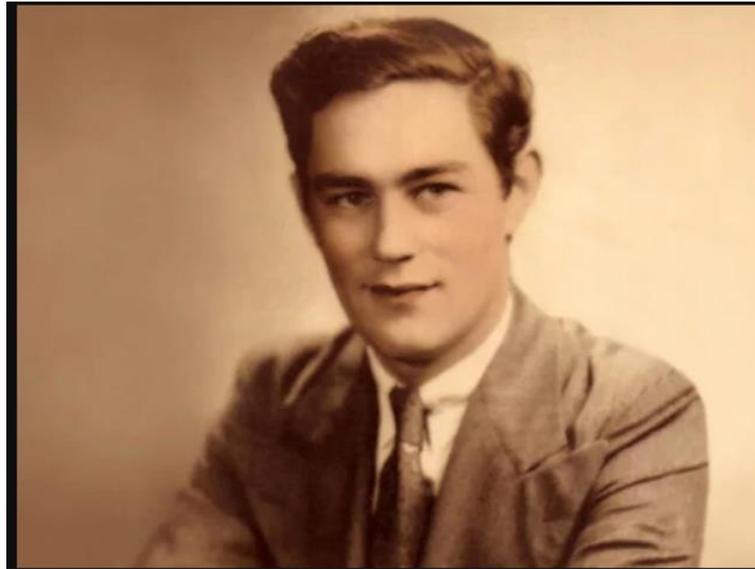
Individuals who are engaging in emotion regulation strategies also may process and remember different types of event details than those who are not attempting to regulate their affective reactions to events (Richards & Gross, 2000). A person's

gender can also influence how well emotional events are remembered (Cahill, 2003; Hamann & Canli, 2004) as can a person's perspective about the finite (or infinite) nature of their future (Carstensen et al., 1999; Mather & Carstensen, 2005). As research continues to delve into the complexities of emotion's effects on memory accuracy, it will be important for these types of individual differences to be considered so that broad effects of emotion (i.e., those that impact nearly everyone's memory) can be distinguished from those that may impact only a subset of individuals or that may arise under only a constrained set of circumstances. If the hippocampus were to be taken out of your brain right now, you would be stuck in time and memories of new experiences would rapidly fade away. The hippocampus functions to create a seamless story of the self.

It's pretty clear that there is a connection between human memory and the photographs we take. Simply put, a photo is information about past light that we can perceive in present time. Similarly, memories are the effects of our past experiences on our present self. Photographs can serve as memory storage and, when viewed, can activate memory recall. The basis of our autobiographical memory is what happened, where it happened and when it happened. Similarly, the photos we take can store information of what, where and when. In this regard, a photograph is very much like a memory of a life event. Interestingly, doctored images may be more of an accurate analogy to memory, but that's for another day.

### **Some History on Memory Research**

Before we get to the interaction between human memory and the photograph, it's first important to understand some of the neuroscientists history on memory research. Present day memory research owes a lot to the patient who was simply known to the research community as patient H.M... H.M. had debilitating seizures that developed after a bike accident as a child. For 18 years various treatments did not work in helping him with his seizures.



The surgery eventually stopped his seizures, but the amnesia that resulted was completely unexpected and since then the research on hippocampus autobiographical memory formation has grown exponentially.

The photographer Phillip Toledano published a book in 2010 that exemplifies H.M.'s dilemma. Like H.M., Phillip Toledano's father could not form new memories and primarily remembered himself as a younger man. A picture that Toledano took of his father looking in the mirror shows just how powerful the impact of his amnesia was on his identity. Because Toledano's father remembers himself only as a young man, he is in disbelief that the individual in the mirror is actually him.

### **1.6 Visuals, Human Emotions and Technology**

“When people look at a beautiful countryside, we like to derive pleasure from it. We receive light sensations of different colours, different wavelengths reflected by the various objects all over the field of vision. This concert of light is similar to the one played by a hundred different instruments, in other words, a symphony of visual music” [Alton 1995]

For the last 100 years, the moving image has been illuminated with specific lighting styles defined and practiced by filmmakers. Ideally, if a filmmaker is performing his or her job correctly, the audience member should never be conscious of all the theory, methodology, and craft the lighting designer is manipulating to create a deep and engaging viewing experience. Nevertheless, filmmakers work very hard to bring audiences experiences that will make them “feel they are right there in the movie,” or

are experiencing presence (Lombard & Ditton, 1997). The goal is to make the viewer integrate what he or she knows as reality with what is being seen on the screen in order to feel transported to the world crafted by the filmmaker.

One way film theorists and filmmakers achieve creating this media effect is by employing lighting theory. From the early days of cinema, lighting has been a fundamental element in creating the final picture. Just as in real life, light is everything for the moving image. Light is all the human eye sees. People do not see objects; they see light bouncing off objects at different colour temperatures. The human eye observes light through the iris and the brain interprets the world as 3 dimensional. A camera, a model of the human eye able to record an image passing through the iris onto film, reproduces the image in only 2 dimensions.

In order to produce images that appear 3 dimensional and help the audience interpret the intended story or plot-line, intense work on developing defined lighting theory and practice has been ongoing since film's creation. Genres such as comedy, drama, romance, science fiction, fantasy, and mystery, have been defined since the earliest forms of human storytelling. As cinema and film lighting theory developed, different lighting techniques grew to become associated with different types of stories to provoke audience emotional response and assist in narrative interpretation.

These lighting styles used to enhance film's power to impact audiences' emotional response and narrative interpretation have been practiced for the last century but have not been examined by empirical study of how the audience actually responds to various lighting styles. This study investigates the impact three different lighting styles may have on audience perceptions. The methodology section details an experiment that isolates the variable of film lighting from other structural features.

The study was conducted with both quantitative and qualitative questionnaires to evaluate audience responses. Unlike many of the experiments from Communication and Psychology, this evaluative design is simple and only tests three basic lighting styles of High Key, Low Key, and Available Light in isolation.

Rationale Film theory has been developed and practiced for a century but not many empirical studies have been conducted to examine if the established theories that drive application in the field in fact produce the media effects documented in film literature. Formal elements, as they are known in film literature, include lighting, sound, shot scale, editing, color, and pacing among others and are the basic structures that present the content to the viewer. Within Communication, Film Lighting, along with all of

film theory's formal elements are considered to be structural features of media. There are numerous academic articles concerning the emotional and behavioral effects of media on audiences, though they are mostly conducted by evaluating content, not by the structural features. Some communication scholars have studied different structural features such as sound, pacing, and editing but neither communication nor film scholars have empirically studied the impact of Film Lighting.

Psychological experiments testing architectural lighting design in real physical spaces has been completed and has provided positive results that lighting has emotional, cognitive, and behavioral effect on participants. Bridging the links between these fields demonstrates support for why and how empirically testing the application of Film Lighting theory on audience response and narrative interpretation is an important study. The current study manipulates three film lighting styles and tests the impact on participants' emotional responses. The goal of the study is to provide empirical evidence for the relationship between lighting styles and emotions discussed in film literature.

Lighting designers think about psychological response and how behavior is affected by lighting.

Some examples are:

1. Visibility of vertical and horizontal junctions aids orientation.
2. People follow the brightest path.
3. Brightness can focus attention.
4. Facing wall luminance is a preference.
5. Lighting can affect body position (Ginthner, accessed April, 2013 p.2).

Just as lighting designers light spaces to stimulate human mood and behavior, Cinematographers light the space inside a movie frame with the intent to persuade a viewer's perception. The way objects are lit in the frame will focus the viewer's attention, the amount of shadows cast will limit perception, and changing lights can indicate change in a character or opportunity (Brown, 2012). Each scene in a film can be considered a new architectural space that is visually illuminated with the intent using perceptual psychology to initiate audience response, interpretation, mood, and behavior.

Film and Architecture also have collegiate programs in lighting design and cinematography and produce highly skilled professionals who not only practice the

theory and methodology behind their crafts as truths, but are also well compensated for quality work using their training. They both have prestigious clubs and awarding systems honoring professionals who are trained and skillfully implement new techniques and create innovative visual images and spaces. They share similar terminology, work with comparable tools and technology, and essentially developed in a parallel fashion. However, unlike film, architecture has had psychological study on how different light in a physical space effects human arousal, concentration, memory, work productivity and mood.

The High Key, Low Key, and Available Light were created and implemented from the primal development of the human psyche, and even if the film lighting effects have yet to be empirically tested on audiences, psychology has conducted lighting tests in controlled physical environments with significant results. Though psychologists do not use the same terminology as film studies, correlations can be made that suggest if architectural lighting design does have an impact on human interpretation, mood, and behavior in the physical world then it may also have an impact of the audience of a film. Like structural features in within the topic of Media Effects in Communication, aspects of the impact of architectural lighting design on psychological interpretation have been conducted in Psychology.

Different psychological studies proved significant results in varying areas of the human condition. "Light is a pervasive feature of the environment, which exerts broad effects on human behavior" (Sburlea, 2011, p.1). Felix Deutch writes "Every action of light has, in its influence, physical as well as psychic components" (Birren, 1969, p. 400). Slegers et al. (2013) state, after testing two different Dutch elementary school classes in different lighting environments that "the results of our study offer support for the influence of classroom lighting conditions on concentration" (p. 15). Knez (1995) found significant results when measuring mood and memory under different lighting conditions.

"The results in long-term recall and recognition tasks showed that both retrieval processes were affected by in accordance with congruent, incongruent mood valence" and suggests "that highly structure to be learned was indeed sensitive for memory-mood effects" ( p. 50). Additionally, Veitch et al. (1991) found that lighting differences can increase arousal and task performance and suggests "If information is provided to employees concerning the lighting installation and its effects on people, performance and mood might improve" (p. 94). Positive results continually verify

psychological effect lighting has on the human psyche while the subject is in the architecture of the physical environment.

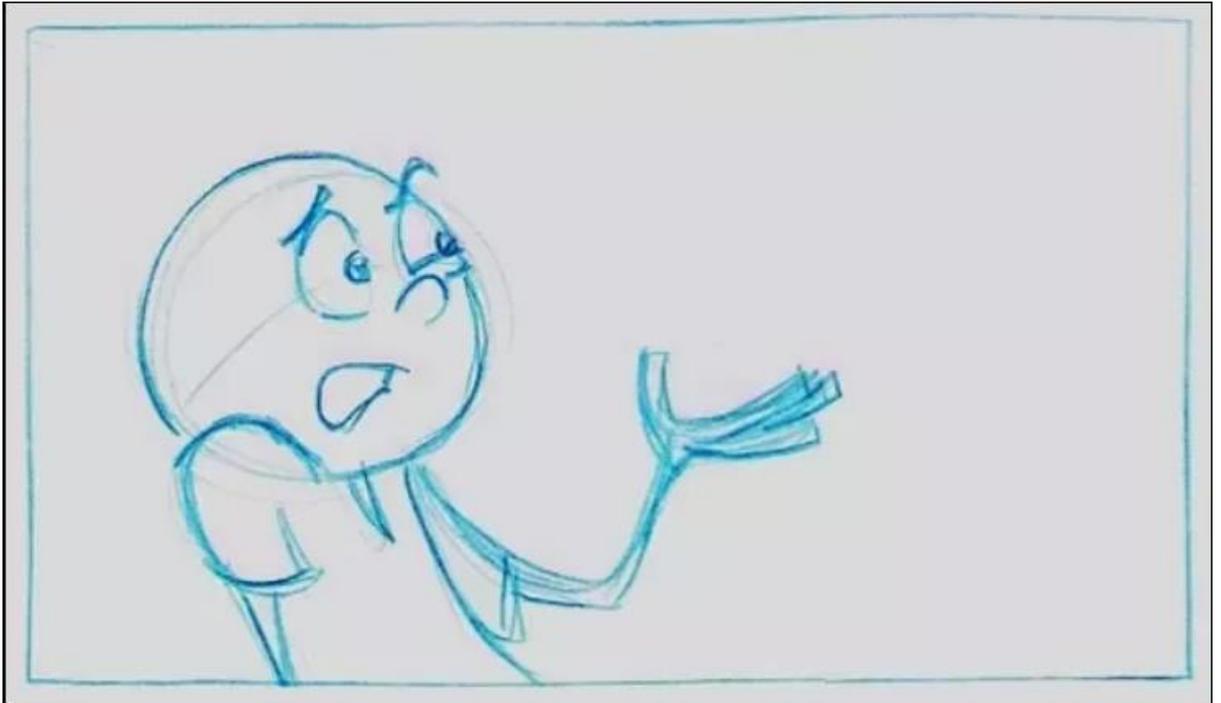
### **1.7 Visuals and Images Create Mood**

Picture a scene from a movie, then take an imaginary step back 'outside' of the camera. You can see a camera, some lights, a set, the actors, maybe a smoke machine. Everything you see there is having an impact on the shot in some way.

Take a step further back and you'll see many different specialists, each of whom was involved in making the shot what it was. Costume designers, make-up artists, set designers, concept artists, the director, cinematographer, and many more. If you change one little thing - the shot would be different, and a different emotion or meaning would be conveyed.

This is true down to the smallest detail - the brand of lens used on the camera, the sensor in the camera (or film stock if it is a film camera), the cultured gel of a light, the way an actor's make up is done. All of these things are precisely orchestrated to manipulate an audiences emotions. Framing of shots is done very precisely - for example the amount of headroom an actor has makes a difference.





All are very different from one another.

The overall 'tone' is defined by many smaller decisions; it's the way that all these little choices add up together across the film that creates impact.



**Picture: Eyes Wide Shut**

In Eyes Wide Shut - the color blue encroaches into the frame across the movie.

Not to mention factors like editing, music and sound design which also define the tone of a movie in conjunction with the visuals.

It all starts with the script really, this is where the bulk of the 'tone' of the movie is defined. Everyone else is working to bring the script to life, and all decisions are made to suit those characters and that story.

For example, if you choose epic helicopter shots for your down to earth realist family drama, it's probably gonna be weird! I'd recommend the documentary Visions of Light which is a fantastic look at the art of cinematography.

### **How Do Photographs Interact With Memory?**

There are many ways to answer this question, but we will focus on one example that parallels H.M.'s memory deficits. Microsoft researchers have been studying the role of photography in strengthening memories in individuals with damaged hippocampi. These individuals with hippocampus damage have autobiographical memory deficits, meaning they cannot recall the events of their lives and after a few days their memories of life events fade away. Microsoft developed a wearable camera, which they call the SenseCam. This camera passively takes photos throughout the day. In

this study, participant with hippocampal damage reviewed all the photos taken during their day. The level of recall in individuals with the SenseCam was then compared to memory recall of events without the SenseCam or to events that were written in a diary.

## **SENSECAM**

Sensecam is a camera that takes pictures automatically with an internal timer, and no viewfinder. A light signal on top of the camera indicates whenever a picture is taken. The camera has a fisheye lens that gives the pictures a wide-angle view. The resolution is low (VGA resolution is 640x480 pixels) and up to 30 000 pictures could be saved in the camera. The battery lasts for about two to three days if the camera is on all the time, and for a week if it is on more temporarily or pictures are taken less frequently. The camera also has a manual button for picture taking, and a “privacy” button to put the camera to sleep-mode for 5 minutes (for example during a toilet visit).

The Sensecam has a USB connection to upload pictures and to charge the battery. Once the pictures are uploaded to a PC, they can be replayed in a viewer application. The viewer can show the pictures at different speeds and present sensor data. The saved data includes several sensor values. Light level sensors detect a change in light condition. Temperature measures for example body heat in front of the camera. The accelerometer senses movement, and prevents the camera from taking extremely blurry pictures. An infrared sensor (IR) detects if someone is in front of the camera. In the initial design, sensors were considered crucial so that the camera would “know” when to take pictures. For example, if the light level suddenly would change, this could be a sign of entering another room. However, it turned out that the sensors were not successful in knowing which situations that were interesting to log, and the automatic time lapse was set to trigger picture taking to every 30 seconds.



The Sensecam (left) being worn (right). Sensecam has previously been investigated as a memory aid, and as a life-logging and memory tool. Then its “disengaging design” was considered suitable as a memory device that should not interfere with the everyday life or demand constant attention.

Sensecam has also been reflected upon for more creative uses, such as a playful device to augment traditional games such as hide and seek, without involving user studies. More recently Sensecam has been studied as a tool for storytelling and digital narratives. This has shed light on how Sensecam brought the mundane to life, and made people reflect upon their life. The study concluded that people regarded Sensecam to be a producer of raw material that they would not try to steer, or give their own voice to 222. However, Sensecam still evoked creative uses. Some people expressed that they would like to put it on dogs, or on a kite, and someone placed it in the car. This shows that Sensecam in fact can be a more engaging experience and allow people to create pictures in novel ways.

### **The SenseCam Experience**

Using an automatic camera such as Sensecam involves a different experience compared to traditional photography, both in the moment of taking pictures and concerning how the pictures are valued afterwards.

Is Sensecam Use Passive and Disengaging? Wearing Sensecam could potentially involve that the camera is forgotten during use, or that the photographer does not

“care” about which pictures are being taken automatically. However, this is not necessarily an entirely disengaging form of photography. Forgetting about the picture-taking Sensecam can sometimes be forgotten in use, for example if the photographer engages in a specific situation or if it is placed somewhere.



Participants with a SenseCam had greater levels of recall when compared to no SenseCam and when compared to only having a written diary. What is interesting about the findings is that it suggests that visual memory of events is stored outside the hippocampus, but only after studying photographs.

### **Cinematography is an art of visual communication**

The word "cinematography" was created from the Greek words “kinema” and “graphein” meaning "movement" and "to record", together meaning "recording motion."

The word used to refer to the art, process, or job of filming movies, but later its meaning was restricted to "motion picture photography."

Cinematography is the science or art of motion-picture photography by recording light or other electromagnetic radiation, either electronically by means of an image sensor, or chemically by means of a light-sensitive material such as film stock.

Cinematography is the art of visual storytelling. Anyone can set a camera on a tripod and hit record, but the artistry of cinematography comes in controlling what the viewer sees (or doesn't see) and how the image is presented. Film is a visual medium, and the best-shot films are ones where you can tell what's going on without hearing any of the dialogue.

With some basic knowledge of composition and scene construction, you can plan scenes using this visual language. Learn how different shots work together to form a clear, cohesive narrative and how to compose each shot in a way that is visually pleasing for the viewer. Understanding these simple rules will help make your films more thrilling and engaging.

There are some simple cinematography techniques that will have a great impact in making your videos look more professional.

The Rule of Thirds is a technique of dividing the frame up into a 3x3 grid, splitting your frame into nine boxes. Our natural impulse is to put our subject dead center, but a centered subject will look like they're caught in a spotlight, and by dropping them in the center of the frame, it gives them nowhere to go. Instead, by positioning your action in any of the four vertices where those nine boxes meet, you create a balance in your composition that feels more natural. For example, a side view of a person driving a car: on the top left vertex is the driver's head and shoulder, which follows their arm down to the lower right vertex to the steering wheel. This creates a nicely balanced frame of the driver on the top left and the wheel on the lower right.

Relatives of the rule of thirds are Head Room and Look Room. Just as the rule of thirds splits up your frame to add balance, head room and look room mean to give your subject a little extra room in whatever direction they are facing. If you are filming a public speaker, position them so there's a little less room at their back and a little more above their head. Subconsciously, we picture the edge of the frame as a wall, so by giving your subject more look room and head room, there is a space for

them to speak into. By not giving them enough look room, they'll look like they're talking to a wall!

Varying your shots will keep your audience interested by giving them something new to look at or an object presented in a new way.

Find unique ways to show everyday things. Observing a scene from the height of your camera operator can get dull; one way to avoid over-reliance on this point of view is to meet your subject on its own terms. If you are filming someone setting down a glass, rather than show the person from the torso up setting the small object on a table, make the glass your subject and position your camera on the table, then watch as a giant drink fills the frame. Your audience will know that because you took the time to focus on this object that it must be important and helps keep the visual element of the story from growing stale.

Add depth to a composition. Rather than imagine the scene taking place on a single plane, use the foreground, midground and background to create depth in a scene. For example, a factory worker has entered his boss's office to ask for a raise. The subject of the scene, the worker, is in the midground, while the large, looming figure of his boss occupies the foreground. Behind them, the factory scene hums along with dozens of other workers. You have tied the three key elements of the scene (the worker, the boss, the factory machines) together in one visually rich composition.

These are just the simple rules, but they will do a lot for improving the look of your compositions, and will help you to start thinking of the frame as a canvas where you create your images.

Your camera is a surrogate for your audience. The way it interacts with the scene dictates the way your audience feels they are interacting with the scene. How do you want your audience to feel watching a scene? Do you want them to feel disoriented? Detached? Should the story feel serene, off-balance, or static? Do you focus on sweeping grandeur or small details? Different shots convey different tones to a scene; answering these questions first will help decide what types of shots to use.

Moving from long to close shots is a trade-off between showing informative visuals or intimate emotions. You can't have more of one without giving up an equal amount of the other. Starting at the extreme long shot, actors are made very small compared to

their surroundings, but this is where you establish the scene and its elements. It is also where you can express yourself visually in the patterns in scenery and shadows that you are afforded at this range. At the opposite end is the extreme close-up that puts a character's emotions front and center. There is less contextual information at this range, but at this proximity to a subject, the emotional intensity can be powerful.

### **Role of a Cinematographer**

1. The cinematographer—also known as the Director of Photography, or “DP”—though one of the most obscure members of the production team, is responsible for all the visual elements of a film. He or she makes every creative choice related to composition, lighting, and camera motion—anything that audiences can see in a given shot.
2. The DP determines everything from colour to depth-of-field—how much of the shot is in focus versus how much is blurry—from zoom to the positioning of people and objects within any given frame. The visual look of your film is heavily dependent on cinematographer.
3. Directors of photography make many creative and interpretive decisions during the course of their work, from pre-production to postproduction, all of which affect the overall feel and look of the motion picture.
4. The cinematographer controls the film choice itself (from a range of available stocks with varying sensitivities to light and colour), the selection of lens focal lengths, aperture exposure and focus.
5. As a result, the cinematographer's job also includes personnel management and logistical organization. Given the in-depth knowledge. A cinematographer requires not only of his or her own craft but also that of other personnel, formal tuition in analogue or digital filmmaking can be advantageous.

### **How Light and Lighting Design Creates Mood on Human Beings?**

A film brings light to atmosphere. Light becomes mood. It reminds us to respond to physical events such as coldness, ice, fog, sun or dryness and to psychological parallels such as sorrow, depression, secrecy, terror, anguish, warmth, joy and happiness.

The vivid highlighting of the comedies makes audience chuckle, see and raise their storyline, and find characters to like, while the authentic illumination available in the core movies of Mumble settles the viewer for a storey that does not differ from its real life with plausible characters and plot incidents.

Film lighting is a formal feature used among many other human cognition manipulations for the creation of mood, vision, focus, illusion and feeling. It is a systemic attribute which induces media impacts as an influence on the content. It changes individuals, places and events' psychological perceptions which affect understanding and emotional reaction, and architectural lighting design leads to different human moods and conducts. This is a long awaited phenomenon for testing and analyzing and can help to develop an empirical framework in communication, film, architecture and psychology.

Emotional answers various emotional answers have been evaluated. In order to match the illumination types depicted in the film, three special emotional responses were chosen from the film theory.

## **Lighting Styles**

### **High Key**

Although high-key illumination is the first and only lighting type operated in early movies, and is a luminous style set in a flat wash of light. "Although 'first' arguments still seem questionable in terms of film history, the first film may be considered a comedy. Comedies were a very popular genre, whether they were probably the first film ever made or not. They were filmed in High Key, with plenty of outside light and are also physically active in nature. High key lighting makes all visual space visible to the audience and illuminated flat without any shadows, while providing security and positive characteristics.

The illumination available is often heavily used for actual TV shows or in every cinema truth that tries to convey the audience through a true narrative. The lighting available helps to convince the spectator that it is looking at a real storey. By developing new hardware and increasingly light sensitive phone sensors, a sense of realism through lighting and image management is convincingly simpler to achieve.

## **Light-heartedness**

The general emotional label for optimistic feelings is light-heartedness, which is supposed to be stimulated by high-key lighting. The Likert form ranged from 1 up to 7 where 1 equaled 'not at all' and 7 equaled 'very much.' Ten feelings were assessed by the participants with optimistic emotions. 10 were assessed. Three separate points in the film were requested to evaluate their sentiment. The ten emotional statements were combined to construct a summary lightheartedness scale of between 10 and 70 at each point for reliability of the scale. By adding the three times together, the average light heart level is achieved.

## **Suspense**

Suspense is the ultimate emotional response label for the hypothesis that low-key lighting stimulates emotions. The participants measured ten emotions synonymous with suspenseful emotions on a Likert-type scale of 1 to 7 where 1 was "no" and 7 was equivalent to "very much." Three separate points in the film were requested to evaluate their sentiment. The 10 emotional statements were combined to build a combined suspense at any point in time for the durability of the scale.

### **1. How composition Play a big role on understanding visuals by humans?**

Some principles of organization affecting the composition of a picture are:

- Shape and proportion
- Positioning/Orientation/Balance/Harmony among the elements
- The area within the field of view used for the picture ("cropping")
- The path or direction followed by the viewer's eye when they observe the image.
- Negative space
- Colour
- Contrast: the value, or degree of lightness and darkness, used within the picture.
- Geometry: for example, use of the golden mean
- Lines
- Rhythm

- Illumination or lighting
- Repetition (Sometimes building into pattern; rhythm also comes into play, as does geometry)
- Perspective
- Breaking the rules can create tension or unease, yet it can add interest to the picture if used carefully

## 2. How Camera Movements Makes A Significant Contribution In Understanding the Visuals?

### Camera movement

Camera movement, too, makes a significant contribution to storytelling. Here is a list of different types of camera movement that you might encounter in narratives:

**Dolly.** A dolly is any sort of moving platform that a camera is mounted on. Professional camera crews often lay down tracks which the camera can be moved along. Sometimes, the camera is mounted in the back of a car. Skateboards, office chairs and supermarket trolleys are the dollies of choice for low budget camera crews. Dollies are often used in very subtle ways. Throughout the course of a conversation, for example, you may notice that the camera very subtly moves closer to the characters. In M Night Shyamalan's *Unbreakable*, for example, there is a scene where two characters – portrayed by Bruce Willis and Robin Wright Penn – are sharing dinner at a restaurant. The camera gradually dollies in on the couple to suggest a rekindled sense of intimacy.

**Tracking Shot.** The camera follows a moving subject.

**Pan.** The camera turns horizontally when mounted on a tripod.

**Tilt.** The camera tilts up/down when mounted on a tripod.

**Crane.** The camera is mounted on a crane, helping filmmakers to achieve dynamic overhead shots.

**Handheld.** Handheld camera movement is often used to achieve a sense of realism. Films like *The Blair Witch Project*, *The Bourne Supremacy* and *Syriana*. Handheld camera movement achieves a sense of realism partly because audiences associate this sort of camera movement with documentary film.

**Steadicam.** A device that allows camera operators to achieve smooth, fluid camera movement.

**Zoom.** The lens of a camera is used to magnify an image.

## **1.8 Technology Innovations**

### **Movie camera**

The movie camera – a camera capable of capturing a series of photos in rapid succession on the filmstrip - was a late development of the 1800s, without which we do not have the medium of vision we all love to experience when chopping in the dark rooms on popcorn and responding to our mobile phones.

To want to see which film camera was first conceived is to try to decide what the first film was ever: futility.

An equivalent number would argue that it was the camera of William Friese Greene in 1889 against how many people who claim that Louis Le Prinz was the very first camera in 1888. It was previously conceived by someone bound to argue by the Chinese.

While I would contend that it was the brothers Lumière who brought the medium to the masses and inspire early pioneers such as George Méliès, who was perhaps the first to apply narratives to moving pictures.

### **Synchronous sound**

Despite several technological shows of "moving images" during the period, There was the golden age of silent films when sound was filmed simultaneously in the picture.

This period was known for the use of interts (titles during shootings) and live music to accompany films in the theatres. Even early projectors are now accredited for making live sound effects for movies (surely one of the most fun jobs in the last century).

But it all meant there were narrative limitations.

1. The process of synching sound had been achieved in 1914 with The Photo-Drama of Creation, in which slides and phonograph records were synched up. But it was Warner Brothers' "Vitaphone" that took the system to feature films.

2. Recording sound effects (including dialogue) and adding musical scores all started with the major motion picture *The Jazz Singer* (1927) which is regarded as the first film to have synchronized dialogue – and singing for that matter.
3. Screenwriting and acting slowly took on a whole new meaning, and new genres were formed, as dialogue became a key component of films marking the beginning of ‘the talkies’.

### **Colour**

There’s nothing wrong with a good black and white film, after all last year’s Oscar winner for best film – *The Artist* – proved that black and white films can still provoke an emotive experience for today’s audiences.

Regardless, colour changed film for the better. Not only because it gave the medium the ability to mimic life more realistically than ever before, but it also led to more narrative possibilities, with the prime example being *The Wizard of Oz* (1939) which famously depicted Dorothy’s Kansas in black and white, but then brought Oz to magical life in Technicolor.

### **Camera rigs: the dolly and steadicam**

The dolly and steadicam are inventions that signify benchmark camera techniques. You’ll be hard pressed to find a major motion picture that doesn’t make use of either or both of these inventions.

The dolly, to put it simply, is the placing of the camera on wheels that move along tracks. The subsequent smooth movement means that you can follow people walking and talking or get sweeping opening shots, especially when you combine it with a crane.

**Let’s take a closer look at the different types of shots and how they can set the tone for a scene:**

### **Extreme Long Shot**

Typically used to show subjects of relatively massive scale. Picture a mountain climber represented as a tiny speck against a vast expanse of snow, the extreme long shot conveying the relative insignificance of the character struggling against their environment. It is a study in scale and majesty.

## **Long Shot**

The contrary of the closing. Here the main point of interest is far from the camera or seems to be moving. This shot may also cover a landscape or a large interior. Abbreviated: LS.

The distance of the camera from its subject also reflects an emotional distance; the audience does not get as emotionally involved in what is going on as they would if they were closer. In a way, it makes viewers a casual bystander, somewhat aloof to what is happening. Take a couple arguing, where the details of their argument are lost to the viewer, and only the big blow-ups are able to catch our attention. Something is happening, but we cannot be sure what it is.

## **Medium Long Shot**

Falling between the long and close shots, this is more informative than emotional. It is too close for the epic scale of a long shot and too far to convey the intimacy of a close up, making it emotionally neutral.

## **Medium Shot**

The medium-shot typically depicts a person/person from the knees or views a scene at a "natural" view gap between the extremes of the long shot and the close up. Abbreviated: MS.

The medium shot is where we are starting to engage with the characters on a personal level. It is an approximation of how close someone would be when having a casual conversation.

## **Close Up**

More intimate than the medium shot, the expressions and emotions of an actor are more visible and affecting and is meant to engage the character in a direct and personal manner. You are starting to lose visual information about the character's surroundings, but the character's actions are more intimate and impacting

## **Extreme Close Up**

For amplifying emotional intensity, the extreme close-up puts the camera right in the actor's face, making even their smallest emotional cues huge -- and raises the

intensity of the problems behind them. This works for objects too: the ticking hands of a clock, a bullet shell hitting the floor, the blinking cursor of a computer terminal. What the extreme close up lacks in context, it makes up for by taking a small event and making it enormous.

### **Dutch angle**

Tilting the camera gives a subtle cue that something about the scene is unstable or just a little bit off-kilter. The effect shows the unbalanced mental or emotional state of the character, or to make the scene feel somehow unsettling.

### **Bird's Eye Shot**

Similar to the extreme long shot, this starts to get into the abstract realm of shapes and lines. It is an opportunity to be completely divorced from character, and let the shape of a grove of trees, the tangle of a freeway overpass, or the grid of city lights on a clear night dazzle the viewer.

Knowing what kinds of information these shots give your audience, think about how each of them fit together to compose your scene. Using wide shots can make your scene feel distant and impersonal or grand and epic in scale. Moving in very close to the action gets your audience invested in the characters and what's happening to them, but at the cost of disorienting them in visual space.

Cinematography is a work of artistic visualization of the story in cinema using camera, light and sound with movements. During the early production of the motion pictures, understanding of cinematography was very limited. Since there were limited technical resources, the film makers had to work within the available applications. The process of film making became more sophisticated with the growing knowledge in film making, by adopting novel ideas and technology with high end devices.

For example, the camera has seen a big change in the last hundred years with many applications and high picture quality. From a fixed camera shot to moving camera shots and crane shots, this enhanced the level of visual experience. Today, camera can capture the scenes in an existing manner and the audience can be really thrilled. This is increasing the scope of the story telling cinematically, and also opening new visual interpretations. Though we don't deny the other areas of film production such as editing, compositing and special effects in creating a cinema with good visual appeal, we can acknowledge the cinematography as one of the most critical contributors to its success.



As we all know, Cinematography is one of the key technical element of visualization in cinema and camera is the device that captures the shots using Cinematic elements such as focus, exposure, framing, depth of field and scale. Light is another key element which illuminates the scene and when artistically used can produce wonderful image quality.

Colour is also one of the most interesting elements in impacting the visual quality of the composition of the frame. This can actually grow beyond the mere visual effect to symbolic and

Metaphorical representation to convey the content, mood, emotions with cultural and social implications. Today, the computer technology is helping the cinematic language in presenting mesmerizing visual impact. A film by James Cameron's, "Avatar" is a good example for how C.G technology, such as motion capture can be used.

Cinematography is the "Art and technology of motion-picture photography. It involves the composition of a scene, lighting of the set and actors, choice of cameras, camera angle, and integration of special effects to achieve as desired by the director." Cinematography focuses on relations between the individual shots and groups of shots that make up a scene to produce the film's effect.

## **1.9 Watching Visuals Approach**

To make the task of approaching film from an analytical viewpoint more manageable, this handout addresses three basic components of film:

- Image
- Movement
- Sound

### **Image**

#### **Mise en scène and Framing**

Whether audiences realize it or not, there are many elements in plays and in movies that help guide a viewer's attention. Here's everything you need to know about mise en scène, one of Hollywood's most ubiquitous yet hard-to-define terms. Mise en scène, pronounced meez-ahn-sen, is a term used to describe the setting of a scene in a play or a film. It refers to everything placed on the stage or in front of the camera—including people. In other words, mise en scène is a catch-all for everything that contributes to the visual presentation and overall “look” of a production. When translated from French, it means “placing on stage.”

Mise en scène creates a sense of place for the audience whether they realize it or not. It does so by using:

#### **Actors**

Actors, their performances, and their performance styles are crucial parts of mise en scène. When an actor is on screen, they're typically the focal point, so their presence carries a lot of weight for the overall look of the story.

#### **Location**

The location of the scene sets the mood and supports the action. For example, in a scene in which a man proposes to his girlfriend, a domestic setting sets a completely different tone than a public one.

#### **Set design**

Set design refers to everything the audience sees within a particular scene. These details help build out the world of the location and add even more context to the story. If it's a dorm room, are there books and notebooks on the desk to indicate studying? Or are there pizza boxes and red cups to indicate a party?

## **Lighting**

Lighting is often the tool that conveys mood most clearly. High-key lighting, often used in musicals and romantic comedies, relies on hard light to minimize shadows. Low-key lighting, often used in horror movies, features a high-contrast lighting pattern to both brighten and darken parts of the frame.

## **Shot blocking and camera placement**

Blocking is working with performers to figure out their body positions, gestures, and movements on stage. In cinema, blocking also involves working out the placement and movements of the camera, and can impact the lighting, set design, and more. Both shot blocking and camera placement are effective tools that convey things like characters' status and relationships to the audience.

## **Composition**

Composition is the deliberate selection of frames and camera angles that make up a shot. Manipulating composition can accentuate the emotional themes of the story and communicate a sense (or lack) of meaning to the audience.

## **Depth of space**

The depth of space is the distance between people, props, and scenery, both in relation to one another and the camera. Much like shot blocking, it can tell the audience a lot about the tone of the scene and the status of the characters. Is the space shallow or deep? Does this accurately capture the truth of the narrative?

## **Film stock**

The film stock refers to the appearance of the movie on the screen. Is it in black and white, or colour? Is the film fine-grain, or grainy? Each tells a different story.

## **Costumes**

Costumes are the clothes actors wear and how they're tailored to fit them. For costumes to be effective, a costume designer must know which colours look right on a character, and then reconcile this with the colours suited to the actor playing the part and the colour palette of the production design.

## **Hair and makeup**

Hair and makeup are the physical touches that help actors transform into their characters, such as prosthetics, blood, or aging techniques. Like costumes, hair and makeup are fundamental ingredients in the story being told.

One of the best things about DVD technology is that it is even easier now than it was with video to get a clear still image, which is a good place to start to think about how film builds images into meaning. The two main things to pay attention to in a filmic image are *Mise en scène* and framing. *Mise en scène* is a French term meaning literally “put in the scene,” and it was originally adapted from the theater. It refers to everything that goes into a film before it is photographed, including set dressing or location, costumes, lighting, actors, blocking (actor locations and movement), and dialogue. If you like, it is what you would have seen if you were there with the crew when the scenes were being filmed. The camera adds to this framing (setting the bounds of the image, usually in a rectangle) and camera movement (reframing). The latter is discussed in the next section, but framing is as important for still photography as it is for film, since it works with *Mise en scène* to determine the overall composition of the image.

## **Movement**

So far, this isn't very different from analyzing photography. But film is not just a photography, but a series of photographs shown in succession (at a rate of 24 frames per second) to create the illusion of movement. This section offers suggestions for how to talk about a moving image.

There are two main types of movement in film: continuous and discontinuous. The former involves characters and/or objects moving within the frame, either as a result of their movement or of the camera's.

The latter is a result of editing, in which two discontinuous bits of film are spliced together (the most basic form is a cut, but this also describes dissolves, wipes, etc.). You will want to keep these separate in your mind, since they describe different aspects of the filmmaking process (filming and editing).

Here are some basic questions to ask when thinking about the role of movement in the visual language of film:

- What is the pacing like? Are things moving quickly or slowly?

- Are the characters in synch, or is one shuttling around the frame while others remain stationary?
- Or are they all stationary while the camera moves around them?
- If the camera does move, how does it move? Is it quick, slow, jerky, or smooth?
- How long are the shots (the time between two cuts)? You can even time these by the second, or
- See how many there are per minute. You might also want to think about the relative shot length of two different scenes.
- And, the crucial question, what effect does all this have?

#### Analysing a Film for Its Visual Qualities

### **Sound**

It may seem strange to discuss sound in a visual literacy handout, but there is no getting around the fact that most films you will see have a sound track to accompany the image track. This is usually made up of three main components:

- Dialogue
- Sound effects
- Music

One or more of these will be more important than the others for any given scene, but try thinking about all of them when you go to analyze a scene. Often, the absence of one of these will be as important as its inclusion. For example, a long scene of dialogue without background music may make a fiction film seem more “real.” On the other hand, a long dialogue scene in a crowded restaurant without background music or noise may be deliberately unrealistic, focusing the viewer’s attention on the intimacy of the conversation rather than the setting. For a demonstration of how important sound is for a film, even and especially when you don’t notice it while watching casually, try watching the scariest part of a horror film without the sound. Then, listen to the same scene without watching the images. How scary are both “versions,” how do they each compare to the combined image/sound experience, and what does that tell you about how the film communicates?

### **Colour – contrast and light**

Colour is a product of light. Colour in association with light helps to set up mood in a composition. Variation of light means variation of colour which means change in composition and visual experience. In a day from morning till evening light constantly changes. The intensity of light in the morning is not the same as the intensity in the afternoon and dawn. Our eyes, brain and the body are very sensitive to the changes in light. To understand the phenomenon of light and colour impact on visual experience in cinema we need to discuss about few shots of the film. There are some points to discuss about the aesthetical part of lighting.

In cinema, every frame is a work of art. Here two aspects we need to know is frame is a visual representation of the story and every frame will be having a visual composition. Light and colour are the two visual elements that elevate the composition. And they can distinguish the composition of a particular frame from the rest of the frames.

Mood in a composition is associated with emotions of the character/ characters and the situation in the story. For example, sad, happy, scary etc moods can be achieved through using specific colors and lights in a cinematic frame.

### **The aesthetics of lighting - general features**

In accordance to the theoretical definition of the term ‘aesthetics’, it is understood as the preservation of proportion, moderation, relevance, usefulness and harmony. The meaning of this term is sometimes described in short – aesthetics is the truth and good. The issue of aesthetic lighting should be analyzed in two different categories: an aesthetic effect (the object’s appearance as a consequence of lighting) and aesthetics of a device (lighting – fixture, lenses, placing). While assessing the aesthetics in automotive lighting, the attention should be paid to the aesthetics of hardware. The effect of an automotive lighting is difficult to predict, because it depends not only on the characteristic of a reflector but also on the course of the road and it is ambient. In the illumination of various objects, one has to put more attention to the effect of the illumination rather than to aesthetics of the object itself. When it comes to an illumination of the interiors, both categories of the aesthetics of lighting are equally important.

Bearing in mind the general definition of aesthetics and its importance in the sphere of the electric lighting, it should be understood as the combination of certain characteristics such as:

the ratio of luminance (gentle and uniform luminance distribution), the harmony of colours, luminance distribution and the arrangement of lighting fixtures, the moderation of the levels of lighting: the luminance, the number of luminaries and the number of lighting accents, the appropriateness (the relevance of the choice of different solutions and characteristics), The utility (serving a specific function).

### **Having right proportions in lighting**

Means having a ratio between the brightness of certain accents and the brightness of general lighting, having a ratio between the luminance of the luminaries and the ceiling, having a ratio between the luminance of the working surface and the brightness of the walls and the ceiling, having a ratio between the size of luminaries and the size of the interior, Having a ratio between the size of the shadows and illumination.

The harmony in lighting can be expressed by: the harmony in the arrangement and the distribution of colors used for lighting, the harmony in the luminance distribution (avoiding strong contrasts and unreadable "designs" of the spots of light and shadows, the use of regularity, repeatability, predictability), The harmony in the arrangement of luminaries (regularity, accuracy, rhythm of light, etc.).

### **The balance means avoiding**

- Too high lighting levels,
- Excessively high luminance of the certain parts of luminaries,
- Too many points of light source,
- Too rich variety of the saturation of the colored light.

### **Appropriateness means**

Selecting the right type of lighting (general and localized in the corners),

- selecting the direction of the light,
- using the proper class of lighting,
- using the right colours of light,
- using the lighting accents wherever they are needed and allowed,
- Conscious and controlled use of illumination,
- matching geometric shape of the luminaries with the shape of the interior,

- Conscious and rational use of the energy efficient light sources (avoiding unconditional submitting to trends and fashion).

### **Utility means**

Fulfilling the lighting functions as intended, the usability of hardware (i.e. the use of equipment wherever it is justified), Using luminaries suitable for the purpose (waterproof outdoor lighting, dust-proof and flameproof lighting in the mines).

Deadly sins in the area of lighting aesthetics: glare, disharmony, distortion of colours and shapes, lack of consistency, freedom of using coloured lighting, Shoddiness and carelessness (bare light sources suspended on a cable, incidental replacement of light sources and luminaries).

In conclusion, in every society there appears to be different preferences in the area of lighting aesthetics. The light which intensity can be moderated is more popular than the lighting that is exaggerated. This means that it should adjust to the surrounding. It appears to be better to receive a warm light than a high colour temperature light. Most people like the lighting which is not intensive, quiet, consistent and uniform. However, there are always exceptions, because the final assessment is individual.

### **1.10 Devdas - An aesthetic interpretation of Novel to Film by three directors**

#### **Story line of Devdas:**

Devdas was written by Sarat Chandra Chattopadhyay in 1901, when he was 25 years old. Adapted on a literary classic, Devdas is a cinematic masterpiece. This film brings pre-independence Bengal and Calcutta to life. It's no longer merely a short story in India. Neither an archetype nor a pattern can be found here. People frequently disparage it as a personality type.

Sarat Chandra was moved by the woman's plight - both at home and in the outer world - and sympathised. To him, people who had provoked the wrath or censure of their family or community were of special interest. Novels such as Parineeta (1914), Biraj Bou (1914), and Palli Samaj (1916) are relevant to the Indian cinema industry because of their filmogenic nature.

As the first film to depict the social repercussions of a man of high birth leaving his feudal, upper-class origins in rural Bengal for the colonial metropolis of Calcutta in the years leading up to World War II, Devdas has societal significance. It attempted to delve into the inner turmoil of this person, who is divided between his desire to return to his rural origins and his desire to flee to the city to escape the awful truth of a

broken heart. His disregard for the hamlet where he grew up may be seen as a careless disregard for the place, he once called home, a place he now regards with conflicting emotions. Before he dies, he returns to the countryside in a last-ditch effort to rekindle his old friendships and escape the suffocating anonymity of the metropolis. His view of the hamlet has changed since he moved to the big metropolis and encountered its cold, uncaring reality. Finally, he rejects the seductive illusions and fancies that the city previously held up to him for his own good. Devdas is lost to the city, but the village also rejects him despite his disgraceful and humiliating death. He leaves behind just two women - Parvati and Chandramukhi - who act as unseen, unwritten "guardians of conscience" amid the debris of his life. Devdas, the guy who doesn't know what he wants, is characterised by this uncertainty.

### **Selection of Location, Properties, Costumes and sets.**

It is a more realistic setting in Bimal Roy's "Devdas" (1955).

With Roy's help, Calcutta is brought to life in all its glory. The homes of any Zamindar in the hamlet were not gleaming as in the new Devdas.

While the Sanjay Leela Bhansali rendition has lavish sets and costumes for Devdas and Paro's homes and the brothel where Chandramukhi performs, this version's architecture is a much simpler.

In contrast to Sanjay Leela Bhansali's version, which incorporates overly ornate jewellery, gold embroidery, rich brocades, and luxurious textiles, the clothing in this adaptation are spare and authentic to rural Bengali life in the past.

Even Chandramukhi's kotha, or attire, isn't very ornate. In Bhansali's rendition, Madhuri Dixit is portrayed as a queen.

Although the lack of colour and opulence is true to the genre, I believe that this is what gives the film a more grounded feel. Roy manages to evoke your thinking that you're viewing Devdas in a hamlet rather than a castle while he is on screen as Bhansali depicted in his version.

Bhansali wanted the sets to be distinct from the ones seen in the 1936 and 1955 Hindi adaptations of the book. The story takes place in the early 1900s, Bhansali, Desai, and the rest of the production team spent a lot of time researching and talking about the architecture and culture of Calcutta under the British Raj.

Colors of yellow and green were utilised for Devdas' no-walls-in-between mansion to reflect an aristocratic family, and between 128 and 180 pillars, each 60 feet (18 m) high, were employed. On a budget of a little 1.5 million (US\$20,000), the 250-foot (76-meter) skyscraper was completed.

After spending 30 million (US\$400,000) on Paro's Haveli (before marriage), Desai noted that they employed a lot of attention to detail in the colour scheme, there were 1.22 million pieces of stained glass for Paro's bedroom manufactured constantly in 10 days. Desai used "claustrophobic" red as the predominant hue for the walls of Paro's mansion, which appears in the film after her marriage to Bhuvan.

A total of 120 million (US\$1.6 million) was spent on the brothel of Chandramukhi, making it the costliest among the others. The multi-dimensional set, which included a temple city, an artificial lake, and 60 intricately carved domes, included a 6-foot (1.8-meter) chandelier. P.C. Alexander, the Governor of Maharashtra, urged that the director of Film City keep this as a permanent tourist attraction.

The Bhansali's new version, with its bright colours and widescreen aspect ratios, amps up the dream "Intricate song and dance routines, flamboyant colours, and rich settings".

As a result of the hefty costume weights that weighed down both Rai and Dixit, Devdas became "loud and theatrical" in comparison to the rest of the cast "Bringing 1930s ideals and culture to a modern audience."

Devdas, by Sanjay Leela Bhansali, is a kaleidoscope of hues. Before he started filming, he undertook extensive study on Bengali culture, including traditional clothing and dress styles. The team went to a number of museums and discussed "a look" from the magical time and "a look that today's audience may connect to" when designing the outfits. 'Kaahe Chhed Mohe,' a Chandramukhi-inspired ghagra-choli by Abu Jani and Sandeep Khosla, weighs a whopping 30 kg. Wearing it, she was unable to carry out her duties as a classical dancer. It was finally replaced with a lighter suit that weighed 16 kg.

Kundan and garnet were chosen because they "fit the film's period," and they were embellished with stones.

### **Actors' performances**

The P.C. Barua's Hindi version of Devdas, starring KL Saigal, made him a cult hero.

In Roy's Devdas, the characters are brought to life. In his portrayal of Devdas, Dilip Kumar embodies the essence of the actual Devdas. Dilip Kumar, Suchitra Sen and Vyjayanthi Mala all provide excellent and hidden performances in this film.

Whether it's the complex plot or the well-acted and realistically articulated emotions shown by the characters, nothing can quite capture the depth of this film. In contrast to Shahrukh Khan's character, which uses a lot of flowery language, Dilip Kumar's conversations are straightforward and simpler to follow.

Madhuri Dixit's portrayal of Chandramukhi as a diva but she is just a courtesan. Vyjantimala did really outstanding in her portrayal. If the performers don't act properly and the tale loses authenticity, no amount of aesthetic features can elevate a film to greatness.

### **Cinematography, Sound, Music and Editing.**

#### **In 1936**

The jump cut/parallel cutting technique in Devdas by Pramathesh, a novel editing tactic. For example, when Devdas vomits blood on the road, the camera switches to Parvati's matrimonial house, where a dish of flower gifts falls from her hands. It was the first time in Indian cinema that this method was used. In Ghatak's admiration for Barua's use of the subjective camera, he lauded Barua. Devdas and Parvati's love for one other is shown via the film's economy of style, which is evident in the piercing noises of the train that carries him on his last sad tryst with Parvati.

#### **In 1955**

All of Bimal Roy's films, including this one, are a tribute to nature's beauty. A lot of natural light was utilised in Kamal Bose's cinematography. S.D. Burman's mesmerizing score wonderfully complements this masterfully created picture. Furthermore, "Devdas" (1955) has a stunning original musical composition. There is no doubt that Lataji, who was just starting out, deserves all of the credit. Editor Hrishikesh Mukherji's work is also outstanding.

## **In 2002**

Aside from being hailed as "Bollywood's finest music album ever," Bhansali's Devdas has nine original songs and one background score, and the usage of Indian instruments in cinema music is particularly welcome these days. For the film, Ismail Darbar and Sanjay Leela Bhansali had worked on the soundtrack for two and a half years.

Bhansali's Devdas was shot by Binod Pradhan, who was also the director of photography. Before filming started, Pradhan deemed the filmmaker "meticulous and thorough," and the director had done extensive pre-film study. Pradhan worked on the sets' lighting for two days, using three million watts of electricity from 42 generators and 2,500 lights with 700 lightmen.

### **Original Story line interpretation and its impact on audience:**

In the cinematic adaptation of Sarat Chandra's book works, the social and household milieu does not exist.

## **In 1936**

Pramathesh Barua's films have had a lasting impression on the Indian film industry. Devdas, however, is his best-known masterpiece.

It is not only a translation of one medium to another that PC Barua did, but rather he utilises the book as raw material and creates his own framework and transforms what was vocal into visual.

Sarat Chandra Chattopadhyaya's work, Devdas, served as the inspiration for the narrative of Devdas. PC Barua's Devdas was more unique than the Devdas in his book, according to the novel writer, who admired the film Devdas.

Pramathesh used a refreshing style throughout the movie. "The picture marked a total break from the then-predominant theatricality in performance, treatment, and language.

A genuine and unaffected style of acting was pioneered by actor Pramathesh Barua. He used substantial pauses between lines of conversation to communicate emotion, and he used subtle tremors of the voice to convey meaning. It was ordinary and everyday speech. Pramathesh had mastered the art of filmmaking techniques.

As Pramathesh's characters struggled with mental and emotional strain, he used cinematic language to convey their feelings without resorting to sentimental language. Barua elevates the picture to a noble tragedy by avoiding clichés and exaggeration. Ordinary people, not heroes or villains, make up the film's protagonists and antagonists since he directed and brought to life the Devdas persona, Pramathesh has become a cultural icon of his time.

It was Pramathesh's unique addition to the narrative since Sarat Chandra had written it in a different fashion. It would have been difficult to understand if film Devdas had finished in the same manner that the book did.

Barua resolved that if Parvati heard that her Devdas was dying outside her house, she would rush out to meet him and bring him back to her home. However, as she hurried to leave, the doors began to shut behind her. For married women, running out of the house to meet their ex-lover is a taboo, and this door is a symbol for that. In those days, it was unimaginable. "The whole scenario was created by Barua. It wasn't in the book. Barua was overjoyed when Sarat Babu informed Jamuna Barua that he had never imagined concluding the storey in the manner Barua did in the film Devdas.

Devdas under the direction of Barua's estimated box office collection is listed below;

<b>Barua's film Devdas - Box Office Collection</b>	
<b>Budget</b>	₹ 3.5 - 4 lacs
<b>Box office</b>	₹ 30 - 40 lacs

"It looks that I was destined to write Devdas because you were born to replicate it in cinema," Sarat Chandra Chatterjee, a regular visitor to the New Theatres studio in south Calcutta, informed Barua after viewing the film Devdas. Authors seldom pay appreciation to the director of a film based on their work, but this was an exception.

### **In 1955**

Film director Bimal Roy's adaptation of Saratchandra Chatterjee's book became one of India's greatest ever. One can't help but feel the agony in Bimal Roy's Devdas. Imagining a film with such a high degree of realism is impossible.

Bimal Roy was responsible for both the production and the direction of this timeless masterpiece. Everything about this picture was superb, from its director, photography, acting, soundtrack, and box office totals.

<b>1955: Bimal Roy's film Devdas - Box Office Collection</b>	
<b>Budget</b>	₹ 5 million
<b>Box office</b>	₹ 10 million

It is Bimal Roy's Devdas that exemplifies the simplicity, austerity, honesty, and passion with which he portrays human ideals and emotions. Excellent and more inventive and unique, he depicted a tragic finale in which two lovers who were unable to meet, died on the doorstep of one another. The lengthy voyage is beautifully, endlessly, and devastatingly dismal in Bimal Roy's "Devdas," which is rich in imagery and anguish and also a global classic.

### **In 2002**

"Layering" abstract stylization with a charged narrative structure, Bhansali's superb cinematic methods and technology" leave you gasping at their beautifully, painstakingly crafted beauty in practically every shot.Devdas, according to Bhansali, is a film that really embodies the art of filmmaking in its purest form. Everyone knows that I directed Devdas on my knees.We were constantly being put to the test by God. Because everything worked out in the end.

Chandramukhi and Paro never meet in the novel. For his "dramatically modifying" the social mobility of women from prior filmic readings" of the book, Devdas. There is a forced meeting between the Paro and Chandramukhi in the film's second half and they perform a dance routine together, which was inconceivable at the time. Bhansali has made Paro's mother a more important role in the film, giving her a more integral part of the storey. During another scene, Bhansali has Paro rush to Devdas' home in the middle of the night and propose they elope.The film was transformed by Bhansali.This is a storey of women's friendship, between a headstrong Paro and Chandramukhi.

Women in traditional Indian attire became a fashion trend this year after the popularity of Devdas,” From her jewellery to her pallu, all her style was given precise elements which made this Paro seem immaculate,” The Hindu noted of Rai and Dixit's saris in Devdas, citing the film's effect on young Indian women. College students in India loved Rai's jewellery.

Devdas's box office total "is a testament to both Bhansali's trust in the visual medium and the audience's belief in him.

<b>2002: Bhansali’s film Devdas - Box Office Collection</b>	
<b>Budget</b>	₹ 500 million
<b>Box office</b>	₹ 998.8 million

Despite the fact that Bhansali's film was commercially successful, its long-term influence on the plot is less assured than that of earlier adaptations.

As soon as Devdas was selected as the official entry for India to the Oscars, the film was lauded in high esteem.

#### **Summary: Story line of Devdas**

In order to make the audience feel like they were "Moving with the time," all three films were modified which in fact based on Sarat Chandra Chattopadhyay's same original work Devdas. The songs in Barua's film do a great job of expressing the novel's themes of spirituality. But Bimal Roy only included one spiritual song, and Bhansali had nothing to say about spirituality in his interpretation of the storey.

Filmmaking may be seen in a variety of ways other than as a work of art. In the film business, creating a film and generating money from the box office is the primary goal. According Trade Guide's Taran Adarsh, out the 120 films produced in 2002, 119 have lost money. Devdas 2002 was a tremendous bet for the film business. Devdas, the costliest Hindi film ever, with a budget of Rs 50 crore, hence its success was imperative.

Because the director's duties are so great, they are free to interpret and change the book as needed. The film business's goal is to increase earnings, which is understandable given that they are in the entertainment sector. As previously said, the

box office collection for Bimal Roy and Sanjay Leela Bhansali's film indicates that they have met their goal of adapting the original text into cinema while also satisfying the demands of the public.

According to the Hindi film Devdas, which was created between 1936 and 2002 by filmmakers Barua, Roy and Bhansali, "People had accepted all tiny alterations in screenplay, as well as deviances from the original literature."

### **1.11 Aesthetic requirements for individual areas of lighting**

The aesthetics of street lighting is mainly conditioned by a collection of lit lanterns, which should be identical - equal height, neatly arranged, equal spaces between them and from the curb. After fulfilling these conditions, they form a perfect picture – the points of light create a line, which is parallel to the course of the road. Aesthetics of the street lighting also include the selection of the forms of light (the pole and housing), which is adapted to the architecture of the nearest street environment.

In the historic areas, the lit lanterns should be stylish and should look nice when they are switched off, which is not inconsistent with the need of carrying out a specific photometric solid. Street lighting will be considered aesthetically pleasing, if the luminance distribution surface is uniform, without shadows cast by the trees and without dark spots resulting from improper distribution of luminance on the road (Figure 2). An installation which generates an excessive glare is considered as unaesthetic, because it acts on the emotions.



*Figure 2: Geometrically structured, regular line of the points of light (optical arrangement) and high uniformity of illumination of the road determine the aesthetics of street lighting to the greatest extent.*

### **The aesthetics of automotive lighting**

The aesthetics of automotive lighting is mainly the headlamp and signal lamps, noticed during the day and at night. In this area of illumination, the street lighting is so important anymore. It is significant, to form the headlamp in a way which is aligned with the line of the body of a car.



*Figure 3: Aesthetics of the automotive lighting should be judged solely on the basis of the look of the headlamps and signal lamps, both in daylight and after switching.*

In previous years, an arrangement in which the line of the body of a car was smoothly joined with the line of a lens reflector was considered as a determinant of automotive lighting aesthetics. Nowadays, the engineers are trying to create the new category in this area of aesthetics. Headlamps are more distinctive and unique (usually applies to DRL). Particular brands can be identified by the characteristic line of lights (oval, curved etc.).

The aesthetics of automotive lighting is also evaluated based on the image of the back signal light when switched on. Signal lamps are the objects of observation for the drivers. The luminance distribution of the signal lamp cannot be accidental, even from the point of view of the requirements for photometric. The luminaries must meet all the formal requirements. It is expected that the image of the shade will present the planned figure with regularly distributed points of light (scattering macrostructure, reflector, matrix of LED-s, attractive light-line system, uniformly bright and shiny surface of the output lens etc).

In the area of the aesthetics of illumination the general look of the equipment is less important than the effect of the whole illumination. Since, by definition, it should be invisible (the principle of hiding the reflectors and floodlights. So it is totally different

than in the automotive lighting. In the illumination, the effect of lighting that complies with the principles of illumination is considered as aesthetic.

What is more, one should bear in mind the level of the light expressed in the value of an average luminance of the object, as well as local accents (keeping proportions). It is said that the skilful use of lights and shadows can give the effect of positive emotions while looking at the illuminated objects. If it comes to too aligned illumination, where the object and all the details are equally clear and ‘flat’ at the same time, it is described as unaesthetic. (Figure 4)



*Figure 4: The illumination is considered as aesthetic in such projects, where both – light and shadow are used at equal level (on the left). The object which is fully illuminated frontally is considered as unesthetic (on the right).*

In frontal illumination, the objects lose their plasticity. Situations, in which the shadows coming from the details are too deep and cover a substantial part of the facade, are also not welcomed. In addition, too much usage of colored light, especially with the high saturation and multiplicity of shades are not good either. They are not creating the proper associations with the nature and the function of the object. Taking care of details and paying attention to all the technical details and conditions of the light sources used in the illumination is also of high importance. A single not functioning reflector may destroy the order and the consistency of the illuminated object and cause distortion.



*Figure 5: Appropriateness in lighting also means the suitable connection between both – aesthetic and technical characteristics used to illuminate the object or space.*

### **Lighting in public spaces**

Lighting in public spaces, as well as in interiors, is the largest area of the application of the artificial light (electric light). It seems that the effect of illumination and the form of lighting equipment are of equal importance. In large public places, it is necessary to have many points of light or, alternatively, a big chandelier. It appears that this feature of public places shows a whole range of implications directly related to aesthetics: the regularity of the distribution of the points of light, equal authentication, light distribution and colour of light. In the area of lighting effects, it seems that apart from ergonomics, aesthetic lighting implements some psychological effects: adequate saturation of light in the room, spaciousness, clarity, pleasure, relaxation etc. These effects are the result of the implementation of the appropriate levels and proportions of luminance in the interior.

Aesthetic lighting in the interiors of the public places is also a balance between the specular light and diffuse light the result of this is a balance between the need of visibility of certain details and the general lightening of the entire interior. We can also improve the aesthetics of lighting by baring human preferences in mind, such as selection the colour of light and adaptation the level of lighting to the rhythm of the day.

## **The aesthetics of interior lighting**

First of all, the decision about which colour of light will be the most suitable for a certain interior should be conscious, not accidental. Secondly, the colours of lighting in all the rooms in one interior/building should be consistently and skillfully combined to form a coherent whole. The main mistake in the area of lighting the interiors is the wrong choice of the colour temperature of light and inadvertent use of the light sources which have different shades of white in one room – it gives the effects of imbalance and negative perception of the space.

The best light to perceive in the interiors is warm white, which technically, can be specified as 3000K colour temperature. The use of light with higher colour temperature, and thus colder shade of white, is reasonable in the rooms such as the bathroom. In this way, it will look more like a sterile place. A cold shade of white is also suitable for harsh and minimalist designs. It appears to be difficult to describe all the dependencies, especially because of the fact, that the owner of the place or object is making the final decision.

Aesthetic lighting is designed in accordance with its intended purpose. The first step should be to decide how the general lighting should look like. It should evenly illuminate the entire room. What is more, the light concentrated on the ceiling (notably in larger areas) can form a sufficiently high uniformity. This form of lighting can be achieved by using ceiling recessed or suspended luminaires. It is important for the light sources to have wide beam light distribution. If it comes to complementary form of general lighting, one can use the corner lighting, which means lighting selected areas such as workplace, reading space or a place in front of the mirror.

The intensity of the distribution of lighting is this parameter which, undoubtedly, affects the aesthetic perception of the room. However, one cannot generalize and say that non-uniform lighting of spaces is unaesthetic. What is significant here is the idea about some kind of uniformity of the light spots. The lighting which causes irregular so-called light spots, caused by a poor selection of a beam angle, its placement and direction, is described as a dissonance.

To reduce the luminance levels and unpleasant or disturbing glare, the light sources should be adequately hidden, so that the surface which is emitting the light does not cause it. The luminance of the lenses should also be moderated. The luminance distribution should be uniform and adapted to its geometric shape. Considering the issue of aesthetics of lighting, the aspect of design and art should also be considered.

Lighting fixtures are the most subjective criterion of the aesthetic of the interior lighting. We can now describe the technical and decorative luminaires. The former ones, can be determined by their appearance in the relation to its function: waterproof mesh in the bathroom, vandal-resistant wall lights in the stairwells, the dust-proof luminaires in the factories etc.. In the case of the latter ones, which are the part of the design and sometimes serve the main element of the interior, it is not possible to determine the aesthetic guidelines. Currently, we have a huge variety of styles used in the interior design and each of them is characterized by the taste of the designer and investor. Therefore, there can be as many views and votes for the aesthetic luminaires as there are interior design projects.

However, there are some aspects that in some way define the aesthetics of the fittings:

- luminaires should be aesthetic in both situations - when they are not illuminated and also after switching,
- luminaires should match the style and the function of the interior in which they are used,
- luminaires should have the suitable length of the cables,
- The size of the luminaires should adequately correspond to the size of the room.



### **Lights, Camera, Emotion! An Examination on Film Lighting and Its Impact on Audiences' Emotional Response**

One way film theorists and filmmakers achieve creating this media effect is by employing lighting theory. From the early days of cinema, lighting has been a fundamental element in creating the final picture. Just as in real life, light is everything for the moving image.

Light is all the human eye sees. People do not see objects; they see light bouncing off objects at different colour temperatures. The human eye observes light through the iris and the brain interprets the world as 3 dimensional.

A camera, a model of the human eye able to record an image passing through the iris onto film, reproduces the image in only 2 dimensions. In order to produce images that appear 3 dimensional and help the audience interpret the intended story or plot-line, intense work on developing defined lighting theory and practice has been ongoing since film's creation. Genres such as comedy, drama, romance, science fiction, fantasy, and mystery, have been defined since the earliest forms of human storytelling.

As cinema and film lighting theory developed, different lighting techniques grew to become associated with different types of stories to provoke audience emotional response and assist in narrative interpretation. These lighting styles used to enhance film's power to impact audiences' emotional response and narrative interpretation have been practiced for the last century but have not been examined by empirical study of how the audience actually responds to various lighting styles.

This study investigates the impact three different lighting styles may have on audience perceptions. The methodology section details an experiment that isolates the variable of film lighting from other structural features. The study was conducted with 3 both quantitative and qualitative questionnaires to evaluate audience responses. Unlike many of the experiments from Communication and Psychology, this evaluative design is simple and only tests three basic lighting styles of High Key, Low Key, and Available Light in isolation.

## **Cinematic Techniques for eLearning**

### **Technique #1: Use Camera Angles**

One powerful way to communicate with your learners is through camera angles. A camera angle is the position of the camera when a shot is taken. Different angles can add and induce different meanings and level of engagement for the audience. Selecting the appropriate camera angle for each shot can add moods to the recorded picture and create powerful relationships with your audience.

Primary (non-boring) camera angles include:

- **Birds-Eye View** — From above the subject, best used for isolating the subject to a dramatic effect.
- **Oblique Angle** — shot taken at a tilt. Adds a level of disorientation and engages.
- **Worm's View** (aka Low Angle) — Shot from below the subject, looking up on a scene. Make the subject look larger than life, signifying power and tension in the scene
- **High Angle** — Shot from a height, making the subject seems smaller, signifying insignificance and weak relationship with the environment.



## Technique #2: Use the Right Shots

The distance between the camera and the subject define relationship (and importance) between the subject and the scene.

Focus on using the right shots in your courses to communicate meaning:

### 1) Add Context with a Long Shot or Extreme Long Shot

This type of shot shows a scene as seen from a distance. It is used to stress the environment in which the subject is.



The Long Shot

## 2) Take a Medium Shot to highlight interaction

A general purpose shot, it is taken above-the-waist height. It is more intimate than a long shot, and a great way of focusing on interaction between multiple subjects in the scene (and hence minimal focus on the background) e.g. a debate, a struggle, etc.

It is best used to allow the audience to pick on the body language of the subject (gestures, expressions, movements, etc.). It is often used in sync with a close-up shot.

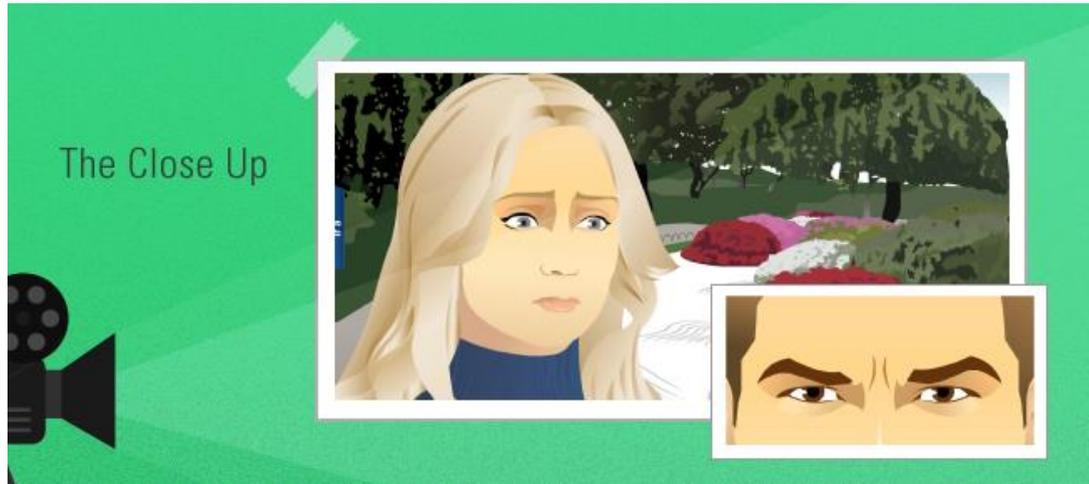


The Medium Shot

## 3) Use Close-Up for details and expressions

This type of shot focuses on the upper part of the object/subject, offering a targeted view of a single area/region or aspect of the image and hence adding emphasis to the scene. Examples include facial expressions of the subject and the details of part of an object. Including strong and vivid details will make your story come alive for the

learner. Detailed shots help learners connect to the story and give the story credibility.



### **Technique #3 : Flash-forward**

Flash-forward is a cinematographic and literary technique of altering time's logical sequence "past-present-future," beginning with the events in the future and then jumping in time to deal with present events. Therefore, the order of events which traditionally is 1-2-3 can become a 1-3-2 or 3-1-2 argument. In other words, it "introduces the end in the beginning" (Cole, 2003).

When using Flash-forward technique, we force the audience to evaluate the material corresponding to the future, in light of new information. This way we create curiosity in the learner and we encourage them to analyze and reflect on the chain of events that led to a problem, something that is certainly very educational.

### **Use Your Camera to Control Audience Perspective**

Controlling your audience's perspective can be challenging when working with a limited budget. When shooting a scripted piece or a documentary style project, you may not always have as much control as you'd like over things that affect the tone of your shots such as lighting, locations and production design. You may have little to no money for costumes and props, you may be limited to the location where the subjects of your documentary happen to be, or you might just barely have enough lighting gear to get a properly exposed shot. By controlling your camera's perspective, you can drive your audience's reaction to images involving techniques that can be attained on almost any budget. [vm\_ads:segment\_break:1]

## **The Subtle Traditions of Visual Language**

Just as painters often prefer a certain type of composition to convey a particular emotion, cinematographers have developed a complex visual language for storytelling over the years. This language is told through the use of colour, contrast, point of view, focus and motion. While at first it may seem that feature films have a uniform look, on close inspection you'll notice that modern cinema horror films look very different from romantic comedies (unless you're watching a film like "Warm Bodies" that crosses both genres.)

The styles that make up this visual storytelling system weren't formed in an arbitrary manner. They are the result of learning how people react to images. Many of the great cinematographers have studied the works of master painters and artists from traditions that date back centuries and have incorporated these techniques into how they shoot. This isn't to say that the language of visual storytelling hasn't evolved. If you watch scenes from a few thrillers from the 1940s and a few made in the last few years, you'll see that they share some similarities; however, many things have changed in the way the genre is now commonly shot.

Audiences have become in-tune with the common techniques used by cinematographers when shooting certain types of stories. If you can bring some of these techniques into your productions, you can more easily and effectively draw the audience into your story.

## **Finding Your Story**

The type of story you're going to tell affects how you're going to shoot it. To start, you need to figure out what type of story you're telling. The common style of shooting a martial arts action film is much different than that of a historical drama. Even if you're shooting a documentary, you need to think about what the story will be about. Both "Enron: The Smartest Guys in the Room" and "Mad Hot Ballroom" were shot very effectively but very differently.

Think of and watch stories that are similar to yours. Even if you have a story that doesn't fit into one genre, watch stories that have similar elements to yours. So if you have a sword and sandal and zombie film set in the Roman Empire, watch things like "Spartacus" and "Dawn of the Dead" then, find the parts of your story that make it unique. Highlight them with your use of camera.

Learning to manipulate and control the camera's perspective to enhance your storytelling will keep your audience engaged.

Strive for consistent execution of technique over originality. Westerns still find an audience, and they're not watching them to see something new. You'll find that as you learn and master the technical skills of controlling your shots, your own point of view and sense of story will cause you to occasionally take a small break from visual tradition. It's often these subtle differences that can have the most impact on one's own visual style.

### **Story, Camera, Shots! How to Use Cinematic Techniques to Add Life to Your eLearning**

The most important thing in cinematic is the shot. It is the smallest unit of any visual storytelling. For eLearning courses, you can think of every visual instance that your audience will experience at every click/tap (think slide) is a shot.

However, like a movie, unless these individual shots seamlessly flow from one to the other, the audience will lose focus. And the only way to create this flow is by first having a script for the entire "movie". For example, you can create a "day in the life" story; this is a commonly used narrative technique that can make your eLearning course flow naturally.

But, you must first know what you want the audience to experience from it.

Therefore, you must first create a clear storyboard for the content that you want to convey. Brainstorm ideas and storyline for the course content.

Think of the characters that you want to add:

- Their posture
- Their expressions
- Their attire
- Their gestures, and
- Their roles

### **The Elements of Camera Perspective**

What your camera sees, your audience sees. In order to use your camera's perspective to support your story, you must learn how to manipulate the different elements of

camera perspective. These elements are: frame rate, aspect ratio, field of view, focus, depth of field, point of view, angles, framing, movement and speed.

### **Frame Rate and Aspect Ratio**

Sadly, for many productions, the decisions on which aspect ratio or frame rate to use are not creative but based on the final distribution of the project or the technical limitations of the equipment being used.

### **Field of View**

Everything that falls within the frame of the image that a camera captures is its field of view. A camera's field of view is determined by two factors, the camera's distance from the subject and the focal length of the lens. Using a lens with a short focal length gives you a wide field of view allowing you to capture a lot of background with your subject. Lenses with wide fields of view also decrease the perception of camera shake making them a popular choice for hand-held action shots. A lens with a long focal length gives you a narrow field of view allowing for close-up shots to be achieved with the camera further away from the subject. Lenses with narrow fields of view are also used to reduce depth of field and make the subject stand out from the background.

There are different types of common shots in production that are named to describe their field of view in relation to the subject. These shots include: extra-wide, wide, medium, close-up and extra close-up. Some wide shots are referred to as establishing shots because they include the area around the subject(s) and give a sense of placement in an environment. Without establishing shots, the audience can feel like they don't know where the story is taking place. It's not uncommon to shift back and forth from a medium shot, where the subject is framed from roughly the waist to the top of the head, to a close up, where the subject is framed from roughly the upper chest to the top of the head, but the field of view in these different shots should stay the same.

Consistency of field of view in the different type of shots you take can be very important in maintaining the mood and tone of your story. If you frame your subjects with all the close-ups and all the medium shots with the same field of view, it helps to convey a sense of stability to the mood of a scene; then, if there's a dramatic change in the story, you can break from this pattern of shooting to help enhance the dramatic

shift. Conversely, if the tone of the story is even and the field of view in the same type of shots is constantly changing, it can draw your audience out of the story. This type of inconsistency of field of view is often pointed out as a sign of a low quality or “B grade” production.

### **Focus and Depth of Field**

Most often you’ll want the subject of your shot to be in focus, but you may want to have them out of focus or going in and out of focus to support their confusion, injury or some other type of trauma. Use of focus in shots to bring emphasis to certain areas of the frame can be controlled by changing the depth of field. A shot with a large depth of field has objects in the foreground, midground and background in focus. A shot with a shallow depth of field has only the mid-ground in focus; if your subject is the only thing in the mid-ground of this type of shot, they will really stand out. The human eye is naturally drawn to things that are in focus, so shots with characters in a shallow depth of field have become very popular in modern dramas and romantic comedies. A shallow depth of field can also be used to hide things in the background that wouldn’t look appealing in focus. In action films, the hero is almost always visually portrayed as being in command of his environment so only shots with medium and large depths of field are typically used for the hero.

### **Point of View**

Point of view is when the camera shoots a scene (or single shot) as though we are seeing it from the subject's perspective. That subject could be a person, animal or even a paper clip. Often the point of view of a camera can affect how people interpret the scene. Lead POV shots have existed since the silent movie era. These shots take you into the perspective or eyes of the main character. Since the film *The Blair Witch Project*, filmmakers have even used Lead POV shots as the sole camera point of view. Security Cameras provide the second most common use of point of view in feature films; however, the coolest and least-used is the point of view of a car hood or bumper. Used extensively in the 1970s, it has become a staple of car chase scenes since then.

### **Angles**

Angles can convey things about characters subconsciously. For instance, when the triumphant hero steps up to save the day if a low angle is used and it suggests that the

character is noble, brave and powerful. Low angles can also often give subjects an overpowering feeling making them either larger than life or menacing. High angles often make people seem small, weak or insignificant so if our hero was shot from above, we might think him afraid, panicked or incapable.

Eye-level angles or standard angles make for more neutral interpretations and often seem more personal. Most romantic comedies are shot from this angle. Low angles that are not level are known as Dutch angles. Dutch angles are commonly used in thrillers and horror films to portray danger as they tend to give the audience a feeling of unease.

### **Framing**

Something as seemingly simple as where the subject is in the frame and where they are looking can have great impact on your production. In TV news and commercials, the subject is often in the center of the frame and looking directly at the camera lens. In film, subjects are usually off center and rarely, if ever, look straight into the camera. This type of framing is based on the rule of thirds which divides the screen into nine parts with three horizontal planes and three vertical. In film, characters are shifted either to the right or left side of the screen which would be vertical planes one and three. When people are framed in the center, vertical plane two, it is used to break the fourth wall or make the audience feel uneasy depending on the context. Sometimes in film, you even see situations where the actors are almost out of frame or only their shadows are in frame to suggest hidden actions or their withdrawal from a scene or situation.

### **Movement**

How you move the camera needs to match your story as well. If you are shooting a film set in the French royal court in the 18th century, then lots of elaborate dolly and crane moves may work well. Likewise, if you're telling a gritty inner-city drama, then slightly shaky hand-held footage may be well received with your audience. If you swapped the two styles, the audience may not be as accepting of the stories being told in a visually, unfamiliar way.

There are many different terms for camera movement and they are often related to the different types of camera support being used.

Movement for tripods is pan (twist tripod head left or right) and tilt (angle the tripod head up or down). Since a person with a hand-held camera can mimic the tripod movements, the same terms are used for hand-held shots.

Dolly or slider movement is dolly in (moves closer to the subject), dolly out (moves away from the subject), truck (moves the camera left or right), and tracking shot (the camera moves with the movement of the subject while maintaining the same size field of view. It can be done hand-held as well.)

Movement for crane or jib is boom up or down (tilts the arm up or down.) Cranes and jibs are sometimes called booms.

Zoom lens movement is zoom in (make the focal length longer) or zoom out (makes the focal length shorter). While a zoom in or out has a similar effect as a dolly in or out, the depth of field of the shot changes with the zoom; additionally, most zoom lenses distort the image when zooming which also alters the look of the shot. A zoom in or dolly in on a subject's face can make their facial expression more noticeable.

### **Speed**

Effects like slow motion or time lapse affect the way events are perceived by the audience. Slow motion created by filming in high frame rates and playing back at a normal speed can be used to achieve a number of different responses and are currently seen most frequently in action films to emphasize a spectacular action from a hero such as a Spartan leaping dramatically into the air as he is about to strike down his enemy. Time lapse is created by taking stills or video footage over a long period of time and compressing them to a short period of time. This can make people feel as if time is flying by or can signal a dramatic transition. A common example would be seeing the phases of the moon rapidly pass to suggest a month of time has passed in the story.

### **Essential characteristics of film**

In its short history, the art of motion pictures has frequently undergone changes that seemed fundamental, such as those resulting from the introduction of sound. It exists today in styles that differ significantly from country to country and in forms as diverse as the documentary created by one person with a handheld camera and the multimillion-dollar epic involving hundreds of performers and technicians.

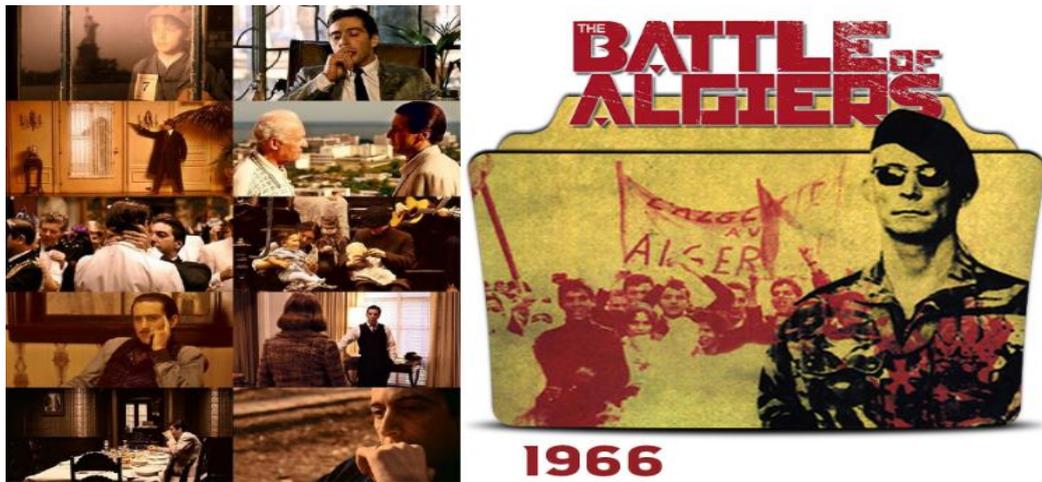
A number of factors immediately come to mind in connection with the film experience. For one thing, there is something mildly hypnotic about the illusion of movement that holds the attention and may even lower critical resistance. The accuracy of the film image is compelling because it is made by a nonhuman, scientific process. In addition, the motion picture gives what has been called a strong sense of being present; the film image always appears to be in the present tense. There is also the concrete nature of film; it appears to show actual people and things. No less important than any of the above are the conditions under which the motion picture ideally is seen, where everything helps to dominate the spectators. They are taken from their everyday environment, partially isolated from others, and comfortably seated in a dark auditorium. The darkness concentrates their attention and prevents comparison of the image on the screen with surrounding objects or people. For a while, spectators live in the world the motion picture unfolds before them.

Still, the escape into the world of the film is not complete. Only rarely does the audience react as if the events on the screen are real—for instance, by ducking before an onrushing locomotive in a special three-dimensional effect. Moreover, such effects are considered to be a relatively low form of the art of motion pictures. Much more often, viewers expect a film to be truer to certain unwritten conventions than to the real world. Although spectators may sometimes expect exact realism in details of dress or locale, just as often they expect the film to escape from the real world and make them exercise their imagination, a demand made by great works of art in all forms.

The sense of reality most films strive for results from a set of codes, or rules that are implicitly accepted by viewers and confirmed through habitual film going. The use of brownish lighting, filters, and props, for example, has come to signify the past in films about American life in the early 20th century (as in *The Godfather* [1972] and *Days of Heaven* [1978]). The brownish tinge that is associated with such films is a visual code intended to evoke a viewer's perceptions of an earlier era, when photographs were printed in sepia, or brown, tones. Storytelling codes are even more conspicuous in their manipulation of actual reality to achieve an effect of reality. Audiences are prepared to skip over huge expanses of time in order to reach the dramatic moments of a story.

For example, *La battaglia di Algeri* (1966; *The Battle of Algiers*), begins in a torture chamber where a captured Algerian rebel has just given away the location of his cohorts. In a matter of seconds that location is attacked, and the drive of the search-and-destroy mission pushes the audience to believe in the fantastic speed and precision of the operation.

Furthermore, the audience readily accepts shots from impossible points of view if other aspects of the film signal the shot as real. For example, the rebels in *The Battle of Algiers* are shown inside a walled-up hiding place, yet this unrealistic view seems authentic because the film's grainy photography plays on the spectator's unconscious association of poor black-and-white images with newsreels.



**Picture: *The Godfather* [1972] & *The Battle of Algiers* [1966]**

## **Movement**

As a feature of the motion picture, movement is so obvious that its central importance is sometimes forgotten. The motion picture has much in common with the graphic arts, but the added dimension of movement transforms it, allowing a narrative or a drama to unfold in time in a way no other graphic art can. Both in filmmaking and in film appreciation, movement must constantly be borne in mind: composition in the motion picture is kinetic rather than static. It is not a single colour but the cumulative effect that matters, not a single situation but a developing plot. The composition within any frame, or exposure, of a motion picture is as important as the relationship of that frame to those that precede and follow it.

## **Realism**

Another essential element of the motion-picture image is that it gives an impression of reality. Whether in a drama enacted expressly for the camera or in a documentary film of an event at which the camera just happened to be present, this feeling of realism deriving from motion-picture photography accounts for much of the force of motion pictures. Animated films, which lack this element of photographic realism, tend to be taken as fantasies.

The attempt of the motion picture to reproduce three-dimensional reality on a flat screen presents the same problems and opportunities that are encountered in still photography and in painting. The standard camera lens, in fact, is constructed to produce visual effects precisely similar to those achieved by painters using the principles of perspective that were developed during the Renaissance.

Cinematic realism is most fully heightened when the images are accompanied by synchronous sound, whereby a second sense, hearing, ratifies what the eyes see. Although reproduced sound can be manipulated with regard to distance, timbre, clarity, and duration, in combination with photographed moving images, it forcefully brings alive its subject as present in a way unavailable to the other parts of representation.

## **Expressive elements of motion pictures**

Many observers have seen in films a means of expression comparable to language. The French poet and filmmaker Jean Cocteau, for example, called the cinema “picture writing.” The language of film, however, is not the language of words, even though spoken dialogue has been an integral part of motion pictures since the late 1920s, and written captions were usually required to explain the action before that. It is primarily in the qualities of its images and sounds that the expressivity of the cinema must be sought. Certain basic traits of motion pictures may operate with the logic of natural language, but few theorists have held that cinematic expression follows rules like those of natural language. As Christian Metz, one of the foremost film theorists of the 20th century, argued, it is not linguistics so much as poetics that should serve as a model for those interested in understanding or explaining how a film works.

Various codes of expression have, nevertheless, been shown to operate naturally or to have been inculcated, and their effects can be calculated. Such codes and effects occur in all aspects of moviemaking and can most readily be categorized into those affecting cinematography, editing, sound, the script, acting, and design.

### **Objectives of Research**

- a. To understand the different lighting styles used in cinematography
- b. To understand how technology in lighting is perceived by the respondents particularly from three different eras.
- c. To understand how human emotions and behavior got influenced by the different aspects of lighting styles.
- d. To understand the evaluation of media arts and the factors influenced media as well as media's effects on society.
- e. To study the improvements of visual presentation associated with technological innovations.
- f. To explore the journey of film making process and the technology behind the screen in capturing the images called Cinematography.
- g. To analyses the changes in human feelings, emotions and moods evoked by images projected on the silver screen and also on different digital screens.
- h. To find out effect of new technology on audience watching films indifferent media.
- i. To give suggestions and recommendations to makers in changing trends of technology towards three dimensional images (3D).
- j. To Finding suggestions to innovate, improve future ways of visual communication.

### **Scope of Research Study**

The research study will be focused on Pune location as a district of Maharashtra state. The boundary has been defined where the only city area has been

considered only. The respondents will be those who will be ready to review the movies shown by the researcher.

### **Limitations of Research**

The researcher has limitation to conduct the research only in Pune this keeps the researcher away from generalizing the results for the country as a whole. The respondents are people having the idea of cinematography hence the general audience who has no idea about cinematography has not been considered hence the larger part of population will not be considered into the research study.

## **Chapter 2: Literature Review**

### **Gerben Bakker et al (2003)**

In the 1900s, the European film industry exported throughout the world, at times supplying half the US market. By 1920, however, European films had virtually disappeared from America, and had become marginal in Europe. Theory on sunk costs and market structure suggests that an escalation of sunk costs during a rapid US growth phase resulted in increased concentration; eight surviving companies dominated international film production and distribution forever after. European film companies, although overall profitable, could not take part, and after the war could not catch up. US, British and French time series data for 1890-1930 support the theory.

### **Arnav Jhala and R Michael Young et al (2005)**

As the complexity of narrative-based virtual environments grows the need for effective communication of information to the users of these systems increase. Effective camera control for narrative-oriented virtual worlds involves decision making at three different levels: choosing cinematic geometric composition, choosing the best camera parameters for conveying affective information, and choosing camera shots and transitions to maintain rhetorical coherence. We propose a camera planning system that mirrors the film production pipeline; we describe our formalization of film idioms used to communicate affective information. Our representation of idioms captures their hierarchical nature, represents the causal motivation for selection of shots, and provides a way for the system designer to specify the ranking of candidate shot sequences.

### **Thomas Baumgartner Michaela Esslen Lutz Jancke et al (2005)**

Most previous neurons physiological studies evoked emotions by presenting visual stimuli. Models of the emotion circuits in the brain have for the most part ignored emotions arising from musical stimuli. To our knowledge, this is the first emotion brain study which examined the influence of visual and musical stimuli on brain processing. Highly arousing pictures of the International Affective Picture System and classical musical excerpts were chosen to evoke the three basic emotions of happiness, sadness and fear. The emotional stimuli modalities were presented for 70

either alone or combined (congruent) in a counterbalanced and random order. Electroencephalogram (EEG) Alpha- Power-Density, which is inversely related to neural electrical activity, in 30 scalp electrodes from 24 right-handed healthy female subjects, was recorded. In addition, heart rate (HR), skin conductance responses (SCR), respiration, temperature and psychometrical ratings were collected. Results showed that the experienced quality of the presented emotions was most accurate in the combined conditions, intermediate in the picture conditions and lowest in the sound conditions. Furthermore, both the psychometrical ratings and the physiological involvement measurements (SCR, HR, and Respiration) were significantly increased in the combined and sound conditions compared to the picture conditions.

Finally, repeated measures ANOVA revealed the largest Alpha-Power-Density for the sound conditions, intermediate for the picture conditions, and lowest for the combined conditions, indicating the strongest activation in the combined conditions in a distributed emotion and arousal network comprising frontal, temporal, parietal and occipital neural structures. Summing up, these findings demonstrate that music can markedly enhance the emotional experience evoked by affective pictures.

### **Jehoshua Eliashberg et al (2005)**

The motion picture industry provides a fruitful research domain for scholars in marketing and other disciplines. The industry has a high economic importance and is appealing to researchers because it offers both rich data that cover the entire product lifecycle for a large number of new products and because it provides many unsolved 'puzzles'. Despite the fact that the amount of scholarly research in this area is rapidly growing, its impact on practice has not been as significant as in other industries (e.g., consumer packaged goods). In this article, we discuss critical practical issues for the motion picture industry, review existing knowledge on those issues, and outline promising research directions. Our review is organized around the three key stages in the value chain for theatrical motion pictures: production, distribution, and exhibition. We discuss various conjectures, framed as research challenges or specific research hypotheses, related to each stage in the value chain, followed by a set of specific research avenues for each of those stages. We focus on what we believe are critical managerial issues.

**Justin D. Weisz, Sara Kiesler, Hui Zhang et al (2007)**

Watching video online is becoming increasingly popular, and new video streaming technologies have the potential to transform video watching from a passive, isolating experience into an active, socially engaging experience. However, the viability of an active social experience is unclear: both chatting and watching video require attention, and may interfere with one another and detract from the experience. In this paper, we empirically examine the activity of chatting while watching video online. We examine how groups of friends and strangers interact, and find that chat has a positive influence on social relationships, and people chat despite being distracted. We discuss the benefits and opportunities provided by mixing chat and video, uncover some of the attention and social challenges inherent in this combination of media, and provide guidance for structuring the viewing experience.

**Michael D. Smith and Rahul Telang et al (2008)**

The creative industries have frequently expressed concern that they can't compete with freely available copies of their content. Competing with free is particularly concerning for movie studios, whose content may be more prone to single-use consumption than other industries such as music. This issue has gained renewed importance recently with the advent of new digital video recording technologies, new digital distribution channels, and Internet piracy. We examine this issue in the context of movie broadcasts on unencrypted over-the-air and cable television networks. We find that, in contrast to competing with free concerns, the dominant impact of movie broadcasts is to promote DVD sales. Movies broadcast on over-the-air networks experience an increase in DVD sales at Amazon.com by an average of 118% in the week after over-the-air broadcast.

We then use this empirical observation to estimate the impact of piracy on after-broadcast sales promotion. We find that movies that are available on Bit Torrent networks have statistically the same after-broadcast sales gain as movies that are not available on Bit Torrent at the time of broadcast. These results should inform both studios marketing their content and policy makers considering regulation of new content distribution technologies.

**Guo-Ming Chen et al (2008)**

The rapid development of new media has been the main force accelerating the trend of globalization in human society in recent decades. New media has brought human interaction and society to a highly interconnected and complex level, but at the same time challenges the very existence of intercultural communication in its traditional sense. It is under this circumstance that we see more and more scholars becoming involved in the investigation of the relationship between new media and intercultural communication. Emerging topical areas in this line of research mainly include three categories: (1) the impact of national/ethnic culture on the development of new media, (2) the impact of new media on cultural/social identity, and (3) the impact of new media (especially social media) on different aspects of intercultural communication (e.g., intercultural relationships, intercultural adaptation, and intercultural conflict). This paper discusses this trend of research on the relationship between new media and Intercultural communication.

**Naremore et al (2008)**

Low Key lighting, though previously used in the theater, transferred onto film with the genre of Film Noir. With its high contrast, dark shadows, and half lit sets and faces, it is said to have “originated in America, emerging out of the synthesis of hard boiled fiction and German expressionism” (Naremore, 2008, p. 9) in the 1920’s. Low Key features stylistic sculpting of dark shadow and bright light. It became popular between 1941 and 1958 - but it is still used today (Silver & Ward, 1992). This is coincidentally the same year panchromatic film stock allowed filmmakers more freedom with interior lighting set ups. Coined Film Noir, or Dark Film in 1946 by French critics, this movement became popularized by cineastes of the French new wave movement. The genre is associated with Low-Key lighting, wet down city streets, and Femme Fatales (French for deadly women). “Stylistically shadows prevail, characters walk out of darkness with slashes of shadow across their faces, even during the day, darkness is the predominant feeling.

**Peter Byrne et al (2009)**

Cinema is at once a powerful medium, art, entertainment, an industry and an instrument of social change; psychiatrists should neither ignore nor censor it. Representations of psychiatrists are mixed but psychiatric treatments are rarely

portrayed positively. In this article, five rules of movie psychiatry are proposed, supported by over 370 films. Commercial and artistic pressures reduce verisimilitude in fictional and factual films, although many are useful to advance understanding of phenomenology, shared history and social contexts in psychiatry. Acknowledging some negative representations, three areas are explored where cinema gets it mostly right: addictions, bereavement and personality disorder. Although there are excellent representations of psychosis on film, film-makers have more often portrayed it violently – ultimately demonizing people as psycho killers in more than 100 films cited. When people with mental illness are stigmatized through stereotypes, examining unwelcome depictions can uncover important truths. Psychiatrists' engagement with film will ensure professional and artistic gains.

#### **Shruti Vinayak Gokhale et al (2010)**

Statistical tests showed that there were a significantly higher number of product placements in Hollywood movies that were integrated into the storylines, verbally referred to by characters in the movies, appropriate to the movie scenes, and containing implied endorsements by the actors than product placements in Bollywood movies. However, in terms of duration of the time that brands were onscreen, product placements in Bollywood movies in 2006 and 2007 were significantly greater than in Hollywood movies. The results also showed many similarities between the movie industries in the two countries. Transportation was the most prominent product category followed by electronics in both Bollywood and Hollywood. Brands from both the industries were primarily presented in a positive context and were mainly associated with the primary movie characters. Almost all the products were featured in such a way that their brand names or logos were shown as well their other functional or aesthetic qualities.

#### **Chareen Snelson et al (2010)**

This article traces the historical roots of YouTube and online video to examine it within the context of educational motion picture history. The current state of online video is discussed first followed by a thematic analysis of the history of educational motion pictures from silent film to YouTube. The historical literature reveals recurring themes and issues, which include: (1) the intrinsic advantages of motion picture technologies, (2) differing opinions about the benefits of film and video, and

(3) access and equipment issues. Previous historical accounts fall short of addressing how these themes connect to online video. The potential future of online video is discussed in the conclusion.

#### **Marc Fetscherin et al (2010)**

The Indian film industry produces more movies and sells more tickets than any other movie industry, with revenues second only to those of the US film industry. We employ a two-by-two research design using a set of multiple regression analyses for two different countries of destination for Bollywood movies for two dependent variables. By examining data and testing our hypotheses on a sample of 330 films, we identify effects related to brand, product, distribution and consumers on opening week as well as total box office sales both individually and collectively. Our results show that the categories of variables affecting Bollywood opening week sales for both countries are identical in order and importance (distribution, product, brand, consumer variables). For total box office sales they are similar, with the exception of the first category. For the UK it was consumer-related while in the US it was distribution-related, followed then for both countries by product- and brand-related variables. Our results underscore previous findings of Hollywood movies, indicating that movie success factors are global rather than regional or national.

#### **Santa Clara et al (2011)**

In the two centuries of photography, there has been a wealth of invention and innovation aimed at capturing a realistic and pleasing full-colour two-dimensional representation of a scene. In this paper, we look back at the historical milestones of colour photography and bring into focus a fascinating parallelism between the evolution of chemical based colour imaging starting over a century ago, and the evolution of electronic photography which continues today. The second part of our paper is dedicated to a technical discussion of the new Foveon X3 multi-layer colour image sensor; what could be described as a new more advanced species of camera sensor technology. The X3 technology is compared to other competing sensor technologies; we compare spectral sensitivities using one of many possible figures of merit. Finally we show and describe how, like the human visual system, the Foveon X3 sensors has an inherent luminance-chrominance behavior which results in higher image quality using fewer image pixels.

**Ryan A. Piccirillo et al (2011)**

The development of motion picture complexity has been driven by a continuing technological evolution, ignited and manipulated by human initiative and inventiveness, which has afforded filmmakers the opportunity to practice a more complex craft to tell more complex stories. In concert with societal attitudes and proximity, this evolution has driven the development of distinct styles, movements, and methods that would have been impossible without increasingly advanced apparatus. However, while this technological progression has been linear, it has not necessarily coincided with a similar evolution of quality; the skill of a filmmaker should not be judged by the technological complexity of the production, but by the ability of the filmmaker to wield the technology of the time and of his or her choosing to effectively and clearly convey a narrative, evoke an emotion, or make an impression. Although the linear technological evolution of filmmaking has empowered filmmakers by offering a more diverse catalogue of tools and techniques, it is the filmmaker's ability to effectively and discerningly utilize this technology within a temporal and societal context that truly drives cinematic quality, of which there has been no clear linear progression.

**Woodward et al (2011)**

Though documentary films have always used available light, which is simply using whatever light is available to the filmmaker from the setting, one of the latest narrative genres of film to emerge around 2002, developed out of the advancing technology and the commercial accessibility of the digital video camera. Labeled Mumblecore of the 1990's, the name "is the flippant term for any number of recent micro-budget American independent films that favour low-key realism over technical fireworks" (Woodward, 2011, p. D7). Almost a combination of documentary, traditional narrative, and reality television, these movies use only available lighting, allegedly giving them a very real life, gritty quality and tone, even though they are fictional stories. With the proliferation of amateur styles of filmmaking, via the Internet and reality television, these movies have had success in the Independent filmmaking world. "Quickly gaining ground in the film-festival circuits and Netflix queues across the country, these films combine art house aspirations with reality television directness" (Maerez, 2007, p. 82). Available Light tends to make the story believable to audiences and is easy for a Filmmaker to use.

### **Celso M. de Melo and Jonathan Gratch et al (2012)**

For centuries artists have been exploring the formal elements of art (lines, space, mass, light, colour, sound, etc.) to express emotions. This paper takes this insight to explore new forms of expression for virtual humans which go beyond the usual bodily, facial and vocal expression channels. In particular, the paper focuses on how to use colour to influence the perception of emotions in virtual humans. First, a lighting model and filters are used to manipulate colour. Next, an evolutionary model, based on genetic algorithms, is developed to learn novel associations between emotions and colour. An experiment is then conducted where non-experts evolve mappings for joy and sadness, without being aware that genetic algorithms are used. In a second experiment, the mappings are analyzed with respect to its features and how general they are. Results indicate that the average fitness increases with each new generation, thus suggesting that people are succeeding in creating novel and useful mappings for the emotions. Moreover, the results show consistent differences between the evolved images of joy and the evolved images of sadness.

### **Werner Robitza et al (2012)**

3D vision is a promising new branch in the entertainment industry that encompasses applications for cinema, television and video games alike. The twenty- first century upraise of three-dimensional technology can only be explained by a mix of technological and social factors. Despite this, vendors are still struggling with reaching a critical mass for the establishment of new products. Some users experience discomfort when using stereoscopic devices due to the difference in perceived and reproduced reality. To address these problems, recording and display technologies need to be compared and evaluated for their applicability and usefulness. We give an overview on today's 3D technology, be nets and drawbacks, as well as an outlook into the possible future.

### **Brian Sutton et al (2013)**

Technology has changed society throughout history. Over the last few decades, cellular devices, iPads, iPods, computers, and most importantly the internet have completely overhauled the way people interact in society and the way educators work in schools. Technology implementation in schools is pivotal to student success post

high school due to the changing times and high demands for tech savvy personnel. It is imperative that teachers of the 21st century adjust to the technological revolution and not only prepare themselves but prepare their students for the technological real world. Technology has changed the way society looks, and the way the classroom looks and there will be no return to chalk boards and writing letters. The 21st century society demands a technologically advanced person and the 21st century classroom requires the same.

**Maia Garau, et al (2013)**

Radar is a new picture-sharing service designed for camera phones. In this paper we present key observations from ongoing qualitative research on the social practices we see emerging among our early users. We discuss how Radar's unique sharing model and overall design combine to shape a new form of visual conversation anchored in pictures. In particular, we address how Radar integrates into users' daily lives, and how the classes of pictures they choose to share give rise to new social interactions with existing friends.

**Samuel J. Leistedt et al (2013)**

The authors investigated the relationship between cinema and psychopathy to describe and analyze the portrayal of fictional psychopathic characters in popular films and over cinematic history. From 400 films (1915–2010), 126 fictional psychopathic characters (21 female and 105 male) were selected based on the realism and clinical accuracy of their profiles. Movies were then analyzed by senior forensic psychiatrists and cinema critics. Secondary (71%) and manipulative (48%) subtypes were the most common in the female group, while secondary (51%) and prototypical (34%) were the most common in the male group. Corresponding to the increased understanding of clinical psychopathy by professional mental health providers over time, the clinical description of and epidemiological data on fictional psychopaths in popular films have become more realistic. Realistic fictional psychopaths remain in the minority but are very important for didactic purposes in Academic facilities, as “teaching Movies.”

**Kristin au et al (2014)**

This thesis studies the differences in the perception of space and character movement between 2D and 3D animation. 2D animation is defined by elements constructed in a

2D environment while 3D animation by elements constructed in a 3D environment. Modern day animated films have been seen to mix the two forms for the sake of artistic effect, expedited production, and general convenience. Though some modern animations combine the two in the explorative quest to discover new animation forms, few films directly compare the forms to visualize the differences in their perceived qualities. Noticeably, the two animation methods differ in level of detail, dimension, realism, and artistic expression. In terms of lighting, the science of illumination dictates the 3D environment whereas in the 2D environment, lighting is an illusion created by colouring conventions. This study looks specifically at lighting as the controlling factor delineating the two forms.

**Daniel L. Bride, Sheila E. Crowell, Brian R. Baucom, Erin A. Kaufman, Caitlin G. O'Connor, Chloe R. Skidmore, Mona Yaptangco et al (2014)**

Research in psychology and affective neuroscience often relies on film as a standardized and reliable method for evoking emotion. However, clip validation is not undertaken regularly. This presents a challenge for research with adolescent and young adult samples that are exposed routinely to high-definition (HD) three-dimensional (3D) stimuli and may not respond to older, validated film clips. Studies with young people inform understanding of emotional development, dysregulated affect, and psychopathology, making it critical to assess whether technological advances improve the study of emotion. In the present study, we examine whether 3D film is more evocative than 2D using a tightly controlled within subjects design. Participants (n = 408) viewed clips during a concurrent psycho physiological assessment. Results indicate that both 2D and 3D technology are highly effective tools for emotion elicitation. However, 3D does not add incremental benefit over 2D, even when individual differences in anxiety, emotion dysregulation, and novelty seeking are considered.

**Emily Drago et al (2015)**

Recent technological advancements have had a drastic impact on the way individuals communicate. In this research, previous studies were analyzed, field observations were conducted, and an online survey was administered to determine the level of engagement individuals have with their cell phones, other technologies and with each other in face-to-face situations. Findings suggest that technology has a negative effect

on both the quality and quantity of face-to-face communication. Despite individuals' awareness of the decrease of face-to-face communication as a result of technology, more than 62% of individuals observed on Elon's campus continue to use mobile devices in the presence of others.

**C.S.H.N. Murthy and O.B. Meitei et al (2016)**

The screen adaptation of the novella *Devdas* by Saratchandra Chattopadhyay is an important landmark in early Indian cinema. A prominent film, screened in four Indian languages (Bengali, Hindi, Telugu and Tamil), it seems to offer a novel vision of romantic love and romanticism. This article critiques the fanciful interpretations of the film provided by some postmodern academics in the field of comparative literature. It endeavours to place the film both as text and cinematic work into a broader perspective based on the study of intersexuality of three renditions: Raghavaiah's *Devdas* (Telugu, 1953), Bimal Roy's *Devdas* (Hindi, 1955) and Bhansali's *Devdas* (Hindi, 2002). Grounded in cultural theory and Indian performative aesthetics coupled with moving image analysis, this study highlights the underlying, deep-rooted romanticism embedded in Indian philosophical and aesthetic traditions of devotion between *atma* (individual soul) and *paramatma* (absolute soul), personifying *Paro/Chandramukhi* as *atma* and *Devdas* as *paramatma*. This article, part of a larger project on de-Westernising media studies, makes a critical intervention in current South Asian Studies by aiming to provide a novel theoretical framework to which the philosophical and traditional tenets grounding the novella of *Devdas* can be anchored.

**Vikas shah et al (2016)**

Is Humanity Defined by Its Images? In this exclusive interview series, we speak to Rankin, avid Bailey CBE, Albert Watson and Peter Lik (four of the world's greatest photographers), HRH Prince Constantine of the Netherlands (Patron of the World Press Photo Foundation) and Professor Francis Hodgson (Co- Founder of the Pictet Prize). We discuss the powerful role of photography in culture, arts and communication; and examine the true nature of the photograph, the photographer and- in the process- ourselves.

**Matthias Rauterberg et al (2016)**

Worldwide the pros and cons of games and social behavior are discussed. In Western countries the discussion is focusing on violent game and media content; in Japan on

intensive game usage and the impact on the intellectual development of children. A lot is already discussed on the harmful and negative effects of entertainment technology on human behavior, therefore we decided to focus primarily on the positive effects. Based on an online document search we could find and select 393 online available publications according the following categories: meta review (N=34), meta-analysis (N=13), literature review (N=38), literature survey (N=36), empirical study (N=91), survey study (N=44), design study (N=91), any other document (N=46). In this paper a first preliminary overview over positive effects of entertainment technology on human behavior is presented and discussed. The drawn recommendations can support developers and designers in entertainment industry.

### **Kaichen Hu et al (2016)**

Film is an art, and it is also a product of the development of science and technology. Without science and technology, humans cannot have this magical art that can make our fantasies become reality. Throughout the history of film, every revolutionary technological advancement has dominated the development direction of film. However, since 1960s, with the emergence of digital technology, the whole film industry entered a new era. People all over the world can experience an unprecedented pleasant amazement and audio-visual experience when they are watching films. Meanwhile, digital technology has become a powerful tool, allowing many filmmakers who have the great passion to make their own movies easier than before. Now, everyone can make “films”.

### **Grotal et al (2016)**

Cinematographers use these lighting approaches to enhance a movie’s plot, characters, theme, style, and overall mood. “One could say that the technical ability and the expressive effectiveness of a director’s or of a cameraman’s work is revealed above all in the lighting” – Bettetini (as cited in Grotal, 2015, p. 2). Bettetini has made this claim that lighting has a monumental impact on cinematic expression but no empirical studies have been performed to support or deny such a declaration. Cinematic theory suggests that audience members experiencing a film lit in the noir style will interpret the highly shadowed, dark, and contrasting images with feelings of danger, suspense, depression, mystery, and evil. Characters in this mode should be interpreted as having evil intentions, being manipulative and untrustworthy.

Cinematographers lighting a comedy use bright lighting set ups, less contrast, and a slick, shiny look to trigger emotional responses of joy, enlightenment, honesty, and happiness. In this lighting style, characters are interpreted as good hearted, funny, loveable, and heroic. For Mumble core, the raw realistic lighting is intended to give the audience the feeling of reality and truth. Audience members are thought to connect with these characters as though they could be from an audience member's life.

### **Hoeckner et al (2017)**

Many of these studies found a positive relationship between the structural features and some type of media effect. The effects of pace, camera movement, screen size, and music provided strong evidence of impacting audience response.

Some examples of the Impact of structural features on media audiences include physiological responses such as startle responses (Lang, 2000) and difference pace rates impact skin conductance (Lang, 1999). Cognitive effects have also been reported. For example, Kipper (1986) reported that changes in camera movement can “provides viewers with more information about the physical form of objects and 3-dimensional layout of a television scene” Detenber (1996) claims his “study provides empirical evidence for what film theorists have suggested for some time- that screen size will have an impact on one's movie watching experience” (p. 78). Music in movies also has shown a positive relationship with audience interpretation as states “for the first time, film musical schemas influence how much viewers like or dislike a character and how confident viewers feel about how well they know a character's thoughts”. Though only a few structural features have been empirically studied thus far, results seem to indicate a general relationship between each feature and audience response.

## **2.1 Technological Innovation from Film to Digital Cinema (Old and New Technology Film Making: A Comparison)**

### **Old and New Technology Film Making: A Comparison**

#### **Old Technology**

##### **Influences on Shooting**

Actually, the influence on digital technology during the shooting process is intuitive. In the past, traditional motion picture camera used 8mm and 16mm film format.



**Picture: The Aero scope (1910) was the first hand-held movie camera**



**Picture: A classical super8 system handheld camera (1965)**

During shooting, the shooting time was often limited within 10 minutes. Besides, the traditional motion picture cameras were extremely heavy and could not even control by hand in some special shooting scene, which was quite inconvenient for the photographer. Therefore, the emergence of digital camera has changed the situation.

### **Black and white film vs. Color Film**

Despite film being “dead,” there’s still a surprising number of different and unique films to choose from in 2020, ranging from the classics from the major manufacturers to some more creative films from up and coming, smaller brands.

Here’s an overview of the current black and white films available right now.

## **Kodak**

It's hard not to start with mother Kodak in an article like this, with all of the history—the ups and downs—Kodak is still one of the true household names in all of photography. In regard to its black and white catalog, the company currently offers four different roll films, plus an additional type for sheet films.

### **Kodak Professional Tri-X 400 Black-and-White Negative Film**

**Tri-X 400** is still the most famous black-and-white film, and still one of the most popular films for veterans and novices. It gives the classic gritty black-and-white look that you're probably thinking of when you look at some of the most heralded photos from history. Even if it's not your film of choice, everyone should respect and be familiar with Tri-X 400.

**T-Max 100** and **T-Max 400** give what I would describe as a more contemporary look than Tri-X. Whereas Tri-X is grainy, T-Max is smooth; it uses a T-GRAIN (tabular) emulsion for a finer grain structure and cleaner appearance. The tighter grain also makes it especially well-suited for scanning.

T-Max P3200, which was recently resurrected, is the fastest film in Kodak's stable and is ideal for working in low-light situations. As a T-GRAIN film, it has a relatively fine grain structure, but it's still a 3200-speed film at heart and will provide the classic "salt and pepper look" of high-speed black-and-white films.

**Tri-X 320**, unfortunately only available in sheet film sizes, is another classic film that offers surprisingly very different results from its similarly named sibling. Tri-X 320, or TXP, has a lower-contrast profile than the 400-speed version, along with a smoother grain structure and unique highlight rendering, making it suitable for portraiture and studio applications.

## **Ilford**

The other heavyweight of the film world, Ilford also has a rich history of film manufacturing and was actually founded nine years before Kodak. The company is

known for its strong dedication to the craft and still produces a full line of films, darkroom papers, and chemistry to supply all aspects of a black-and-white workflow. Here are its current films:



**Picture: Ilford HP5 Plus Black-and-White Negative Film**

**Pan F Plus** is Ilford's slowest film, and one of the slowest available from any manufacturer. As such, it gives a distinctly smooth appearance with almost no perceivable grain and a broad tonal range.

FP4 Plus is a traditional medium-speed film offering fine grain, normal contrast, and a wide exposure latitude; it's a simple film giving predictable and consistent results.

HP5 Plus is a versatile film with a wide exposure latitude, making it suitable for use in varying lighting conditions and for push/pull development. It's one of classic films available and, like Tri-X, a film that everyone should use at least once in their life.

Delta 100 and Delta 400 are Ilford's tabular grain, or core-shell crystal technology films, that yield finer grain results than the equivalent FP4 and HP5 films. Their smooth grain structure is ideal for scanning and both films support over- and underexposure to achieve different contrast profiles.

**Delta 3200**, like the other Delta films, has core-shell crystal technology to provide a relatively fine grain structure that makes this high-speed a film a bit more versatile than traditional emulsion equivalents. It responds well to under- and overexposure, making it suitable for daylight or nighttime use.

SFX 200, XP2 Super, and Ortho Plus are the final three films in the lineup, and each is a specialized, unique option. **SFX 200** has extended red sensitivity, which can be used to achieve some infrared effects when paired with a dark red filter; **XP2 Super** is the sole remaining chromogenic B&W film, meaning it can be conveniently processed in C-41 chemistry; and **Ortho Plus** is, well, an orthochromatic film, which means it's only sensitivity to blue and green light and is typically used for copy and technical applications.

## Rollei

Even though the Rollei name is best known for classic TLR cameras, in recent years the name has been used in conjunction with a film-manufacturing effort to produce a wide variety of different black-and-white options. Ranging from traditional, high silver content emulsions to more contemporary fine grain options, here's a look at what Rollei has to offer:



**Picture: Rollei Infrared 400 Black-and-White Negative Film**

**Infrared 400** is one of Rollei's most popular films, likely because it is the sole remaining true infrared film available. There are other films with extended red sensitivity, but Infrared 400 has true IR sensitivity up to 820nm, and produces the distinct halation effects associated with IR photography.

Retro 80S and Retro 400S are a pair of distinct films with extended red sensitivity, which is used to slightly reduce haze or fog, as well as smooth blemishes when used

for portraiture. They have classic silver-rich emulsions with moderate grain and are coated on a clear polyester base to suit scanning needs.

RPX 25, RPX100, and RPX 400 films comprehensively cover slowly to fast speeds with a similar look and feel. The special thing about these films is their lack of quirkiness; they are simple, straightforward films with fine grain, a transparent film base, and flexible latitude to suit working in a variety of lighting conditions.

**Superpan 200** is another extended red sensitivity film, up to 750 nm, that is designed to reduce the effects of haze and fog when shooting outdoors. It's based on Agfa's AVI PAN aerial film, giving it more of a technical film appearance with high contrast and a moderate grain structure.

**Ortho 25** is an orthochromatic film (blue and green sensitive) that is typically used for technical and scientific applications, but can be used for pictorial situations for creative effect. As a slow film, it has a very fine grain structure with high sharpness and resolution. Also unique, this film can be used in conjunction with reversal processing methods to produce black-and-white transparencies.

Copex Rapid is one of the more specialized films available, and one that benefits from a specific developer (Spur Modular UR) for pictorial results. It is a microfilm, with extremely high sharpness and resolution, and naturally renders scenes with a high degree of contrast and density. When tamed during development, though, it can yield some extremely sharp results with a full range of tones.

## **Lomography**

Best known for its toy cameras, plastic lenses, reintroduction of classic Soviet cameras, and a very distinct overall aesthetic, Lomography also produces its fair share of films. While mainly concentrated in a bevy of unique color options, there are also four black-and-white options:



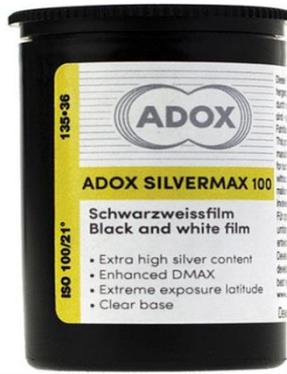
**Picture: Lomography Earl Gray 100 Black-and-White Negative Film**

**Earl Grey 100** and **Lady Grey 400** comprise a pair of traditional black-and-white films, both with similarly smooth grain structures and broad tonal ranges. They are simple and timeless films, perfect for experimenting with or for just having on hand to capture any kind of subject.

Potsdam Kino 100 and Berlin Kino 400 are two distinct films “inspired by the New German Cinema.” These black-and-white films are characterized by their silver-rich emulsions that lend a classic, almost historic look to them. The 100-speed film shows less grain with higher contrast, while the 400-speed film has moderate grain with a lower contrast profile; both are suitable for daylight shooting and have a wide tonal range.

### **Adox**

Definitely a specialist film manufacturer, Adox has some of the more curious and unique options available, including reversal films, high silver content films, and extended red sensitivity options:



### **Adox Silvermax 100 Black-and-White Film**

Silvermax 100 is, as its name would suggest, a silver-rich film that supports negative and reversal processing. It's a slower film but has a wide tonal range, up to a claimed 14 stops when developed with the dedicated Silvermax Developer.

SCALA 160, like the classic Agfa Scala, is a reversal film meant for making rich black-and-white transparencies. The increased silver content lends a deep tonal range with a high Dmax and, alternatively, it can be shot as a negative film with a slower exposure index for more conventional processing.

**HR-50** has an extended red sensitivity, or what Adox refers to as a super panchromatic spectral sensitivity, for reducing haze while shooting and achieving unique IR-like effects. It's also a slower technical film that yields high sharpness with very little grain.

CMS 20 II is another slow-speed film with high sharpness, fine resolution, and very little discernable grain. It's intended to be used with Adotech II or III developers for pictorial use and can be over-exposed to help tame the high-contrast profile.

### **Foma**

Another historic manufacturer keeping current with a useful array of black-and-white films, Foma is about to celebrate its 100th anniversary of producing traditional films. From Czechia, Foma's films offer a distinct Eastern European aesthetic with their silver-rich emulsions that produce a wide dynamic range. The current offerings include:



### **Fomapan 100 Classic Black-and-White Negative Film**

100 Classic, 200 Creative, and 400 Action, three panchromatic films offering different combinations of speed versus graininess. All are relatively fine grained, but have a traditional appearance with a wide exposure latitude. Repackaged versions are available as Retro 100, Retro 200, and Retro 400, which feature a limited edition 1930s-inspired box.

**Fomapan R100** is a reversal black-and-white film intended for making slides with a broad dynamic range and a realistic transference of colors to grayscale. A **dedicated processing kit** is available for developing the film and producing vivid transparencies.

**RETROPAN 320 soft** is a unique panchromatic negative film with notably low and manageable contrast, making it easier for traditional printing in a darkroom. It also has a distinctively high grain structure, which makes it more appealing for large format photographers and larger film formats in general; especially in 8 x 10" for contact-printing applications.

### **Additional Films**

*AgfaPhoto* APX 100 and APX 400 are reformulated versions of the classic and beloved APX films, which are distinguished by a traditional appearance, but with finer grain. These films have wide tonal ranges and are well suited for underexposure/push development processes.

*Arista* EDU Ultra 100, EDU Ultra 200, and EDU Ultra 400 are traditional films that, as their names would suggest, are perfect for students and other educational purposes. They are flexible, versatile films that respond well to push processing and offer high consistency and a fine grain profile.

Bergger Pancro 400 is a newer film that was uniquely originally introduced in sheet film sizes only, and then ported over to the more common roll film sizes. It has a “dual emulsion” design that gives fine grain results and high resolution, and offers a truly distinct tonal response with medium contrast.

*CatLABS* X Film 80 and X Film 320 are silver-rich films that produce a very traditional look with a broad tonal range, medium contrast, and moderate grain. They are also designed to be flexible in terms of speed, for adjusting contrast response using different exposure-and-development combinations.

*Cinestill* **BwXX Double-X** is, like its color films, a cut-and-re-spooled movie film for still photography use. Making use of the unique traits of cine film, this classic film has subtle tonality, low contrast, and high sharpness, making it suitable for difficult lighting conditions and for controlling extreme highlights.

*Japan Camera Hunter* StreetPan 400 is a high-speed panchromatic film that also features a dual emulsion design to reap the benefits of a fine-grained film and a classic silver-rich design. It has a classic feel with extended red sensitivity and is coated on a transparent base to suit scanning applications.

*Shanghai Film* GP3 100 is another traditional medium-speed film with fine grain, deep blacks, and panchromatic spectral sensitivity. It's suitable for scanning and optical printing.

### **Fuji film**

- Fujifilm photographic films
- Motion picture film stock.
- Fujichrome color reversal (slide) films.

- Velvia: one of the most saturated and fine-grained slide films, valued by nature and landscape photographers.
- Provia: a slide film giving more natural colors than Velvia
- Astia [ja]: a fine-grained, low-contrast slide film often used for studio or portrait applications
- Sensia: a low-contrast consumer slide film; the current emulsion is considered to be identical or near-identical to Astia in the professional line.<sup>[30][31]</sup>
- Fortia: slide film, featuring extremely vivid color rendering suitable for flower photography and other high-saturation applications (for Japanese market).
- **Fuji color negative (print) films**
  - Fujicolor Pro 160S, 160C, 400H, and 800Z (formerly NPS, NPC, NPH, and NPZ): professional films with different levels of contrast
  - Reala: the first film to use the fourth cyan-sensitive layer, currently sold under Superia Reala name
  - Superia: intended for snapshots
  - Press: Cut from the same emulsion stock as Superia, but cold stored and sold as a professional film.
- Fuji Neopan Professional black & white negative film. Neopan 400 and 1600 were designed to use the same developing times, and can be developed in the same tank/machine and developer combination simultaneously. ACROS and SS do not share this feature.
  - Neopan SS: ISO 100 film, most common and least expensive Neopan film
  - Neopan ACROS: ISO 100 film, finer grain than SS but usually more expensive
  - Neopan Presto: ISO 400 speed film
  - Neopan Super Presto: ISO 1600 for low-light shooting or fast action

## **Cameras and lenses**

- Fujifilm X-series cameras
- The Fujifilm FinePix series of digital cameras including:
  - Fujifilm X-mount compatible Mirrorless interchangeable-lens cameras like the X-Pro1, X-A1 etc.
  - Nikon F-mount compatible digital SLRs like the FinePix S5 Pro
  - Compact cameras like the FinePix F-series and FinePix Z-Series, Fujifilm X100 and X100S
  - Waterproof and shockproof FinePix XP-Series digital cameras
  - The Fujifilm GFX 50S, medium format digital, announced in 2016. This uses the Fuji G-mount lenses, released in 2017
- The Clear Shot series of 35mm compact cameras
- Instax series of instant camera
- Fotorama series of instant camera
- Various rangefinder cameras, and older Fujica film cameras
- Professional film cameras such as the GA645, GW670, GW690, GF670, GF670W and Fuji GX680 6x8cm medium format cameras
- Fujinon camera lenses and binoculars: including the most widely used television lenses in the world

### **ORWO Film**

**ORWO** (for *ORiginal WOlfen*) is a brand for photographic products and magnetic recording tape.

It was established in East Germany as a brand for photographic film and magnetic tape, mainly produced at the former *ORWO Filmfabrik Wolfen* (now Chemical Park Bitterfeld-Wolfen).

In 1909 the *Filmfabrik Wolfen* was founded as part of the Aktien-Gesellschaft für Anilin-Fabrikation (Agfa) and belonged to I.G. Farben since 1925. The Agfa Wolfen

plant developed one of the first modern colour films, with incorporated colour couplers, Agfacolor, in 1936, one year after Kodachrome.

In the last issue of Reel Deals, Mike Tricket presented an overview of mainly American and British colour processes. Other colour film stocks that collectors often come across are Agfa and Orwo. The German Agfa Company has a long history in photographic products. It initially produced photo-graphic papers, and from 1903 on it started to produce cinematographic b/w film stock. From the early 1930s, Agfa did research into colour films.

In 1936, it introduced Agfacolour Neu reversal film, a year after Kodachrome, but the Agfa product could be processed in a single colour developer. This reversal film was available as 8mm and 16mm for home use, and as 35mm (slide) film. Agfa color motion picture film was released by the Agfa Company in 1939. It was the first negative-positive process using just one strip of multilayer photographic film. In the following years this German colour film stock became a prestige project of the Nazi regime, who wanted to rival the American Technicolor process. Several short films and advertisements were shot in Agfa color, and 13 full-length feature films were completed by 1945.

The most well-known are the Ufa productions *Münchhausen* (1943), *Große Freiheit no. 7* (1944; *Great freedom no. 7*), both with Hans Albers, and the infamous *Kolberg*(1945). Typical for Agfa color films were the wide range of natural colours and the pastel tones with subdued reds. This is in contrast to the bright colours of Technicolor. After the war, the Agfa factory in Wolfen, was in Soviet occupied East Germany (later GDR). This enabled the Soviet Union and other Eastern Bloc countries to soon produce colour films using Agfa color film stock, often credited as Sovcolor or Polcolor (in Poland). Because the Allies declared all German patents open and free-to-use, companies like Gevaert in Belgium and Ferrania in Italy adopted the Agfacolor system (Geva color & Ferrania color). In Japan, Fuji and Konishiroku (now Konica) also produced colour films based on the Agfa patents (Fuji color & Sakura color).

Another derivative of Agfa color was Foton color in Poland. In the United States, Ansco also manufactured colour film based on Agfacolor during the war and afterwards under its own name (Asco color & Ansco chrome). As an American subsidiary of Agfa, this company had knowledge of the Agfa color process and its

patents. In West Germany, a new Agfa factory was built in Leverkusen, which opened in 1951. In 1964, after license negotiations, the East German Agfa factory agreed to change its name to Orwo (“Original Wolfen”), whilst the West German company retained the name Agfa. From then on, Orwo color was produced in East Germany.

Also in 1964, the West German Agfa merged with the Belgian Gevaert company. This all happened during the rise of Eastman color in the 1950s, with more and more studios in America and Europe producing colour films. One of the main problems of Agfacolor and its derivatives was that these films could not be developed by the same process as Eastman color films. So in 1968, Agfa-Gevaert discontinued production of the traditional Agfa color film and changed its chemistry to an Eastman compatible process. Most other companies, except Orwo, also changed their films to the Eastman process.

In 1995 Agfa-Gevaert stopped manufacturing colour negative film and was then only manufacturing printing film, production of which ceased in 2005. After German reunification Orwo color ceased production in 1995. The factory, however, continues as one of the last producers of b/w film stock under the name FilmoTec. Ferrania ceased production of film stock in 2009, and closed down in 2012, but re-emerged last year, announcing the production of new colour negative and slide films in 2014.

Film collectors and AGFA One of the main advantages of Agfa motion picture film stock is that its colours are very stable, probably comparable to Kodak’s LPP film stock. If fading is observed, then it is usually a loss of colour saturation, the film appearing paler overall. In older films, especially in Orwo film stock, there might be a slight shift of the colours to blue/purple, but all other colours are usually still present. And it is definitely not a shift to red/pink, as in Eastmancolor films. This of course makes film prints on Agfa stock very desirable for the collector. Interestingly, with the change from the original Agfa chemistry to an Eastman compatible process, some of the Agfa derivatives seem to have lost their colour stability. For example, early Ferraniacolor films have very good colours, whereas later prints can fade quite badly towards the brown spectrum (then often labelled 3M, as Ferrania was purchased by the 3M Company in 1964).

Agfa films can be identified by the following writing between the sprocket holes: AGFA, AG, AGFA-GEVAERT, 1S, 2S. Orwo stock is always marked ORWO, usually followed by a letter S for safety film, and maybe a few numbers. Reversal film is typically black in the sprocket area, with yellow writing. As with other German

film stocks, early Agfa film is often labelled SICHERHEITSFILM, German for safety film. Unfortunately, unlike Eastman Kodak, Agfa did not have an edge code indicating the year of production of the film stock. As such, dating of Agfa or Orwo films is not possible, apart from the fact that stock produced before 1964 cannot bear the name Gevaert, and the name Orwo only appeared in that year, too. The soundtrack area in Agfa films is often dark blue in modern prints. Orwo always has a brown soundtrack. This is in contrast to Eastmancolor films that commonly have a black (silver) soundtrack, which remains black, even when the image has faded to pink.



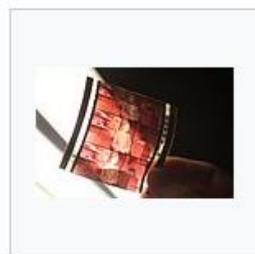
ORWO NP 20 (before 1980s)



ORWO NP22 (before 1990)



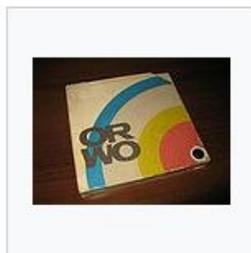
ORWOchrom UT21 - 135 film for colour slides (before 1990)



Perforated ORWO projection film (70 mm) used in USSR (before 1990)



1980s ORWO CHROM Reversal film slide taken in UK (before 1990)



Magnetic tape packaging (before 1990)



ORWO Chrome Audio cassette tape (before 1990)



ORWO PAN 400 cartridge (before 1994)

### Eastman Color, Technicolor and ORWO Color

Technicolor introduced color motion pictures in the 1930s. It started out with a camera that ran three strips of black and white film through the same camera. They were exposed through red, green, and blue filters. Each strip of black and white film was printed onto a matrix film where, after processing, the thickness of the gel matrix was proportional to the exposure. The matrix film was imbued (soaked) in either cyan, magenta, or yellow dye. This film loaded with dye was brought in contact with the print film so that the dye could transfer. The process had to be repeated for each

color. Keeping the registration was critical. This was a long and complicated process, but it worked.

By the early 1950s they had scrapped the three-strip cameras and used Eastman color negative film to shoot the movie scenes. The imbibition process for printing remained.

As the Eastman negative, intermediate, and print films improved, it was much easier to shoot on negative film and print in a high-speed optical printer onto print film. Technicolor became a service lab that processed Eastman and other products and provided printing service.

In the beginning, “Technicolor” was a unique and proprietary process. Eventually, “Technicolor” was the name of the lab where many movies were processed and printed.

Eastman has always referred to the film stock in the motion picture business. They provided processing for 16 mm movie products, but not for the Hollywood 35mm productions.

## **2.2 New technology**

### **Digitalization of Shooting Equipment**

First, based on its digital technology and physical principles, a digital camera is highly precise computerized equipment providing digital display modes for the convenience of the shooting process. Second, it provides important data reference for the post-production of film and enables the post editing very quickly. Third, the storage medium of digital camera will no longer be limited to a single format like film, because digital cameras use digital memory cards or a plug-in hard disk to replace the film (Thursby, 2009).



*Figure 6: the classic Sony HD-900F*

Source: <http://www.panavision.com/products/uk/hd900f>

Fourth, professional digital camera manufacturers such as Arriflex, Sony and RED have all developed small and handheld new models that are nearly as good as large traditional cameras. Also, these cameras allow filmmakers to make steady moves even when the film crew is shooting under some extreme conditions (Dongli, 2013).

### **Digital Format Shooting**

Another huge impact brought by the digital video camera to the film industry is that people are able to obtain the feedback of video and audio immediately. Directors and cameramen can get the actual details and effects shot just now (including image and sound) right away via the external monitors and other equipment of the digital video camera, which contributes to the decision and controlling of whether it is needed to add shooting, reshoot or confirm the direction of the shoots in future, and greatly improves the mastering of the entire shooting site by directors and other creators. While in the past, with the traditional film shooting, directors and other creators usually can only see how the post-productions were on the second day samples meeting (James, 2005).

After adopting shooting in the digital format, editing and shooting can theoretically proceed almost simultaneously. This shortens the interval between shooting and editing in traditional film generating, and makes post-production faster and more economical.

Digital shooting, up to now, has always been considered the weakest link in film industry digitization. Even in Hollywood, the amount of feature films shot utilizing digital technologies only accounted for one fifth of the total amount. Many famous directors, such as Christopher Nolan and Martin Scorsese, have said they will not abandon film, the most classic film shooting media (James, 2005).

However, in low-end independent films, digital shooting has become the mainstream, greatly lowered the barriers of shooting films.

### **2.3 The Available Technology in Digital Film Making**

1. Autonomous Drones.
2. Smartphone Filmmaking Gear
3. Drone Goggles
4. Dual Camera VR.
5. Ultra HD 4K
6. 3D technology
7. IMAX With Lasers.
8. Digital Storage Devices
9. Modern lights and LED lamps
10. High speed lenses
11. Virtual studios
12. Digital Editing
13. Digital Special effects
14. Digital Synthesis
15. Digital re-mastering
16. Digital Intermediate
17. Digital projection
18. Digital cinema distribution
19. Photographic Film vs. Digital
20. Large format digital cinematography

One industry that has been expansively affected by technological changes is film. Both mechanical and digital innovations have influenced everything from equipment

to distribution, changing how films are made and the manner in which we consume them.

With the medium being just around 120 years old, we take a look at the biggest tech innovations that, through time, changed film for the better.

The Indian film industry has evolved, both mechanically and digitally. Earlier, there were movie cameras that captured a sequence of photographs onto a filmstrip in quick succession. Gradually, the industry adopted new ways and methods to project better quality films with the use of synchronous sound, coloured screens, lightweight or portable equipment, camera rigs, DSLRs and HD video cameras, and computer-generated imagery (CGI), to name a few.

Today, there are many internet users who are changing the way films were consumed and distributed. Due to access to the internet through smart phones, tablets and laptops, people are now playing videos while on the go. The cinema industry is shifting to align more with the consumers, as there are new ways of accessing videos in the form of streaming and downloading. Everything is digitalizing.

### **1. Autonomous drones**

The cinema industry now uses autonomous drones that have built-in knowledge and algorithms related to filmmaking techniques. They take different angles and shots while shooting a movie. They are also GPS-enabled, and can be operated through smart phones, an app, or even by a remote control system. The filmmaker, on the other hand, can make or alter shots as per his/her requirement. The drones cruise at high speed and at high altitudes, depending on the model. They are good innovation for cinema as drones are lightweight, and have better maneuverability than big equipment.



## 2. Smartphone gear

Indian cinema has adopted different and new ways in the filmmaking process such as Smartphone filmmaking gear. Big and bulky equipment to shoot films is no longer needed, when it can be done easily with smart phones. Smartphones have become the future of the filmmaking process, and many filmmakers are adapting to it. Many short films and documentaries are being made on smartphones as they find it more comfortable and easy to use. There will be a day in the future that any new equipment to shoot a film will be a Smartphone with filmmaking technologies.



### **3. Drone goggles**

Drone goggles are the most futuristic technological innovation in the cinema industry. They are good to view live feeds, and one can use them for a while without stressing their eyes. Some drone goggles also output audio from tiny speakers, giving a new experience in the filmmaking process. There is an audio jack too that one can use to plug in their headphones for better sound quality.



### **4. Dual camera VR**

The filmmaking business has always had only one centric above all- do whatever makes more seats booked. It is only due to this that we see more technology immersed in the process, to improve the quality of storytelling, with every passing day. We, as consumers of movies, have always defined that quality with how much the experience of a film resembles reality. So, when leveraging some technology shortens the gap between seeing and experiencing, it then has monumental impacts on the future of film-making.

The technologies that have impacted the making of cinema more than any technology out there are clearly Augmented Reality (AR) and Virtual Reality (VR). They are making huge changes in the ways of storytelling and film-making. Let's take a look at how AR and VR are knocking dominoes to the future of cinema.



### 3.5 Impacts of Virtual Reality

- **Sight to Experience**

Virtual reality can be considered as somewhat similar to the leap from 2-D to 3-D, with the essence of reality magnified infinitesimally. While people were experiencing just object moving in/out of the screen with 3-D, VR lets them act as flies on the wall. They can explore a particular scene from different angles.

- **Increased Flexibility**

Another gigantic impact will be the flexibility VR will bring in the movie-making process. It will give the directors the flexibility to shoot a scene from all the angles that they please rather than choosing one of them. It will also be flexible for the viewers to watch a movie on VR multiple times through different paths from multiple angles to look at different characters and plot-points. Apart from some fixed defaults in the timeline of a film, the viewers can also have choices for different timelines.

- **New Standards**

The very support of VR experience is the experience of a real environment. Hence, as these new technologies slowly get institutionalized in the cinema making processes, we will also see new thresholds for standards in VR films. Apart from a frame speed requirement of 60 fps in VR compared to 24 fps in films, standards like immersive 3-D VR, high-resolution imagery with seamless editing will be perceived as prerequisites rather than options.

This is different from the typical video cameras, and shoots or captures film in all directions, giving a 360-degree view to viewers. Companies like Google are working on professional grade cameras, while others are developing cameras for consumers. A virtual reality headset is required to create a 360-degree view, and some equipment manufacturers have already started selling products specially designed for recording 360-degree videos.



## **5. Ultra HD 4K**

Technologies like 4k+ 3D or ultra-high definition 3D are now being used to shoot action sequences. The camera uses two or more lens to capture details that display better content on screens. It captures live action and playback, and features editing plug-ins and VR audio recording. The technology is expensive, but is helping shape the film industry, both in India, and globally. It appears as 3D, which it is actually not, and provides clear and improved picture quality. It is expected that at the pace cinema is adopting new technologies, 4K content is likely to be available everywhere, and at an affordable price.

### **4K movies**

4K Ultra High Definition Digital Cinema was also called “p”, namely, latitudinally 4000 pixels and longitudinally 2160 pixels, with the total pixel exceeding 800 million. This equals to 2k of another projector and four times that of HDTV resolution. Resolutions of 2k digital cinema and HDTV are roughly the same, but resolution of

HDTV is 1920 x1080. If theatre is displaying 4k movies, no matter what position in the theatre, the audience can clearly watch every detail of the scene. However, as recently as 2013, only 10% of theatres were able to project 4k and UHD contents (Jugang, 2015).

Globally, Europe and other developed countries are accelerating the upgrade implementation in 4k digital cinemas. Among them, the three major US cinemas - Regal, AMC and Cinemark are installing 4k cinema projection system in their cinemas. Regal and AMC use Sony SXR technology. Earlier in 2009, the 2 companies respectively signed agreements with Sony on 6500 sets and 4500 sets 4k projection system installation. On the other hand, Cinemark, which adopted DLP technology, has been planning to install more than 4,000 sets of 4k projection systems in the United States and Latin America. In addition, many European cinemas, middle and small American cinemas, and even Asian countries such as Korea, Japan and China started to upgrade 4k digital cinemas in succession. Theaters in Europe, the UK, Switzerland and the Netherlands and other European countries have also signed an agreement with Sony to install 4k (Jugang, 2015).

A brief analysis and summary of the advantage and the main problems existing in the development of 4K digital cinema are followed as below. Advantages of developing 4K digital cinema are:

- Wide screen, high-quality definition, and excellent audio and visual effects are eternal targets of movie audiences. 4K digital cinema is equipped with a super high-quality definition and visual effects, which can greatly improve audience's viewing experiences as well as competitiveness and influence for movies in traditional and new media (Archer, 2014).

The popularization and application of 4K digital cinema will effectively break the monopoly of IMAX in the giant screen film industry and significantly reduce the costs of super-large screen projection system. IMAX essentially belongs to 70mm film projection technology, which has been very backward among technologies in the digital era. At the same time, the launch of digital IMAX projection system is an improved 2K projection system, not a 4K projection system in its true sense. Many key innovations are reflected and injected into 4K digital cinemas (Archer, 2014).

### **Practical problems existing in the development of 4K digital cinema:**

Obviously, 4K sources are insufficient at present. Annual output of 4K films in the world is about a dozen in recent years, among which most are produced by Columbia Pictures.

### **Compared with 2K sources, 4K sources are obviously at a disadvantage**

That the limited spaces of most theaters is a reason for screen width shortage, which making it is difficult to give full play and reflect technological advantages and visual effects of 4K film (Archer, 2014).

Film technology developed regarding black and white to colourful screen, silent to sound, 2D to 3D, panoramic screen to IMAX and so on, which reveals human being's continuous efforts for the purpose of ultimate pursuit towards vivid experiences of the reality, especially the emerging virtual reality technology (referred to VR). By using computer technology and digital space, which are highly similar to reality, VR allows users to timely feel things in the virtual space without any limitations. VR was applied to movie creation so as to let the audience completely immerse in it without relying on lights and space of the cinema. Film-makers all around the world draw attention to VR since it was born (Yanming, 2016).

After a few years of development, it gradually advanced out from obscure conception to real products and experiences which are tangible and feasible. This is a kind of completely immersive, interactive viewing experience.

In 2012, VR movie made its debut at the Sundance Film Festival in the United States. Since then, VR movies came to light and gradually become more familiar to the public. At Sundance Film Festival, for example, the number of new VR productions has multiplied in recent years: four in 2014, nine in 2015, while 33 this year. According to rough statistics, there are more than a dozen Hollywood directors who started to throw themselves into VR filmmaking. So, what's the audio-visual experience of watching VR movie? Let us take the VR version of 'Star Wars' that distributed by Lucasfilm as an example. The audience wears a head-mounted display and every scene they watch exists in the outer space of the movie. They can turn around their heads by virtue of a gyroscope to choose perspectives freely. Viewers are able to observe this novelty from different angles when a "vehicle" passes by (Yanming, 2016). Published on the Sundance Film Festival in 2015, the VR movie Fury is similar to 'Godzilla' (2014) and both of them belong to the disaster movie

genre. Director constantly changing shooting method during production, so it changes the perspective to see people's reactions to chaos as if they are living in the city that is being invaded by the monster. Therefore, a “virtual reality” viewing experience is enjoyed by the audience.

Possibly, the curiosity and expectations we poured into VR movies are just like the feelings people had when watching The Lumiere Brothers 100 years ago.

## **6. IMAX—With Lasers!!**



Coming in late 2013: better and brighter IMAX movies, thanks to... LASERS!

In addition to making raves and popping popcorn more awesome, lasers are also able to produce deeper black colours, which mean better colour and image quality all around—solidifying the commonly-held belief that IMAX is the future of movies.

### **3D technology**

Laser projection systems promise to fix the washed-out, eye-straining quality of 3D movies that everyone hates, and since lasers don't burn out the way bulbs do, struggling movie theaters will be able to save a lot of money.

If your idea of a 3D film is a pair of cheap cardboard glasses with green and red cellophane for lenses it's time to think again. IMAX® 3D is state-of-the-art technology which takes the 3D film experience in a whole new direction.

3D technology is based on human vision from birth to death. It mimics the way we see the real world. When you look at an object each eye sees a slightly different view and our brain fuses these together into a single 3D image.

The two lenses on the IMAX 3D camera roughly match the distance between our eyes and so each lens “sees” a slightly different view. The images are photographed onto two separate rolls of film—corresponding to a right eye and left eye image—which run simultaneously through the camera.

### **7.Digital Image Storage Devices:**

The media and entertainment industries weren’t always big users of storage technology. They were accustomed to shooting film on celluloid or video tape. Old film and tape was simply stored on shelves or in vaults. But then came digitization. Suddenly data storage was a big deal. The solution in the industry has been to use disk but that approach is now proving too expensive.

Storage industry analyst Tom Coughlin of Coughlin Associates explained the challenge. Frame rates for movie content are increasing from the historical 24 frames per second (fps) to 48 and 60 fps, and may eventually go as high as 300 fps. And as resolutions get higher, file sizes soar. Per hour of film standard definition (SD) is 112 GB, HD is 537 GB, Ultra HD is 6,880 GB, 6k is coming onto the market, 8K is on the near horizon, and some are contemplating 16k. When 8k appears, each hour of film will amount to 86,000 GB of capacity.

In other words, 8K film would use more than 100X the capacity of HD, said Coughlin. And then there is free viewpoint imaging which uses many cameras simultaneously to get the viewpoint of the film to change.

“As video resolution and frame rates increase, camera image complexity rises and stereoscopic projects multiply, the storage capacity and bandwidth performance requirements become staggering,” said Coughlin. “How long will it be till we see Exabyte-scale video?”

16k film would eventually call for data rates of 115 GB/s and would generate about 414 TB per hour of content. But if four cameras are used to create data for a free viewpoint presentation, the raw data could add up to 1.66 PB per hour of content.

This frightening quantity of data is driving movie companies into the cloud. According to a survey by Coughlin Associates, 30.2% of media and entertainment companies said they used cloud storage for post-production work in 2015 versus 25.6% in 2014 and 15.15% in 2012. Further, 32.9% said they had 1 TB or more of storage in the cloud in 2015 versus 23% in 2013. And more than half capture six hours of content for every hour of movie. For some it goes as high as 50 hours.

The sheer amount of content makes it vital that movie houses clearly define what content should be kept to hand for rapid editing. How this works out is that brand new content for films and shows is heavily accessed until the work is completed. Once completed and distributed, that content suddenly goes dormant and is rarely accessed thereafter.

Coughlin said 95% of all content, therefore, resides in massive archive. However, in terms of dollars, the archive is only allocated 45% of the available storage funds. Although this material is archived, it can be called upon on occasions such as anniversaries, documentaries, breaking news and for marketing purposes.

“This makes the concept of an Active Archive appealing to the media and entertainment industry,” said Coughlin.

To achieve this, a variety of media are employed. Optical disk, tape and Hard Disk Drives (HDDs) are used together, depending on the required response time and touch rate. The mechanics are simple: As response time requirements move closer to instant and the volume of access grows, costs soars as the fastest storage is called for; as response time lowers and touch rate declines, slower and cheaper storage comes into play, based on touch rate and pre-set policy.

## **8.LED Lighting in Modern Cinematography**

The modern cinema and video industries are heavily dependent on lighting equipment. From high-caliber studio cinematographers to personal video enthusiasts, just about everyone uses extra lighting to create harmonious visual imagery. If you're looking to light up your next production, or just interested in learning more about what goes on behind the scenes, this guide to the key light sources used in the business will help illuminate the way.

## **HMI**

Hydrargyrum medium-arc iodide (or simply HMI) refers to the lamp operating by creating an electrical arc between two electrodes within the bulb. This excites the pressurized mercury vapor and metal halides and provides a very strong continuous light that's been a favorite of filmmakers for decades. HMIs are a high-priced light source, manufactured by the industry giants, but are usually accessible to videographers through rental dealers.

A key feature of this type of light is that it provides a perfect daylight source balanced at 5500 Kelvin, allowing you to film daytime scenes around the clock — one strong HMI source can create the effect of a sunny day in pitch dark night. Typically, these sources also need to be powered through an electrical ballast to limit the current and provide precise voltage.

## **Tungstens:**



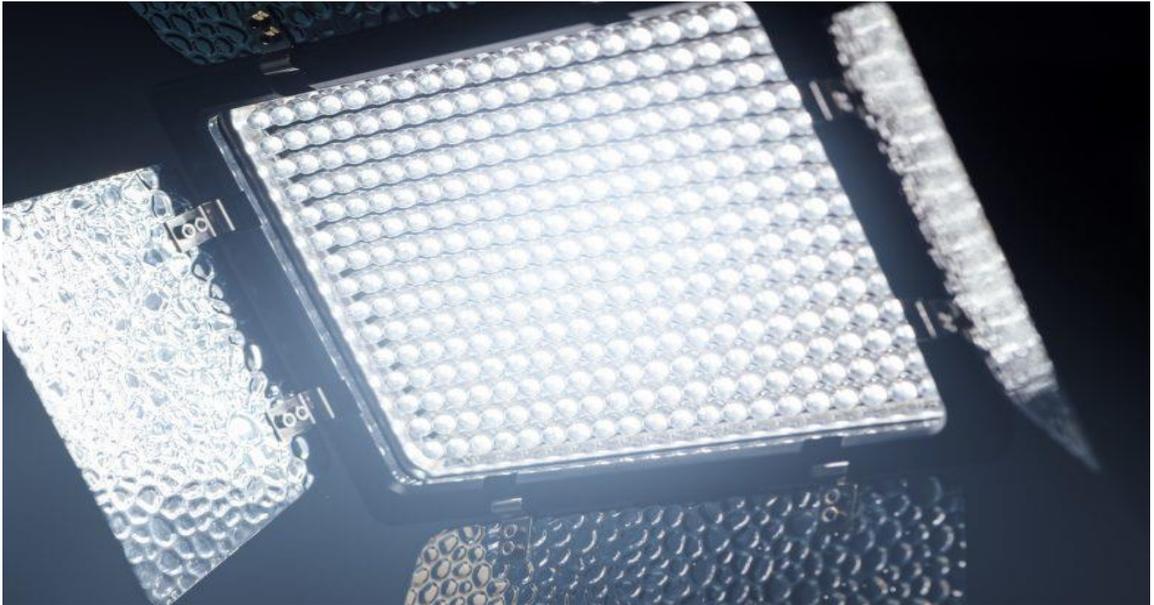
Tungsten light is pretty much the same as the light bulbs we use in our homes — it produces warm, yellow light. In this case, luminance is generated by heating the wire with a passing current trapped inside a glass or quartz environment filled with inert gas. The problem with this type of light is its high consumption of electricity and very high heating. In almost all cases only, 5% of the energy used is transferred to visible light, while the rest is wasted on heating the wire. Tungsten is typically measured around 3200 Kelvin.

## Fluorescent:



A fluorescent light is a low-pressure mercury gas discharge lamp that uses fluorescence to produce visible light by heating up the phosphor coating inside. Fluorescent lamps also produce ultraviolet waves and are about 10 times more economic and ecologically friendly than tungsten light sources. Fluorescent sources are about the same temperature on the Kelvin scale as HMIs and often produce light equivalent to 5400 Kelvin. (They're also available in a tungsten balance 3200 Kelvin.) Typically, these lights are used in major video and film productions pretty much anywhere cinematographers can't use HMI sources, they rely on fluorescent lights. This type of lighting is very easy to use and provides a great cinematic lighting solution for challenging scenes and are the go-to light for interviews.

## LEDs:



Light-emitting diodes (LEDs) are a two-lead semiconductor light source that has become very popular in recent years as the technology has become more affordable. These lights are extremely ergonomic and provide an eco-friendly alternative to filmmakers who want to stay mobile and lightweight with their kits. LEDs have useful features such as temperature control, battery powering, and compact design. Filmmakers can get a cool daylight temperature out of these devices, as well as cozy yellow tungsten light, just by controlling the dimmer on most of the devices. These relatively cheap, lightweight, and versatile lights are the lights of the present and the future.

## **Strobe Lights:**



Strobe lights use a xenon flash lamp to provide a burst of daylight-like flashes, heavily used in photography and commonly referred to as flash light. These sources are typically mounted on digital or film cameras, and the light bursts from them are matched to the shutter speed to light the scene when shutter opens, so that frame gets exposed to the light. Photographers use these sources to give extra light “kick” to darker scenes. One area of modern digital photography that almost always uses strobe light is fashion photography. Almost all the studio setups use larger strobe lights mounted on stands with heavy diffusions to create soft light that smooths out skin tones. Flash lights are also used in event and portrait photography and sometimes even in film and video productions.

In addition to these lighting solutions, natural daylight is also of course an option, but it’s far less under your control, as it leaves you subject to the forces of nature.

## **9. High Speed Lenses**

Camera lenses have a significant impact not only on the look of your film or video but also on the mood you’re trying to establish. If you choose to use your camera’s default lens you’ll undoubtedly be forced to compromise your visual story.

This is because lenses help establish depth, positioning and object priority to name only a few of the more obvious changes.

The following basic 3 lenses will help in composing your scenes with greater flexibility:

1: A “regular lens”: This is a 50mm still camera lens

2: A moderate wide angle lens: 24-35mm still camera lens

3: A moderate zoom lens: 80-200mm still camera lens

As a general rule of thumb, lenses going below 50mm starts to become wide angle. Extreme wide angle lenses would be 17mm or 14mm. The smaller the number, the more exaggerated the wide angle lenses. 14mm would actually be considered a fisheye lens. Lenses going above 50mm would be considered telephoto lenses. The larger the number to more powerful the telephoto capabilities are. For instance a 100mm is less exaggerated than a 500mm lens.

There are other lenses such as extreme wide angle lenses or extreme telephoto zoom lenses.

For example, look on the ring of a lens you may see the following sequence of numbers.

1.8, 2.8, 4, 5.6, 8, 11, 16

Or

4, 5.6, 8, 11, 16, 22, 32

The smaller the range of numbers at, the wider the possible opening of the aperture. In less technical terms, the lower the number the lens starts at, the wider the lens is opened and therefore lighter can come through.

In the examples above the lens that starts with 1.8 is “faster” than the lens that starts at 4.

**50mm f/1.8:** This means it’s a 50mm (regular angle) fast lens with an aperture opening of 1.8 (wide). Although it’s counter intuitive, the smaller the f number, the larger the opening.

Different lenses communicate depth, distance and space much differently. A wide angle lens exaggerates depth and the distance between objects and includes more of the surrounding environment. Zoom lenses on the other hand make objects appear closer together than they really are and these lenses exclude more of the surrounding

environment. 50mm normal lenses are meant to communicate to the viewer images that reflect roughly the way the human eye sees.

### **1. Virtual Studios: 'Virtual' studios could offer a real alternative to green screen special effects**

For as long as filmmaking has existed, there has been a need to build fantastic worlds in front of cameras. The earliest techniques borrowed from theatre: Painted curtains and wooden, two-dimensional backdrops. Then, we painted worlds onto glass, photographing them onto the film itself to blend the real and the fake. At the same time, artists worked out how to project previously-shot film onto a screen behind the actors. These days, we've flipped this story, dropping real actors into digital environments that only exist inside computers. But now we're blending the very old and the very new: Digital backdrops in "virtual" studios could end the blight of green-screened cinema, and its myriad problems.

### **2.4 Digital Special Effects**

Before the development of digital technology, special effects were normally physical special effects, such as the primitive miniature, fireworks technology, and the later animal-robot technology. The appearance of Terminator 2 in 1980s made audiences have great interest in visual effects for the first time, and just because this special effect brought people visual wonders, it urged more film workers to devote himself to this new style means of production (Guanglv, 1998).

In the film special effect industry in digital times, the production and application of special effects rely on computer technology platforms, which enable the special effects to be more lifelike. In addition, digital special effect is also a high-end technology in film digital technology application. The current digital technology application in film special effect presents in following aspects:

#### **Creation of Virtual Characters**

Before computer graphics (CG) technology, special roles like monsters, devils and gods and legendary figures were all realized by actors wearing special costumes or film artists using real objects or models to form things up.



*Figure 7: An articulated skeleton of the Brontosaurus used in 1933 King Kong film*

Photo was taken in The Dinosaur Museum in the city of Blanding, Utah, USA. But at the moment, producing special roles figures can be realized by 3D scanner scanning the real person or role model, and post rendering with strong computer special effect software to form the CG role modelings. In addition to that, virtual characters' actions are usually formed with motion capture technology, namely the Motion Capture collecting real person's or animal's action (figure 10), or referring to images in video recordings, which are all established based on computer technology.

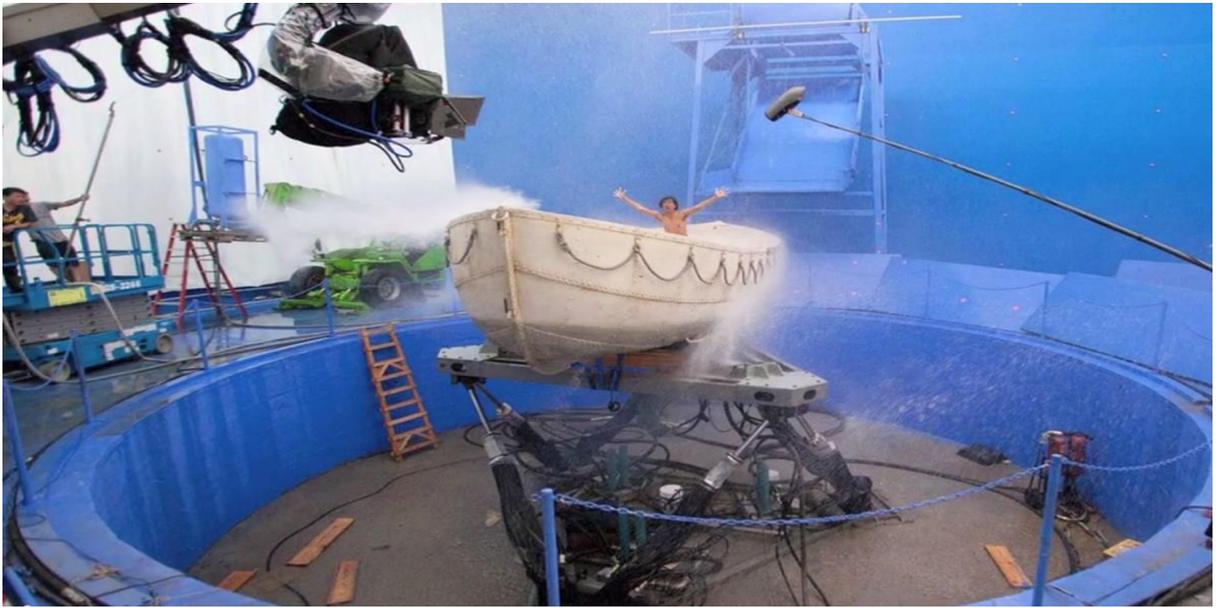


*Figure 8: Dancer wearing a suit used in an optical motion capture system*

Source: <https://commons.wikimedia.org/wiki/File:MotionCapture.jpg>

## Creation of Virtual Scene

The endless ocean, fierce Bengal tiger and fantastic cannibal island appeared in 'Life of Pi' which won Oscar's Best Film of 2012 did not shoot scenes in real places as what traditional films had done in the past, but rebuilt the scenes with digital technologies.



*Figure 9: The BTS scene of special effects of Life of Pi*

Source: <https://www.pinterest.com/BirdsEyeDP/film/>



*Figure 10: The BTS scene of special effects of Life of Pi*

Source: <https://www.pinterest.com/BirdsEyeDP/film/>

Director Ang Lee hoped this kind of film visual effect could make audience feel like they were at the real scenes and feel Pi's all emotions when seeing Pi contending against nature on the ocean alone. In fact, to achieve the largest degree of reality, creators need to acquire professional training to know how to acutely observe the tiny differences between live-action and CG scenery and make adjustments, thus making the two objects integrate perfectly ("Rhythm & Hues Makes Skies Soar", 2012).

### **Digital Editing**

The conventional film editing before was all finished on the cutting benches. In the face of over hundreds of thousand inches of films, the editor would rearrange the scenes according to director's requirement and the editor's own understanding of the creative needs of the production (Evans, 2005). This work needs editing instruments to cut, separate and connect the cine-films, which can be called the real art of editing. Upon the entry into digital times, owing to the appearance of digital intermediate (see below), more productions have come to be edited using computer digital technology formats. Compared to conventional editing, digital editing and image processing appear to be more simple and convenient, and have saved a good deal of money.

Digital editing adopts the concept of non-linear editing, leaving post producers flexible creation space. Non-linear editing uses computers to rearrange scenes. One advantage of non-linear editing is it can instantly access element of image and sound in real time, and no longer needs to linear thousands of feet of film repeatedly as in the past (Buck, 2007).

Secondly, the program materials need only to be acquired once, and then can be used for multiple versions, saving human and material resources, and increasing work efficiency. In 1984, George Lucas used Edit Droid and Sound Droid system developed by himself to assemble one of the first films finished in non-linear fashion (Buck, 2007). With the development of digital editing technologies, editors and producers gradually abandoned the conventional physical editing process.

### **Digital Intermediate**

Intermediate is an indispensable link in traditional film making. The first edition cine-film shot by cameraman is called "camera original" after been developed and printed, which is all the crystallization of the handwork of film crew (James, 2005).

The data will be sealed immediately, because if the “camera original” is damaged, the first-hand material is lost. Before the “camera original” is sealed, it will be copied, which is the first version of “intermediate”.

In over one hundred years after the film was born, this work has always been undertaken by departments of the film laboratory, which is finished by means of traditional chemical processing and scissors and tape. During this more than one hundred years, although the film processing technologies have been continuously developed, it has not become significantly faster or more cost effective (James, 2005).

### **Digital Synthesis**

In late 1980s, the arrival of ‘Who Framed Roger Rabbit’ (1988) astonished movie fans around the world, which was the first attempt at using digital synthesis technology. It managed to make the real character and painted animation figure appear on the same frame, allowing the audience to feel a fantastic world. The later movie Space Jam also entirely used digital synthesis technology to make Michael Jordan and Bugs Bunny compete on the same stage.

This digital synthesis technology mixes video and audio materials of multiple digital formats into a single video-audio file via professional post producing software on computer, which may generally include four major steps of colour correction, geometric fluctuation, filter and picture synthesis (Zhengning, 1998). This synthesis technology changes traditional film making vast amounts on screen effects easier and less expensive to create. This technology, which enables the authentic roles and characters to “appear in the same scene”, has also been utilized by parts of film-television industry. The result of the application can be seen very often in children’s TV shows and other narrative TV production.

### **2.5 The Impact of Digital Technologies to Film Distribution**

The first digitally distributed film was ‘Star War Prequel I’ (1999) by American director George Lucas in 1999. As one of the earliest Sony films shot with digital cameras, it was digitally presented in four American cinemas, winning a lot of applause (Fan, 2010).

The success of the film depended on the continuous technological development. Early in 1987, Texas Instruments developed Digital Light Processing (DLP). At present, this technology has been a leading technology for digital projection in commercial

films across the globe, and even the industrial standard. Many film production companies have projection equipment with DLP (Maltby, 2003).

As time goes on, the introduction of digital technologies has contributed to geometric growth in film distribution, which is much more advanced than before. This thesis will then discuss specific impact of digital technologies on film distribution.

### **Digital Film Distribution**

Traditionally, films were delivered by distributors to cinema projectors through simple means of transportation. Movies always had many reels which must be contained in a special large box. This brought great challenges to movie distribution for not only inconvenient transportation but great space for storage and manpower for maintenance (Fan, 2010). The digital distribution of a film is possible only with an encrypted high-capacity hard disk that can store vast amount of data.

Thanks to digital technologies, audiences can more easily enjoy films through different platforms, and cinema is no longer their sole choice. The emergence of online video sites like Netflix and Hulu is a prime example.

### **Digital transmission of the film content**

The transmission and receiving of film became easier through digital method of network and satellites. For example, in 2002, before the distribution of 'Star Wars Episode III - Revenge of the Sith' (2002) by 20th Century Fox, the Culver City digital film laboratory in California transmitted the global teaser to the digital center in Singapore, and it took for only 10 minutes to finish the transmission of the teaser with a total capacity of several hundred GB. In the past, the transportation of film was not only costly in time, but also wasted a great amount of labor and money (Jieyi, 2011).

### **Production Cost and Efficiency**

With the full introduction of digital technologies into the film industry, a larger amount of special effects are seen in the production and operation of films, especially those blockbusters. Of course, high technological content means high cost, namely lots of capital is required to maintain the application of leading technologies in the film industry. Digital equipment, including high-definition digital cameras, a set of non-linear editing workstations and super computers for special effects always cost much more than traditional equipment, up to several million dollars (Liu Fan, 2010). However, it is worth noting that, digital technologies brought to film production and

operation not only higher cost, but higher production efficiency and more scientific operation cycle, in particular more enjoyment and attraction to films realized by visual effects. Computerized information processing, digital storage of frames and audio and transmission media improves the operational efficiency of every link in the film industry, and makes many tasks which are traditionally complex and time-consuming easier and more convenient (Allen, 2005).

### **Photographic Film vs. Digital**

With film usage and adoption on the rise, we wanted to resurrect the debate of digital photos versus analog photos. As a film processing lab, we obviously have a bias, so not going to say which is better, but to present the differences and list advantages.

While in Eastern Sierra Nevada, we shot two photos, one film and the other digital. Both the digital photo and the film photo were taken with the same settings. The left image was captured on Velvia 50, taken with a Canon EOS 3, a 50mm lens at f/4. The photo on the right was taken with a full-frame Canon 6D with 50mm, 100 ISO, and f/4. Both images are unedited. As you can see, Velvia 50 has a very fine grain and has rich, vibrant colors straight from the scan compared to the unedited JPEG from the Canon 6D. And yes, you do have the option to edit digital photos, but there's something special about making a beautiful image in-camera on film and not having to spend any time editing!

Also, if you're looking for a little less saturation, there are other great film choices, like Provia 100, which isn't as saturated but still has great color and fine grain, or you could go with a color negative film which will give you more subtle colors and has a wider range of exposure latitude.



### **Film Photography Advantages:**

- Lower initial cost than for a comparable digital camera
- With a higher dynamic range, film is better at capturing white's and blacks' details and can't be replicated with digital cameras. Also, film can capture subtle details lost in digital photography.
- Film is more forgiving of minor focusing issues and exposure problems.
- Film captures photos at higher resolution than most digital cameras.
- Analog film can be pushed or pulled multiple stops when needed, but the amount of contrast within the image is affected. Some photographers use this to their advantage to create the ideal look they desire, but this method still does not allow extremely high ISO speeds without impacting image tones.
- Film photographers with a limited number of exposures available on a roll of film must think more about their images before shooting them. Digital photographers tend to take pictures first and think later. Depending on your viewpoint, this is either an advantage or disadvantage.
- Unlike digital cameras, film cameras are future proof and don't become obsolete.

- No power or batteries needed. Long trips and cold conditions can be limiting for digital cameras.
- The Darkroom photo lab scans your film photos, now allowing you to edit your images on a computer with photo-editing software or share on social media.

### **Digital Photography Advantages:**

- The resolution in even point-and-shoot cameras, which is often 12 to 20 megapixels, is high enough resolution for large prints.
- Digital cameras also have the advantage of being able to change film speeds between individual photographs.
- The cameras are generally lighter weight than film cameras.
- Memory cards are tiny and can store many images.
- Instant gratification and images can be viewed immediately. Some film photographers consider this a disadvantage.
- You can edit your images directly on the camera.
- You can choose to print only the images you like best.
- Many cameras offer built-in filters.

### **2.6 Movie Watching Experience in Mobile vs IMAX**

Movie goers swear by the audio-visual quality that IMAX provides. The movie watching experience is enhanced. As a result the ticket prices for IMAX shows are much higher than the regular movies. Even though IMAX theatres were introduced in 1971, they gained popularity much later in the 2000s.

Ever wondered what is it that sets IMAX apart from the regular theatre? We got a list of differences for you.

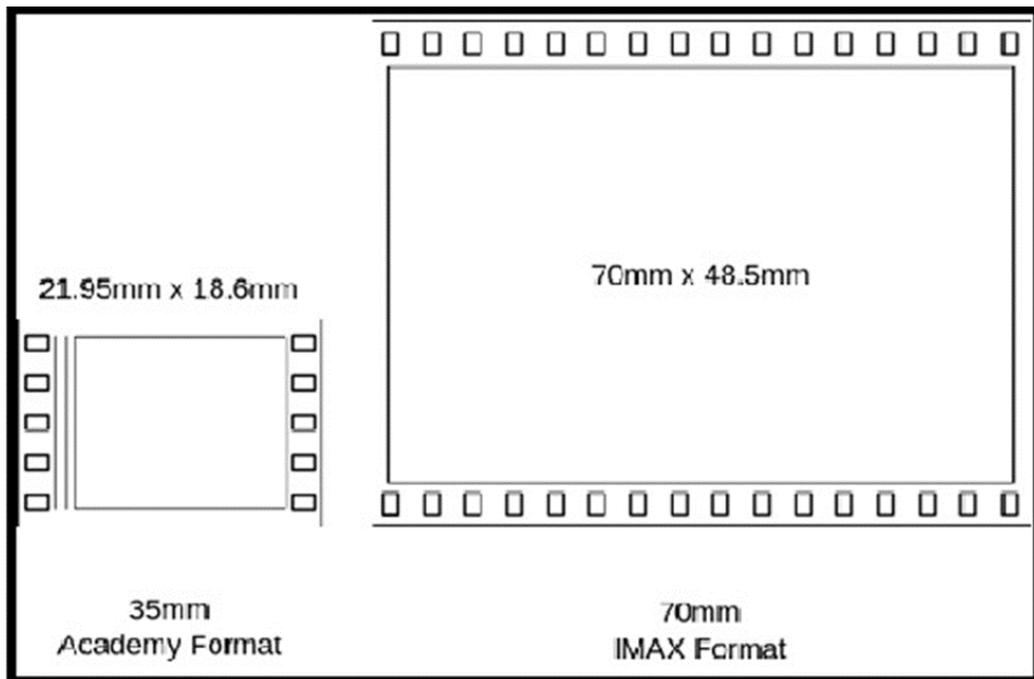
#### **Sound**

IMAX has a patented fully immersive 12.1 channel 15,000-watt digital speaker with a wider frequency response. There are special sound engineers or audio engineers who

specialise in creating speakers with a more powerful output in addition to crystal quality sound. The theatre geometry adds to the experience and the sound travels through the auditorium making the movie an enriching experience.

### Film Formats

Regular film formats are either 35 mm or 70 mm. Whereas IMAX film formats are 15/70 mm. This means that each frame is 70 mm high and 15 perforations wide. This also means that the film size is about 10 times bigger than the standard 35 mm film, giving the visuals in incredible clarity.





**Image courtesy: National Science and Media Museum**

## **2.7 Projection Technique**

Most IMAX movie theatres use a high-powered laser light engine. Unlike the traditional xenon lamps, IMAX lasers have a twin 4K proprietary digital projectors to light the huge screen, thereby giving the sharpest, brightest, clearest and the most vivid screen images ever.

### **Aesthetics**

Legendary IMAX director MacGillivray Freeman claims that the audience experience created in terms of imagery in an IMAX is far detailed than a regular format. The shots in regular films don't last long because the director controls what the audience looks at. In these cases, the audience is directed to look at a specific thing whereas in IMAX the shot is too descriptive and is naturally longer.

### **Digital Projection**

With digital technology, films on the screen are presented in nearly perfect condition without declining brightness and colour, dirty spots and scratches caused by damaged film. At the same time, digital technologies preserve and present original high-fidelity sound, creating a true, exciting stereo ambience for audiences (Jieyi, 2011).



### **Digital Re-mastering**

Most IMAX movies go through a Digital Re-mastering or DMR which turns an already powerful film into an incredible IMAX film with enhanced images and sounds to create a sensational experience.

### **Best Movies Shot On Cell Phones (According To IMDb)**

Filmmakers' creativity knows no bounds as several have shot entire feature-length films on cell phones. From *Unsane* to *Tangerine*, here are the best.

Cell phones aren't just for texting, Face Timing, or scrolling through Instagram. Filmmakers are now using these portable communication devices to make movies. During the 2010s, both well-known and indie directors chose cell phones over professional video cameras. The results, both full-length and short, attest to how anyone has the ability to make compelling cinema with the tool they always have by their side.

All of the impressive films on this list were shot using this piece of technology most people take for granted. Clearly, movie-watchers have responded well to them, taking to IMDb in order to share their thoughts on each one.

**Olive (2011) - 5.9**



Promoted as the first full-length feature shot on a smart phone, Olive was made using a Nokia N8. The directors, Patrick Gilles and Hooman Khalili, attached a 35 mm lens adapter to the phone for a wider depth of field.

Olive tells the story of an enigmatic girl with supernatural abilities who forever changes the lives of three hermetic people she comes to know.

**Rides (2016) - 6.0**



Rides are the ultimate expression of contemporary life. Filmed on a mounted iPhone 6s, the movie follows an Uber driver who gets some really, really bad news during a busy night of ridesharing.

This compelling, taut thriller is directed by Matthew A. Cherry, whose work in television ranges from *Blackish* to the Oscar-winning short film *Hair Love*.

### **High Flying Bird (2019) - 6.2**



Filmed entirely on an iPhone 8, *High Flying Bird* is a fast-paced sports drama from acclaimed director Steven Soderbergh. It stars André Holland as an agent trying to end a lockout between the league and the players.

**Sing by Kristof Deak (2016) (Hungary) (25m)**



Sing won the Academy Award for Best Short Film in 2017; reaffirming the Academy's commitment to honouring films which centre around a child. Inspired by a true story, Sing (Mindenki) tells the story of Zsófi, who joins a new school with a famous, festival-winning choir. Although Zsófi is allowed to join the choir, she is soon asked by the manipulative singing teacher to mime instead of vocalise the lyrics. But is she the only one whose singing is not up to scratch or is the whole choir a sham?

**The Phone Call (2013) (UK) (20m)**



The Phone Call won the Best Short Film Oscar in 2015. This short drama is beautifully made, but it is the performance (and presence) of Sally Hawkins that makes it stand out. Hawkins plays Heather, who volunteers as a phone operator in an understaffed crisis centre (like the Samaritans). Today, she receives a call from Stan, a jazz fan who has decided he can no longer go on after the death of his wife. Will Heather be able to save him and who really needs saving? I have to admit I was expecting a twist but it is a solid and unashamedly lachrymose story.

**Helium by Anders Walter (2013) (Denmark) (23m)**



Helium won the Best Short Film Oscar in 2014. It is a touching and beautifully made short film about a terminally ill boy, Alfred, who is not particularly enamored with the prospect of Heaven. The new janitor invents an alternative place called Helium, which is more to Alfred's liking, and forms a relationship with the boy. Anders Walter went on to make the feature film I Kill Giants starring Zoe Saldana (Star Trek, Avatar).

**Curfew by Shawn Christensen (2012) (USA) (19m)**



Written and directed by Shawn Christensen for him to star in, Curfew won the Academy Award for Best Short Film in 2013. Curfew, also starring child actor Fatima

Ptacek, was written as a proof of concept for the feature film, *Before I Disappear*. Richie is at a low point in his life when he gets a call from his estranged sister asking him to look after his nephew, Sophia, for a few hours. Their night time excursion reveals a connection between two lost souls.

### **The rise of the large-format digital cinematography.**

Large sensors were born a couple of years ago. RED has pushed the industry toward large digital sensor by creating the Monstro VV back in 2017. Although the DSMC2 Dragon 8K VV was developed in 2015, this very rare Dragon VV was used lately on Netflix's *The Dark Crystal*. Anyway, the pursuit after the large format look was established many years earlier by using 65mm cameras like Panavision and IMAX, and was dedicated to delivering the best experience to meet the huge canvas standards (aka IMAX theaters). The thing is, that IMAX filmmaking demands vast discipline and...MONEY (\$15,000 per week for rental, 3-minute film-run that costs about \$1,000 and more). Thus, more "affordable" options were very welcome.

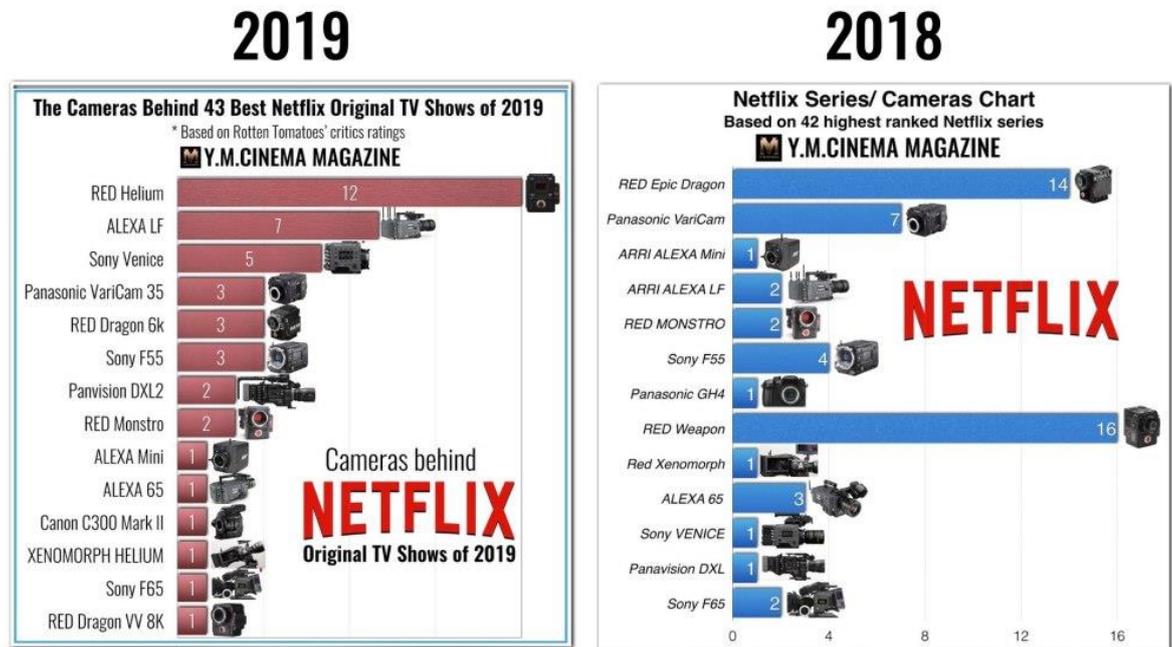
### **Large sensors for the masses**

Camera manufacturers have been exploring the gap in the market for large format imagery. It's important to emphasize that large sensors have many advantages comparing to Super 35 mm sensors (and disadvantages as well), beyond just shooting for the big screen. Nevertheless, it took some time for cinematographers to adapt for the new look of the large sensors as it's very much different from the traditional look of the Super 35 mm.



**Picture: The Kinefinity MAVO Edge 8K**

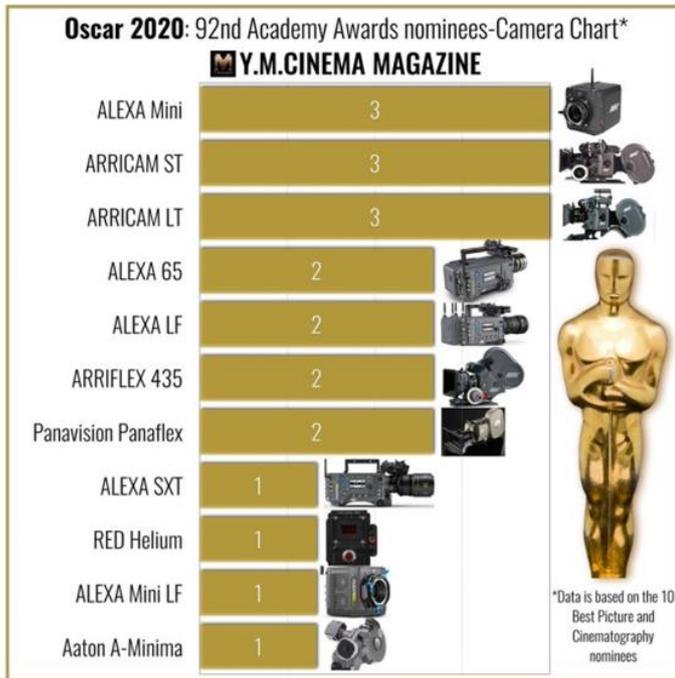
For instance, have a look at the charts below that show the cameras behind the selected high-ranked Netflix series. In 2018, the dominate format was definitely Super 35. However, the statistic slice of large format sensors has grown dramatically with the rise of ALEXA LF, VENICE, and Panavision DXL2.



*Figure 11: The cameras used to shoot major films in 2019 and 2018. Super 35 format dominates*

### Oscar: The home for Super 35

In regard to the Academy Awards, film has been dominating for a long time. Film and Super 35 of course. Explore the chart below which shows the cameras behind Best Picture and Cinematography nominees. Besides a significant presence of film cameras (check out the diagram in the right side of the slide), we can see that Super 35 cameras are at the top.



*Figure 12: The cameras behind Oscar 2020: The majority are Super 35 mm cameras and film*

Furthermore, if we analyze the cameras used to shoot selected film for major festivals (aka Sundance), we can notice that those DPs (and directors) have chosen to shoot their films on Super 35. The reasons for that are obvious. Most of the time, those films have limited budget, and large format cameras are more expensive and demand more recourses in production and post. Explore the camera chart of Sundance 2020 below:



Figure 13: Sundance 2020 cameras: Super 35 mm is still widely used by independent filmmakers

### Oscar 2021: Large format wins

However, have a look at the comparison below of two charts which demonstrate the cameras used to shoot selected (top-rated and nominees' predictions) for the Academy Awards 2020 and 2021. The ALEXA LF, 65, Mini LF, and Sony VENICE helped to break the glass ceiling of large format.

Furthermore, we can notice other large sensor film cameras like the Panavision, IMAX, and surprisingly ARRI 765. This data tells us that DPs have started seeking the large format imagery over the much known Super 35.

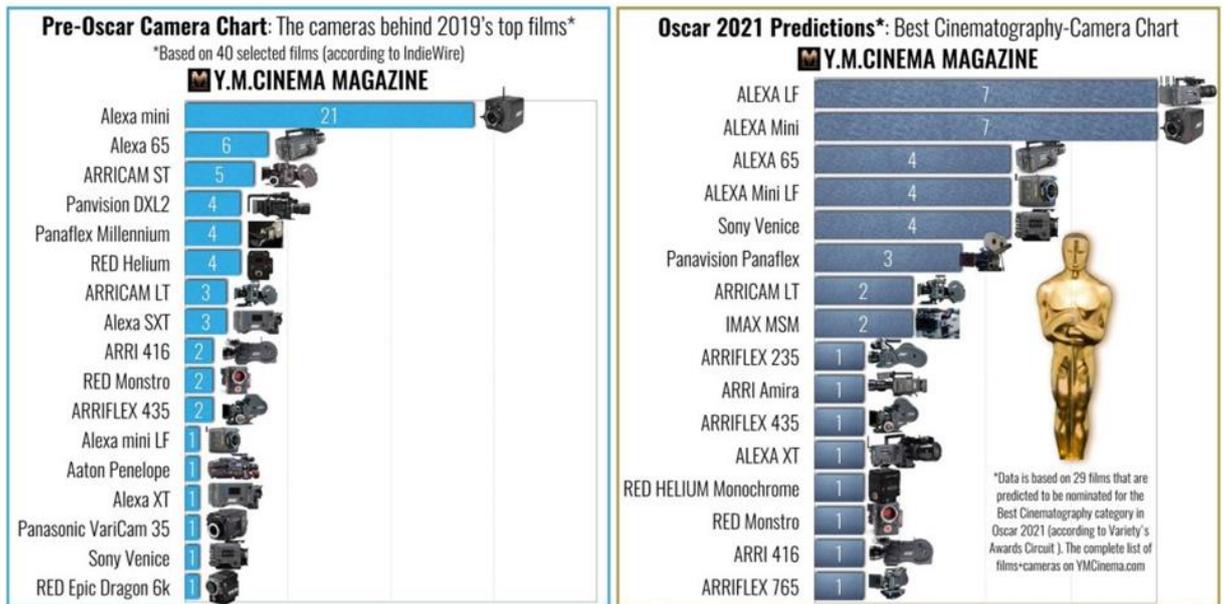


Figure 14: Comparison between Academy Awards 2020 and predicted 2021 nominees. Notice the vast increase in large format sensor cameras.

### Final insights

Please excuse me for writing so technical. It doesn't mean that large sensor cameras are better than Super 35, because they are not! I've got tremendous respect for the traditional look of Super 35 and for me, it's much more cinematic than large format. Super 35 indicates the power and magic of cinema. In fact, ARRI is developing their new ALEXA 4K Super 35 as we speak, as stated by ARRI: "We at ARRI believe in Super 35. Not everybody will shoot Large Format/Full Frame. Many productions, in particular in TV, will remain with Super 35 for the foreseeable future. Therefore, we are also working on a dedicated Super 35 4K camera (not LF), further increasing the choices for cinematographers". On the other hand, the next DSMC3 models of RED Digital Cinema might be focused on the large sensors. The cinematic differences between Super 35 and large sensors are very noticeable. Nonetheless, it's just another pathway for telling your story.

### 2.8 Impact of Technology on creative industries (Source-Dr. Padma Rani)

Creative industries are those companies or organizations which produce or use knowledge and also included are those which use advanced scientific knowledge. For example media, arts and design organizations and universities. The term creative

industries also overlap with cultural industries and media industries. These include advertising, television, radio, newspapers, internet publishing, magazines, book publishing, film and theatres. These have attracted the attention of the government in developed societies because of the earnings that they generate.

Creative industries refer to a range of economic activities which are concerned with the generation or exploitation of knowledge and information. Creative industries comprise of various things like music, radio, television, films, publishing, art, architecture etc. Creative industries are seen to have become increasingly important for the economic well-being, proponents suggesting that human creativity is the ultimate economic resource. The industries of the 21st century will depend on the generation of knowledge through creativity and innovation.

The Indian entertainment and media industry has had remarkable growth in the past i.e. 2004-2008; at a rate of 16.6% while the GDP grew at 14.48% during the same period. There has been a slowdown in 2009 due to the economic crisis but still it has registered a growth of 8%. This paper seeks to study the impact of technology on the Indian film industry. The Indian film industry produces the largest number of films in the world approximately over 1000 movies annually. Over 3.2 billion movie tickets are sold annually in India; this makes it the largest in the world. It was worth Rs.107 billion in 2008. Foreign Direct Investment (FDI) inflow continued in the entertainment and media segment in India.

Drastic technological changes have been taking place in the film industry in terms of digital cinema, 3D screens, Direct to Home services, mobile phones and animation. Indian animation segment has witnessed significant growth due to outsourcing by international studios as well as an increase in demand of animated content nationally. This paper seeks to explore the impact of technology on various facets of the film industry and proposes to put forth certain key aspects which can be adopted by film industries across South Asia, in order to make them enterprising and successful.

Slumdog Millionaire becoming the first movie shot mainly in a digital format to be awarded an Academy Award for Best Cinematography and Avatar, the highest grossing film of all Time, receiving accolades for its visuals that were shot and displayed using digital technologies. The first full length animation feature film – Roadside Romeo was produced by Walt Disney in association with Yash Raj films in

2008. Various international production houses entered the Indian market such as Walt Disney, Fox STAR Studios, Mexican global multiplex operator Cinopolis etc.

**Digital production:** Character-building is done using technology in various ways. The film is shot on blue or green screen then tweaked until the director is satisfied. Visual-effects gurus can track subtle facial expressions. They are “moving beyond the cut” satisfied to see how their characters would look on screen. In such circumstances, the directors have less cost pressure which means they have more creative freedom. Digital cameras and software hybrid are an added advantage to the production team.

**Digital distribution:** Ad labs use fibre optic cable for telecommunication laid by their telecom subsidiary for transmitting movies directly to screens. Currently, cinema halls in Ahmadabad, Valhi, Nasik and Gandhi nagar have been connected to the optical fibre cable. Ad labs, which runs its movie exhibition business under the Big Cinemas brand in India, Malaysia and US, has already started the process of digitalization in its US movie theatres.

Ad labs have also announced the launch of its BIG Digital 3D at the Ad labs Cinema in New Mumbai. It had also pioneered the use of 6D in the first screen of its type in the Ad labs Cinema in Agra in partnership with Israel-based Cinema Park Network.

**Satellite rights:** The intense competition among the General Entertainment Television channels (GEC) has led to a favorable change in dynamics of satellite right revenues for film producers. Several block deals are being done for sale of satellite rights, some of which are as below: • UTV has a syndication deal with Colors with slate of 27 movies on a nonexclusive basis. Colors will have the rights for five airings spread over two and a half years. Zee network also has a syndication deal to telecast 21 UTV movies. Colors will get to telecast the movies, for which it has purchased the rights, ahead of Zee. UTV, however, will get to screen the movies first on its Hindi movie channel.

Colors had earlier acquired two-year telecast rights for 55 Sahara movies for multiple airings through a deal with Baba Arts.

**Home Video Segment** There is a growing emphasis on home video owing to falling DVD prices, the availability of more titles due to shorter-release windows of theatrical releases and new international titles being launched. Shemaroo Entertainment and Acentic announced a deal to exclusively provide South Asian content, including Bollywood content, through video on demand (VOD) on Acentic’s in-room hotel entertainment platform across Europe, the Middle East and Africa.

Under this agreement, guests in more than 1,300 hotels using Acentic's in-room entertainment services will now have access to a content library of the latest movies from South Asia, including Bollywood releases, as well as activities such as instructional fitness videos (Yoga). Indian Filmed Entertainment Industry Key revenue streams There are four key revenue streams from Indian film industry; the domestic box office collection, the overseas box office collection, home videos and ancillary revenues.

Home video segment consists of sales and rentals of movie DVDs and VCDs. This segment is heavily affected by piracy with only 10% revenues sneaking into the industry. The multiplex strike came as a blessing in disguise for this segment. With the lack of entertainment options in the form of new movies, consumers resorted to buying DVDs and VCDs of classic Hindi and Hollywood movies. Home video segment was estimated to be Rs. 6.5 billion in 2009 as compared to Rs. 5.9 billion in 2008. Furthermore, there is an inherent change in the business model of home video in India. The home video market is converting to sell-through from rental, which constituted 100% of sales in 2004. By 2014, sell-through is expected to capture 90% of the market. The migration To sell-through is leading to sharp declines in rental spending. This change in business model was spurred by the entry of Moser Baer in the market in 2007. Moser Baer slashed the retail prices of its DVDs and VCDs to the levels at which pirated products were sold and rented. As a result of this disruptive strategy, other players in the business were also forced to slash their prices to similar levels as Moser Baer. This encouraged the sell-through market as DVDs were now available to consumers at low prices.

The impact of technology on the Indian film industry is not only in terms of innovations in production, distribution but also the growth of various other ways of marketing the film and also associated products like music, tracks of scenes etc.

The various advantages of digital cinema are:

- 1) Savings in Print Cost
- 2) Nominal one time investment for Digital Prints. Possibility of releasing old films also
- 3) No investment for Digital Prints
- 4) No increase in ticket costs
- 5) Savings of foreign exchange in importing film stock
- 6) Wide Release of Film

- 7) Early release in all centres protects film from piracy and adverse publicity
- 8) No investment for Digital Prints allows distributor to give as wide a release as possible with no extra costs
- 9) Digital distribution reaches even C and D centres on day of release; audiences in these centres get access to new releases on day of release.
- 10) Increase in cinema collections means increased entertainment tax revenues
- 11) 11. Durability of Media-As opposed to optical prints which deteriorate in quality, digital prints will have virtually unlimited shelf life
- 12) No expenses on reprints in case of a hit film and no loss in case of a flop
- 13) No hassles such as bad quality prints, delivery dates and so on
- 14) Good and uniform viewing experience
- 15) Good quality prints shall result in increased collection
- 16) Curb on Piracy Digital content protection software restricts piracy
- 17) Maximises a film's theatrical potential in the initial period thus increasing revenues
- 18) Access to good quality theatre viewing in the early part of a film's life
- 19) Curb on piracy will increase cinema collection
- 20) Producers are able to experiment with newer genres of cinema. Provides access to newer variety of cinema
- 21) No risk situation since investment in prints and copyright is minimal
- 22) Encourages film production and enhances revenue potential there are several advantages of digital cinema screens, most prominent of which includes savings on print costs, reducing piracy and efficiency in production.

Technology has brought about newer and easier ways of doing things but also has stifled creativity to a large extent. With the emergence of digital technology, one does not need to search for a location, it can be created in the studio. The backgrounds become the property of the designer and he can earn from it a number of times. Slowly films need not be shot with the help of actors and actresses the whole film can be created with their images.

To sum up, content creation has benefitted significantly from technological breakthroughs, especially in the areas of sound, visual effects and animation. This has benefitted audiences by providing them with a high-tech content viewing/ listening experience. The growing adoption of digital television around the world has forced

leading global broadcasting companies to put development and use of new technologies at the center of their core strategies. For a content distributor, future will come by specialized offerings, such as high-resolution pictures, high-speed Internet access, online games and information, pay-per-view electronic commerce services and voice telephony. It is this trade off that needs to be evaluated before an investment is made in any new technology. If one were to look at emerging trends in technology and their impact on entertainment consumption, the most significant trends are seen in the areas of media distribution, though some may be regarded as product innovations.

**Bollywood on the Wings of Technology and Its Contribution to Economy  
Hundredth Year of Indian Cinema (Source-M.M.K. Sardana):**

Bollywood—as the mainstream Hindi language film producing industry is popularly known as—is the largest producer of films in India, though regional cinemas compete both in terms of quantity and quality of film production with the mainstream cinema. Bollywood film industry is as old as Hollywood. Since 1960, India has been holding the record of producing the maximum number of commercial films and has attracted the maximum number of viewers; yet it stands nowhere near Hollywood in terms of quality and also from the point of revenue generation. It has survived for about a century largely on account of a big domestic market, which in the absence of a competing alternative source of entertainment has provided it with sustenance through undying adulation. The industry remained fragmented and came to be dominated by a ‘star system’ (dominated by stars and producers) and funded by dirty money. In the initial years of its growth and many years thereafter there was no patronage from government and elite leadership.

The Hollywood Industry, in contrast, developed on an organised structure of studios where star system did have over-riding domination and the financing of films was on commercial principles. Besides having a large domestic audience, U.S. Government has always facilitated the growth of Hollywood films in foreign countries as a part of its foreign trade policy. Hollywood has thus remained dominant in foreign markets all across the developed world where the paying capacity is high.

The organized industry in Hollywood has been continuously adapting new technologies and scripting techniques to enhance viewing pleasure. Bollywood, consequent to policy changes towards market linked economy, has been quick to improve the department of visual and cinematic effects by adapting latest technologies and creating a pool of trained technical manpower. It has also improved its distribution channel by integrating technology with management. The growing middle class and increasing disposable income tends to encourage the development of multiplexes catalyzed by government's incentives. Bollywood has taken on the life styles of Indians abroad in their script making them aficionado of its products resulting in improved collections. Revenue generation has shown healthy growth and projections are that the trend would be maintained. However, its growth potential remains severally limited because of its weakness in its story telling techniques and script writings. If Bollywood wishes to create interest of large paying public of non-Indian origin abroad and claim to be truly international entertainment industry, it has to overcome this deficiency.

Movies have come to be key cultural artefacts that offer a window into evolving cultural and social history. A mixture of art, business and popular entertainment, the movies provide a host of insights into shifting ideals, fantasies, and pre-occupations like any cultural artefact, the movies can be approached in a variety of ways. Cultural historians would treat movies as social documents that record the look and mood of particular social settings; as ideological constructs that advance particular historical settings; as ideological constructs that advance particular moral values or myths; as psychological texts that speak to individual and social anxieties and tensions; as cultural documents that present particular images of gender, ethnicity, class, romance, and violence; and as visual texts that offer complex levels of meaning and seeing.

Film is a reflection of society, both present and past. The film and its innovations sometimes have to catch up to society but sometimes it leads society too. Movies are stories, movies are made by people who come out with ideas about something they want to say, something they want to tell someone. Movies are a form of two-way communications between the narrator and society and have been that way and would continue to be that way.

The Indian film industry is built on a strong foundation—the pioneers overcame various odds and spawned new technologies capable of improving nearly every aspect of business, i.e., storing the moving images and integrating the same with already

prevalent rich art forms of theatre based on mythology, dance forms and sagas of local heroes. The tamasha loving and theatre aficionados welcome the opportunity of savouring the performance of talented artists from across distant cultural centres because it promotes cross-cultural understanding and that too at affordable costs.

India's tryst with films started on July 7, 1896, a few months after the Lumiere brothers introduced the art of cinematography in Paris in 1895. Filmmakers in the west were quick to realize the value of India as a site of filmmaking because of its natural beauty and exotic culture in their films like Coconut Fair (1897), Our Indian Empire (1897), A Panorama of Indian Scenes and Procession (1898) and Poona Races '98' (1898). The first Indian to make a film, called The Wrestlers (1899), was Harishchandra S. Bhatvadekar, a stills photographer by profession. This was followed, in 1900, by Splendid New View of Bombay and Taboot Procession, both by F.B. Thanawala.

The average cost of producing, marketing and distributing a Hollywood film is more than US\$60 million and only one out of ten succeeds. At the same time Shahrukh Khan's Ra.One has cost \$30 million dollars and is the costliest Bollywood production till date. 50% movies produced in Bollywood are never released and more than 95% of those released result in losses.

The transition to digital cinema projection has entirely changed the business model of this segment for the better. When Sholay was released in August 1975, only four prints were in circulation—one for Delhi, one for Uttar Pradesh, and two for Bombay. A single print was screened across two cinema halls in a metro city by shuttling the reels on motorcycles from one hall to the other. The returns were slower and there was wear and tear of reels after about 350–400 screenings. This scenario can be compared with the latest releases like Bodyguard when over 2000 prints were released, out of which 1483 were digital. Four weeks into release, the movie grossed over 150 crore. Ra.One set a higher benchmark when it released with 3500 prints. The latest films have been hitting screens all over the country far and wide, on the same day. It is anticipated that 90% of screens in the next two years would be digital.

In view of such emerging advantages, it makes sense for the corporate sector to enter all three segments, namely production, distribution and exhibitions. The process of corporatization was facilitated by the recognition of films as an Industry which would result in the flow of credit to this sector and also build wealth through other financial instruments as were available to other institutions. Government also permitted 100%

flow of FDI which is an enabling provision for the foreign companies to independently produce films across India or can enter into co-production agreements. Bollywood has taken a step forward to make its impact on the global scene by enhancing the visual impact of its presentations by adapting latest technologies from Hollywood and other global film clusters and thereby upgrading the technical base of the industry and creating a network of well-equipped and trained manpower within the country. The strategy for producing trained technical manpower in Bollywood is a farsighted one and is synergetic with the strong manpower base in India. Such a strategy has already started yielding dividends. Oscar winning special effects of the Golden Compass—the Hollywood blockbuster that took \$370 million at the box office—were put together in ‘thatched village huts in India’. The huts are replicas of rural dwellings that have been made into stylised office cubicles. They are located in the outskirts of Mumbai, from where Rhythm and Hues, the leading Los Angeles-based special effects studio outsources world-class visual pyrotechnics with the help of its 250 strong Indian staff, which hunches over computers and works overtime, thereby doing the job at a fraction of normal cost.

Further since the coming of the digital technology, visual effect companies such as Prima Focus, Maya and several others are generating world-class special effects for the indigenous film industry, thereby saving them the hassle of outsourcing them at a huge cost from the west.

Bollywood has been the fastest in tapping into new global business opportunities riding on a clear blend of eastern talent and western expertise to create a seamless viewing experience. Bollywood cluster and other regional clusters leveraged the benefits of what can be termed as polycentric innovation. A large number of films from the Indian clusters harnessed and networked globally distributed talent, ideas, and creativity to co-develop radically new products, services processes and even business models. Media companies in Bollywood and other clusters have since started harnessing and integrating globally distributed creativity into a coherent and synergetic innovation network. This polycentric innovation, which extends far beyond superficial Bollywood/Hollywood alliances or mere backend collaboration, is being pioneered by companies from India. Such a larger than life emanation of this big bang collaboration has been Endhiran (English: Robot), Asia’s most expensive film till 2010, which was released on October 1, 2010. Produced by Chennai based Sun

Pictures and globally distributed by HBO, Endhiran was the collective output of a truly international crew. Not only does this sci-fi thriller feature Bollywood style songs by Oscar winner A.R. Rahman (Slumdog Millionaire) and King Fu Style fight scenes choreographed by Hong Kong legend Yuen Woo-ping;, it also boasts of mind boggling animation and special effects done by Stan Winston Studio (of Terminator and Jurassic Park fame), and eye-popping costume designs by Mary E. Vogt (The Matrix; Men in Black), Endhiran became an embankment of polycentric innovation, cleverly blending Eastern talent with Western experience that no single region could have concocted on its own. The effort lends evidence to the fact that the monocentric film industry of the 20th century where all creative work (concept development, post production, 3D) was done in the West was shifting to a polycentric world of 21st century where new innovation hubs were emerging in India, Argentina, China and New Zealand (The Lord of the Rings).

## Chapter 3: Case Study & Research Methodology

### 3.1 Case Study

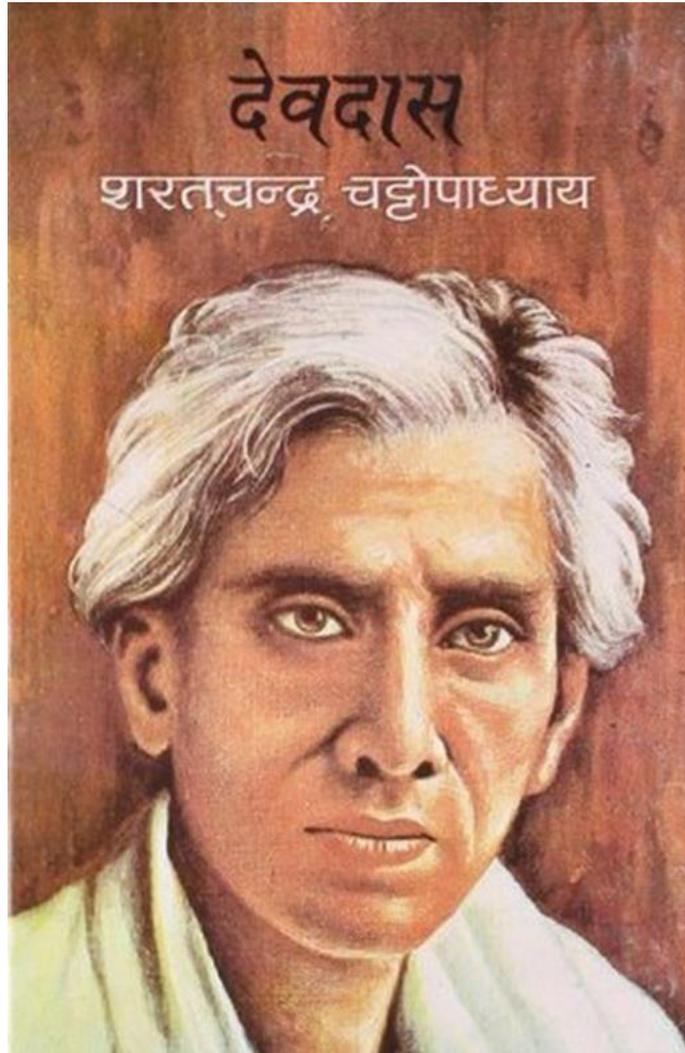
Hindi film is proposed for research and these films were made between from 1935 to 2002. When a film is made today, there are big differences in the look and feel of the films when compared to older films, Modern cinematography has completely changed the way films are viewed, as we'd expect. It's often obvious what the difference is, the industry has moved on, the budgets are higher and the technology is more advanced.

When we sit down to watch a remake and we think about a modern cinematography comparison of old vs. new, the differences jump out at us even more. In the short analysis below, Sean McDougall give's his thoughts on why that is. The video came about after Sean watched 'Man of Steel' and thought it was a poor film, why? Because the fun was taken out of the Superman character, though, among other things, the cinematography. So he sat down to illustrate his point of why modern cinematography is very different to classic cinematography.

Before you shoot any movie, you have to make important decisions about the look of a film. Elements like physical or digital film, aspect ratios, colour or black and white? You have to know what kind of film you're trying to make to then you can make these informed decisions.

The environment these decisions are made in has changed dramatically over time, to the point where modern cinematography can have the biggest impact on the look and feel of a film. Ridley Scott has been the stand out director that has impacted this change in modern cinematography. His style has influenced many great directors, like Tony Scott, David Fincher, Michael Bay and many more. This influence of Ridley Scott is the common de-saturated looks we see in many films today, this isn't necessarily a bad thing. The mistake made, is that it isn't good enough simply to imitate a style. You have known why this style is being adopted to the film and at some point, you have to make this stylistic choice as a result of understanding the script and the film.

**Number of Devdas Movies (Source wikipedia)**



**Sarat chandra Chatterjee- Devdas Author (Courtesy-Google)**

**Devdas(1928):**

There are many version of Devdas movie, among those, first devdas movie was released in the year 1928. Devdas (1928) was the silent film based on the Sharat Chandra Chattopadhyay novella, Devdas. This was the first film adaptation of the novella.

Year	Title	Language	Director	Cast			Notes
				Devdas	Parvati	Chandramukhi	
1928	<i>Devdas</i>	Silent film	Naresh Mitra	Phani Sarma	Tarakbala	Niharbala/Miss Parul	
1935	<i>Devdas</i>	Bengali	P.C. Barua	P.C. Barua	Jamuna Barua	Chandrabati Devi	
1936	<i>Devdas</i>	Hindi	P.C. Barua	K.L. Saigal	Jamuna Barua	Rajkumari	
1937	<i>Devdas</i>	Assamese	P.C. Barua	Phani Sarma	Zubeida	Mohini	
1953	<i>Devadasu</i>	Telugu Tamil	Vedantam Raghavaiah	Akkineni Nageswara Rao	Savitri	Lalitha	known as <i>Devadas</i> in Tamil
1955	<i>Devdas</i>	Hindi	Bimal Roy	Dilip Kumar	Suchitra Sen	Vyjayanthimala	
1965	<i>Devdas</i>	Urdu	Khawaja Sarfaraz	Habib Taalish	Shamim Ara	Nayyar Sultana	Pakistani film
1974	<i>Devadasu</i>	Telugu	Vijaya Nirmala	Ghattamaneni Krishna	Vijaya Nirmala	Jayanthi	
1979	<i>Devdas</i>	Bengali	Dilip Roy	Soumitra Chatterjee	Sumitra Mukherjee	Supriya Choudhury	also known as <i>Debdas</i>
1982	<i>Devdas</i>	Bengali	Chashi Nazrul Islam	Bulbul Ahmed	Kabori Sarwar	Anwara	Bangladeshi film
1989	<i>Devadas</i>	Malayalam	Crossbelt Mani	Venu Nagavally	Parvathy	Ramya Krishna	
2002	<i>Devdas</i>	Bengali	Shakti Samanta	Prasenjit Chatterjee	Arpita Pal	Indrani Halder	
2002	<i>Devdas</i>	Hindi	Sanjay Leela Bhansali	Shah Rukh Khan	Aishwarya Rai	Madhuri Dixit	
2009	<i>Dev.D</i>	Hindi	Anurag Kashyap	Abhay Deol	Mahi Gill	Kalki Koechlin	modern-day take on <i>Devdas</i>
2010	<i>Devdas</i>	Urdu	Iqbal Kasmiri	Nadeem Shah	Zara Sheikh	Meera	Pakistani film
2013	<i>Devdas</i>	Bengali	Chashi Nazrul Islam	Shakib Khan	Apu Biswas	Moushumi	Bangladeshi film
TBA	<i>Aur Devdas</i>	Hindi	Sudhir Mishra	Rahul Bhat	Richa Chadda	Aditi Rao Hydari	

Table 1: *Devdas*(1928)

### **Case Study: Devdas - Hindi Film (1936, 1955, 2002)**



**Picture: Shahrukh Khan and Aishwarya Rai in Devdas (2002)**

#### **Devdas: Sensation**

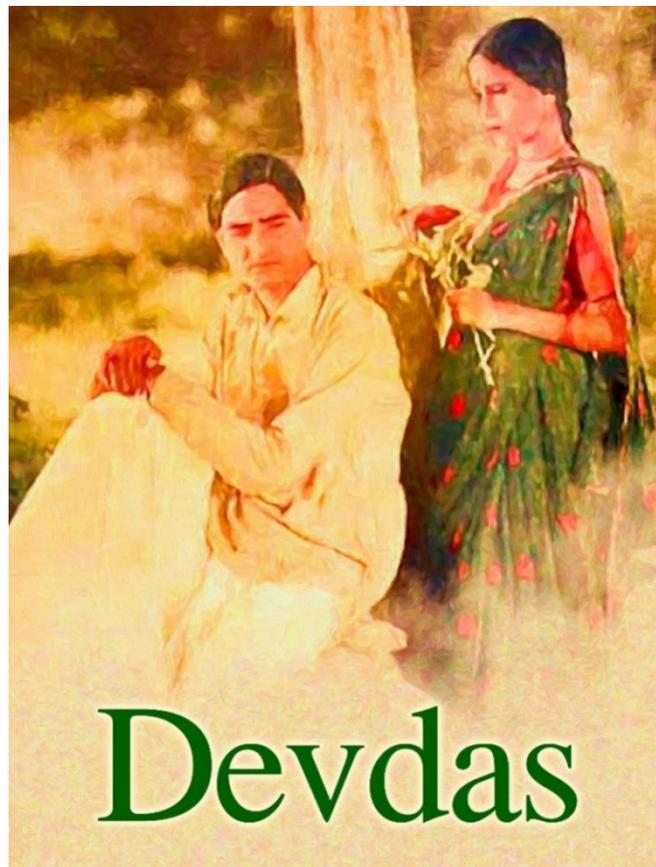
‘Devdas’ is a landmark twentieth century Indian novella written by the revolutionary Bengali novelist and raconteur of relatable, realist fiction, Saratchandra Chattopadhyay.

In the nine decades since its publication in 1917, the novella has acquired a cult status in Indian society, courtesy its many staged and inspired adaptations in regional Indian language films, apart from ‘three landmark makings’ in the national Hindi cinema by P.C. Barua (1936), Bimal Roy (1955) and Sanjay Leela Bhansali (2002). These films have sensitised generations of Indian viewers to ‘Devdas’ as a saga of unrequited love because it revolves around the doomed interpersonal relationships between each of its three pivotal characters –Parvati, Devdas and Chandramukhi –whose love for each other is never mortally realised.

In Saratchandra’s story, Devdas, the younger son of an aristocratic Bengali family, wants to marry his childhood sweetheart, Parvati. Though Parvati’s parents agree to the marriage, Devdas’ family opposes the alliance citing issues of caste and class, typical to the then Indian society. Parvati is ready to forsake her family and in an uncanny moment of daring undertakes a stealthy midnight visit to Devdas’ house and urges him to run away with her. As Devdas dithers about making a decision on the

future of their relationship, his family insults and forces Parvati to leave and let go of Devdas for good. She now has no other recourse and resigns herself to the fate planned by her parents. The gentle, introvert, and seemingly conforming Devdas watches in regret as Parvati is wed to an ageing neighbouring widower Zamindar(landlord) with adult kids. The rest of the story then has a guilt ridden Devdas, unable to come to terms with the loss of his only love, drink himself to death, tended by a courtesan, Chandramukhi, who falls in love with him, awed by his detached engagement with the pleasures of bordello. Devdas eventually dies at the doorstep of Parvati's mansion to fulfil an old promise and realise a life consuming death wish –a parting sighting of his love –as Parvati's husband and family members forcibly restrain her from meeting her dying lover. Thus ends Saratchandra's tragic path to unrequited love.

### **Devdas Hindi (1936)**



**Main cast**

**Kundan Lal Saigal and Jamuna**



**Picture: Kundan Lal Saigal and Jamuna in 1936 Devdas (Source: wikimedia)**

Indian cinema has given new dimensions to Devdas with its various adaptations across the years with grand Bengali sets and opulent costumes to display real Bengali glamor and elegance of pre-independence Bengal that was the hub of culture, music, dance, drama and textiles. The only marked difference in the numerous versions of Devdas is that the more recent one is dotted with more elaborate sets and the makers have kept a keen eye for detail in order to make the story seem as authentic as possible.

The three protagonists of Devdas have also undergone drastic changes in terms of attire over the three different movies shot in different eras of Indian cinema. For instance, the very first and second Devdas films have been shot with austerity wherein the costumes are used to enhance the element of traditional Bengali culture by keeping it simple and using handloom cotton Bengali saris for Paro and Chandramukhi with subtle jewelry. However, come 2002 and the Shahrukh-starrer Devdas was a complete foil to what we had earlier seen, with dress designers who were hired to dress up the protagonists after a lot of research. Sanjay Leela Bhansali, the director, chose the path of unabashed opulence to highlight the three characters by having Abu Sandeep dress up Chandramukhi (Madhuri Dixit) in great finery by using Banarasi brocades, embroidered blouses, silks, jadau and gold ornaments.



Picture: Suchitra Sen and Dilip Kumar in Bimal Roy's "Devdas" (1955)

## Origin and History

The first version in 1936 hindi movie starred the legendary K.L. Saigal as Devdas, who sang his own songs and lent the movie the charm of honest cinema. The second version 1955 hindi movi starred the superstar of those times, Dilip Kumar, as Devdas whose presence livened up the silver screen and made the movie a resounding success. The latest Devdas film in 2002 starred the ‘King of Bollywood’ Shahrukh Khan wherein he displayed his famed antics and managed to portray the conflict, drama, love, anguish and catharsis to portray the ethos of Devdas.

Director Bimal Roy’s representation of Devdas which was based on Sharat Chandra Chattopadhyay’s novel was simple and serene, and void of glamor. The film was made in 1955 and Bollywood actors Dilip Kumar, Suchitra Sen and Vyajanthimala were the leading characters. The film upholds Bengali culture and the traditional outlook while keeping alive the essence of the story in the simplest of settings. No grand display of costumes, no ornate sets, no heavy makeup, and no glitter and glamor. The story of Devdas from the 1955 version is less of a fairytale, and more of a lover’s tragic account. The black and white cinematography adds to the uncomplicated visual effect that the movie has in terms of its style and appeal.

## Devdas across 3 Decades

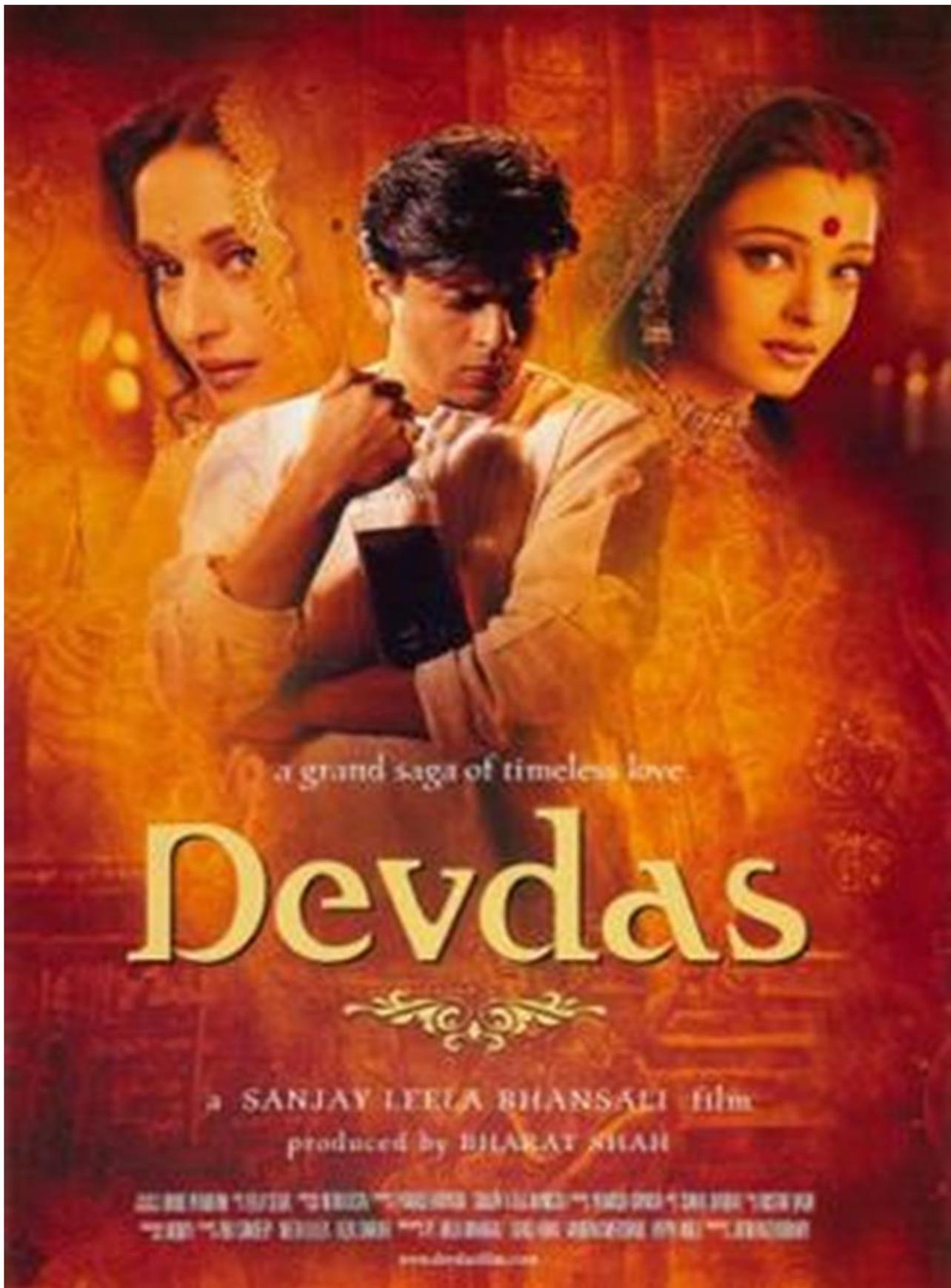


Devdas has been reinvented and resurrected over three distinct eras, wherein the essence of the self-destructive and narcissistic Devdas remains unaltered and so does the storyline of his tragedy. However, the three different actors who have portrayed this epic character have given it shades that have made each Devdas distinctively different and unique in style and essence.

The very first Devdas portrayed by Kundan Lal Saigal is a very simple film that stays true to most of the novel written by Sarat Chandra Chattopadhyay in terms of how he appeared upon his return from England and how he later converted to traditional wear during his days of alcoholism and despondency. The western attire with the full suit, tie, shoes, hat and walking stick are all present and so is the crispness in the traditional Bengali dhoti, kurta and shawl- but that is secondary to the performance and music of the film.

The second version of Devdas which was directed by the legendary director Bimal Roy is perhaps the most authentic adaptation of the book and does poetic justice to the essence of Devdas. Devdas, portrayed by Dilip Kumar, has been the most influential and the entire film exudes a Bengali sensibility of cinema like that of Satyajit Ray. The settings are natural instead of lavish sets, therefore the movie is more believable. Likewise, Devdas is also shown to be dressed in western attire that is elegant and sophisticated- but not over the top. Same is for his traditional attire that has been designed to exude a typical Bengali charm of that era.

However, the most recent Devdas, Shahrukh Khan has perhaps been the most grandest of the lot with Abu Jani creating both the western and traditional outfits. There has been a keen eye for details when it comes to the colours, the cotton and silks of Bengal, the chikankari embroidery work on the kurtas, the typical golden buttons of the suit, the hat, the English overcoat and the polka-dotted bow-tie. Opulent is what describes the attire of the most recent Devdas.



Picture: Devdas 2002

**Paro Vs. Paro**



**Devdas 2002 Fashion (Source: [makeupandbeauty.com](http://makeupandbeauty.com))**

Paro or Parvati is the quintessential character that has a joint destiny with the main protagonist of the film, Devdas. Paro's portrayal in the 1936 film is a very raw representation of the character in the novella by Chattopadhyay, but the movie is largely about Paro and defies the title 'Devdas'. She is dressed in simple Bengali cotton sarees draped in the typical manner of the region. The movie is more focused on story telling through emotions, speech-like dialogues and songs rather than clothes, jewellery and settings.

Paro from Bimal Roy's 1955 version of Devdas is an embodiment of charm, simplicity and grace. Her authentic costumes are reminiscent of the setting of the story. The flowing cottons and silks with the traditional borders, big red bindis and ornaments have been depicted in a manner that would make them relive that era.

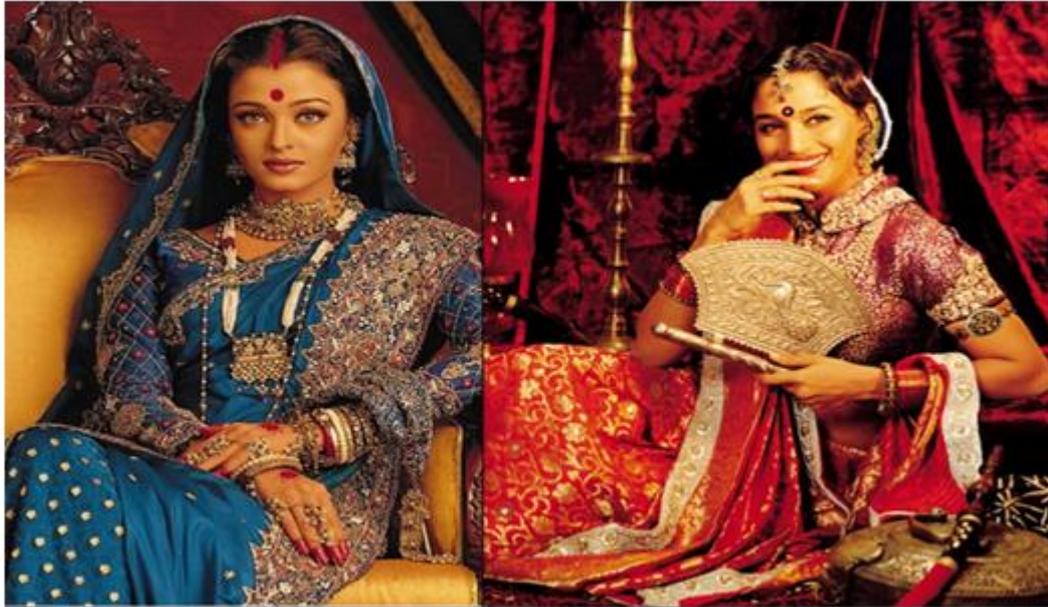
However, things were taken much further in terms of attire and jewelry when Sanjay Leela Bhansali chose to heighten the glamor quotient and portray a fantasy-like element to the tale with its larger-than-life characters. What one may remember of Paro from the 1955 version would be a simple and innocent looking Suchitra Sen in her simple Cotton Bengali sari with the red bindi and kohled eyes. On the other hand, what comes to mind of the new age Paro is Aishwarya Rai's immaculate screen presence in her lustrous sarees, heavy gold jewellery and glamorous makeup, furthermore all the details are easily visible now than in the previous black-and-white movies.

### **Chandramukhi vs. Chandramukhi**



Chandramukhi too has undergone a metamorphosis to what she was presented like in the 1936 movie, which can be an authentic representation of the character in terms of attire as she exuded simplicity and grace in typical Bengali sarees. Vijyanthimala took

the character of Chandramukhi further in the 1955 version and gave her an added glamor in her ornate lehngas and dupattas along with exquisite jewellery befitting a courtesan in Bengal during the pre-independence era. To a certain extent the clothes that have been worn are said to be authentic as possible because Bimal Roy was a perfectionist.



**Picture: Aishwarya Rai as Paro and Madhuri Dixit as Chandramukhi in Devdas (2002)**

However, Chandramukhi that has been played by Madhuri Dixit in the Bhansali magnum opus gives the character a dream-like quality that is almost unattainable. The costumes that range from her famous green dress worn in ‘Maar Daala’(which apparently weighted 30 kgs) and the epic red and white Bengali saree worn in ‘Dola re’ is something that transcends the boundaries of reality and adds a fantasy-like element.

### **Chronicles of the Future Untold**

Devdas is a popular film with global appeal, this is the reason why it has been remade so many times and will be remade once again. In fact, there was a movie that was released a while ago by the name of DevD, which was again a modern take on the same characters in an urban modern setting with the protagonists donning western attire. A modern Devdas of the 21st century would be more than an alcoholic and would exude the qualities of a metro sexual male. The clothing of Devdas would be

contemporary casual, yet extremely stylish. Likewise, the modern Paro and Chandramukhi will be dressed in modern Western costumes that have some Indian/Bengali accents to it. 'Less is more' is most certainly the mantra of modern cinema, hence the minimalist look of the characters would be a far cry from Bhansali's saga of opulence in *Devdas* 2001.

So powerful was the appeal of the *Devdas* persona for successive generations of actors and audiences that while the former became inextricably linked with the role, the latter passionately debated the relative strengths of each actor's interpretation of *Devdas*. Writing four decades after Barua's rendition of *Devdas*, film journalist Rinki Bhattacharya has claimed: "*Devdas* [has been to the Indian actor] what Hamlet is to his western counterpart". Bhattacharya has also located the supreme irony of the cult of *Devdas* in Indian film culture when she writes: "The hero of Indian cinema was ushered in by, perhaps, the best known anti-hero of all times-*Devdas*". The fact that from the late 1920s to well into the 1970s audiences have persisted in empathizing with *Devdas*, the anti-hero, and actors have become inextricably linked with the persona, belies a social and psychological reality that merits understanding.

For Bengali audiences in the 1930s Barua the prince and *Devdas* the character were virtually interchangeable. As the dying Barua, in 1951, himself commented: *Devdas* was in me even before I was born, I created it every moment of my life much before I put it on the screen and yet, once it was on the screen, it was more than a mirage, a play of light and shade and sadder still, it ceased to exist after two hours. (Quoted in Ramachandran 50)

When, in 1946, K.L. Saigal, not unlike the fictional *Devdas*, serendipitously died of alcoholism at the young age of forty-two, his fans throughout the subcontinent regarded the actor and the persona as merging together perfectly. Upon his death radio stations throughout India obsessively played for days on end the tragic and soulful songs that Saigal had sung in *Devdas* and many other comparable melodramatic films, in what came to be recognized as an unofficial mourning for a "national" hero. For two decades Saigal's interpretation of *Devdas* reigned supreme, setting the standard both for an under-stated acting style and a particular tonal quality of playback singing that was emulated by many other singers of the Indian film industry.

The Bengali and the Hindi versions of 1935 and 1936 were virtually identical, with the exception of Saigal playing *Devdas*. However, a comparison of the 1936 and 1955

Hindi versions reveals some interesting differences. The highly regulated film industry of colonial India was transformed after Independence in 1947. Many new studios were established; the infusion of private investment resulted in considerable technological progress; the highly restrictive (British) Cinematograph Act of 1918 was amended; the entertainment tax on films was raised considerably by state governments, thereby changing the demographics of film audiences. Resulting from these transformed modes of production, the old anti-imperialist values of the film industry needed to be revised.

Bimal Roy, the cameraman for Barua, attempted another remake of *Devdas*, this time played by an already established star of the Indian film industry, Dilip Kumar. Dilip Kumar (né Yusuf Khan) was a Pathan—a sturdy mountain people from the Northwest Frontier Province of India, and in this respect he was, not unlike Saigal, associated with the "martial races." Dilip Kumar's "filmic identity offered a complex cultural/psychological terrain displaying the anxieties of Independence and the nostalgias of a pre-Partition childhood" (Rajadhyaksha and Willemsen 123), since he had previously been cast in the role of "an innocent loner caught in and destroyed by conflicting social pressures". So perfectly did Dilip Kumar embody the contradicted persona of *Devdas* that the post-Independence generation of filmgoers "swore Dilip was born to play *Devdas*" (Bhattacharya 15). What is more, so entrenched was Dilip Kumar in the mythology of *Devdas* and so detrimental was this to his self-image that, shortly after he played the role, Dilip Kumar "decided to change to a more swashbuckling image . . . apparently on [the] advice of his psychoanalyst" (Rajadhyaksha and Willemsen 123).

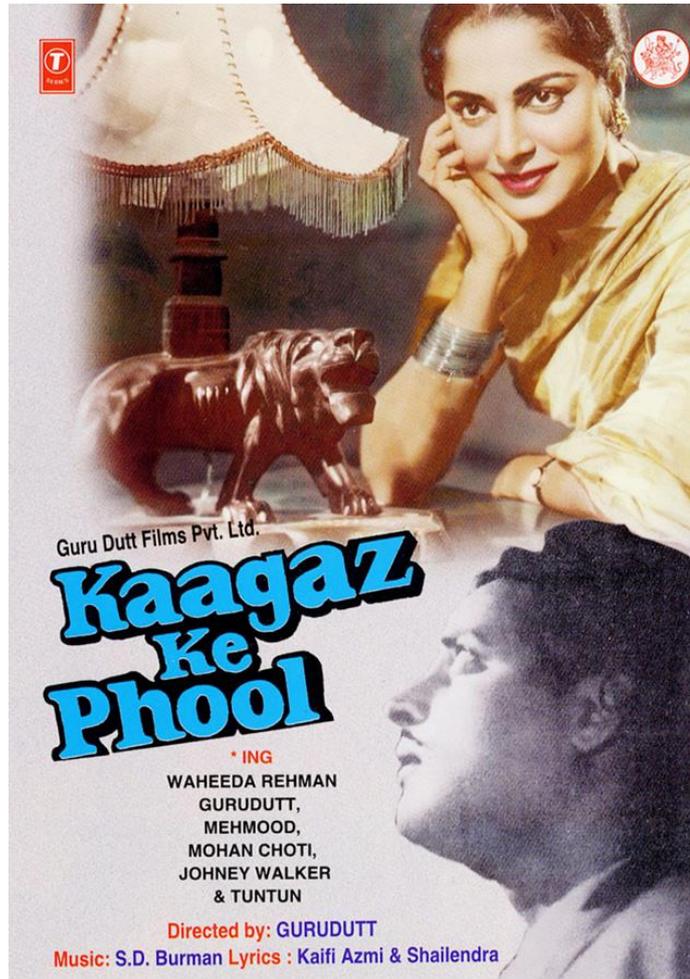
Even though *Devdas* (1955) established its own visual style and bore the imprint of the production values of the studio system, the persistence of the *Devdas* myth dictated that audiences establish the continuities and disjuncture of these text vis-à-vis earlier versions of *Devdas*.

A debate ensued in the popular press wherein film critics and buffs alike passionately argued the relative merits of Barua's, Saigal's and Dilip Kumar's rendition of *Devdas*. Bhattacharya writes that the "release of the remake made nearly everyone wickedly nostalgic, comparing sly notes on all three *Devdases*: Barua, Saigal and Dilip Kumar" (15). No consensus was possible; the generation that came of age in the pre-

Independence days preferred either Barua or Saigal, whereas the post-Independence generation overwhelmingly preferred Dilip Kumar.

While Chakravarty has claimed that in 1955 "the Devdas character no longer captivated the popular imagination" (141), Rajadhyaksha and Willemen have stipulated that "the new approach provide[d] a more resonant historical background to a story usually focused almost exclusively on Devdas's psycho- logical obsessions" (318). This shift from the psychoanalytic underpinnings *Journal of South Asian Literature*, Vol. XXX, Nos. 1 & 2 (1995) of the narrative to the pressing socio-political implications of the Roy production are reinforced by the lyrics of Sahir Ludhianvi, the legendary love poet of the film industry and a Devdas type in his own right.

The existential angst of the protagonist is interpreted by the post-Independence generation of Devdas fans as an expression of the latter's sense of betrayal at the hands of an indifferent state bureaucracy and political leadership, which failed to address widespread unemployment among urban, educated men, political corruption, and a distinct lack of idealism among the young. Nor is Dilip Kumar alone in reinterpreting the Devdas myth in a post- Independence culture. Other stars of the Indian film industry such as Guru Dutt, Raj Kapoor, and Bharat Bhushan displaced Devdas's Indian film industry such as Guru Dutt, Raj Kapoor, and Bharat Bhushan displaced Devdas's psychological neuroses onto a profound disillusionment with the Indian nation state.



**Picture: Kagaz ke phool (1959)**

In 1959 Guru Dutt directed India's first cinemascope film, Kagaz ke phool [Paper Flowers], in which an idealistic film director fails to realize his ambition to make yet another version of the Devdas story. In drawing attention to the marginality of the Indian artist in the project of nation-building, Kagaz ke phool reinterpreted Devdas, once the prototype of the noble but ineffectual colonial subject, as an atavistic icon of a failed idealism in a neocolonial culture, and Parvati not as the legendary beloved, but rather as an opportunist star of the Indian film industry.

I am arguing that Indian cinema has immortalised Devdas and Parvati not so much for their devotion to each other, as for their mutual chastity, to a lesser degree for their defiance of societal codes. In order to understand the psycho-social implications of the lovers sexual chastity and Devdas's chastity vis-à-vis Chandramukhi, one must locate this chastity within the larger gender ideology of colonialism.

Even though throughout the second half of the nineteenth century the British had claimed that they were committed to a policy of non-interference in the social and religious life of Indians, by the 1930s the purview of this "uncolonized space" had been steadily shrinking. In 1891 the Age of Consent Act, according to which sexual intercourse with unmarried or married girls below twelve years of age, with or without their consent, was to be treated as rape, had been passed, despite overwhelming protest by Indian nationalists. However, fearing social unrest, the viceroy had issued a subsequent executive order "that made it virtually impossible to bring cases of premature consummation of child marriage for trial under the Consent Act" (Sinha 1994, 138).

In spite of this corrective measure, the psychological impact of the Consent Act on the Bengali babu was far-reaching, indeed. For between the legal binding of the Consent Act and the impossibility of its implementation, there opened up a chasm of vulnerability. According to the cultural logic of colonized India Devdas is a hero rather than a coward; he is successful in refuting the negative construction of him as a morally and physically effete man by maintaining his chastity. This makes Devdas a text of colonial resistance; it is a narrative which creates a discursive space wherein a colonial subject attempts his self-determination, albeit in the terms dictated by a colonizing, imperial discourse.

By involving multiple stakeholders, it becomes easier to involve them as characters for the story.

### **3.2 Research Methodology**

#### **Introduction**

In the study of this subject, the following research methods are mainly adopted: on the one hand, the existing historical records and books of authority are collected and consulted to understand the historical evolution and cultural characteristics of research objects. In other words, the relations between digital technology and films are sorted out from a historical perspective, and digital technology is analyzed from the standpoint of filmology.

On the other hand, the comparative method, inductive method, and data collection and analysis method are utilized to combine first-hand and secondary academic materials.

Industrial economics and film history are integrated to perfect the analysis of the influence of digital technology on the film industry. On this basis, the relevant materials and data are combined in the context of present digital condition to further analyze the current situation of film industry and look into the future development trend of films.

This research also conducted in-depth interviews for those professional filmmakers and professors. The researcher believes that the experts in the film industry all have strong opinions on the way things should be but depending on who you are speaking to, the opinions tend to change. Based on the information previously researched and mentioned throughout this work, three university professors, and two former filmmakers were interviewed. Each of them answered a set of interview questions and gave their point of view based upon personal experience and industry knowledge.

### **Primary Data**

Primary data is data originated for the first time by the researcher through direct efforts and experience, specifically for the purpose of addressing his research problem. Also known as the first hand or raw data. Primary data collection is quite expensive, as the research is conducted by the organization or agency itself, which requires resources like investment and manpower. The data collection is under direct control and supervision of the investigator.

The data can be collected through various methods like surveys, observations, physical testing, mailed questionnaires, questionnaire filled and sent by enumerators, personal interviews, telephonic interviews, focus groups, case studies, etc.

### **Secondary Data**

Secondary data implies second-hand information which is already collected and recorded by any person other than the user for a purpose, not relating to the current research problem. It is the readily available form of data collected from various sources like censuses, government publications, and internal records of the organization, reports, books, journal articles, and websites and so on.

Secondary data offer several advantages as it is easily available, saves time and cost of the researcher. But there are some disadvantages associated with this, as the data is

gathered for the purposes other than the problem in mind, so the usefulness of the data may be limited in a number of ways like relevance and accuracy.

Moreover, the objective and the method adopted for acquiring data may not be suitable to the current situation. Therefore, before using secondary data, these factors should be kept in mind.

### **Sampling**

- Sampling group – main users young and old age group people
- Geographical location of research
- Pune District – Rural and Urban population

**Devdas Movie Cast & Crew (1936, 1955, 2002)**

<b>Cast &amp; Crew</b>	<b>Devdas Hindi (1936)</b>	<b>Devdas Hindi (1955)</b>	<b>Devdas Hindi (2002)</b>
<b>Directed by</b>	P.C. Barua	Bimal Roy	Sanjay Leela Bhansali
<b>Writing Credits</b>	1. Saratchandra Chatterjee 2.P.C. Barua 3.Kidar Nath Sharma	1.Rajinder Singh Bedi 2. Saratchandra Chatterjee ... (novel) 3.Nabendu Ghosh	1.Saratchandra Chatterjee 2.Prakash Kapadia ... (screenplay) and 3.Sanjay Leela Bhansali 4.Prakash Kapadia
<b>Devdas</b>	K.L. Saigal	Dilip Kumar	Shah Rukh Khan
<b>Parvati aka Paro</b>	Jamuna	Suchitra Sen	Aishwarya Rai Bachchan
<b>Chandramukhi</b>	Rajkumari	Vyjayanthimala	Madhuri Dixit
<b>Chunnilal</b>	A.H. Shore	Motilal	Jackie Shroff
<b>Music by</b>	Rai Chand Boral Pankaj Mullick	Sachin Dev Burman	Ismail Darbar Monty Sharma
<b>Cinematography by</b>	Bimal Roy	Kamal Bose	Binod Pradhan

<b>Film Editing by</b>	Subodh Mitter		Bela Segal
<b>Production Management</b>	Jatin Mitter	Madan Bakaya	Azim Shaikh

*Table 2: Devdas Movie Cast & Crew (1936, 1955, 2002)*

### Technical Details

Sr. No.	Technical Aspects	Devdas Hindi (1936)	Devdas Hindi (1955)	Devdas Hindi (2002)
1.	Black and White/Color	B&W Film	B&W Film	Color Film
2.	Length/ Duration	2 hr 19 min (139 min)	2 hr 39 min (159 min)	3 hr 5 min (185 min) 3 hr 2 min (182 min) (UK) 2 hr 45 min (165 min) (Cannes) (France)
3.	Cost in Indian Rupees	3.5 - 4 lacs	5 million	500 million
4.	Camera	—	—	Arriflex 435, Arriscope and Angenieux HR Lenses
5.	Aspect Ration	1.37 : 1	1.37 : 1	2.35 : 1
6.	Negative Format	35 mm	35 mm	35 mm (Kodak Vision 250D 5246, Vision 500T 5279)
7.	Sound Mix	Mono	Mono	DTS   Dolby Digital

8.	C.G. Effects/Technology	No	No	Yes
9.	Lights	Tungsten	Tungsten	HMI/LED
10.	Post Production	Analog	Analog	Digital
11	Film Distribution	Analog	Analog	Online

*Table 3: Technical Details*

**No of Devdas Movies**

Sr.No	Year	Title	Language	Cinematographer
1	1936	Devdas	Hindi	Bimal Roy
2	1955	Devdas	Hindi	Kamal Bose
3	2002	Devdas	Hindi	Binod Pradhan

**A brief note about the cinematographers of hindi films Devdas. (1936,1955,2002)**



*Table 3: No of Devdas Movies*

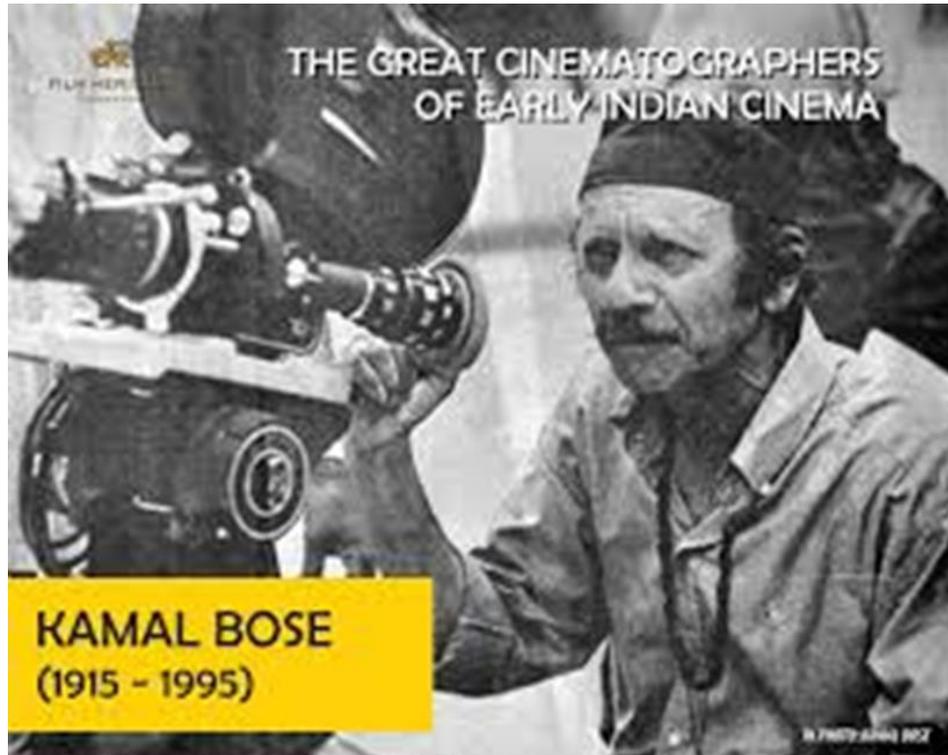
**Bimal Roy - Cinematographer - Devdas Hindi (1936)**

**Picture: Bimal Roy - Cinematographer - Devdas Hindi (1936)**

Two decades after Barua's masterpiece, his distinguished cameraman Bimal Roy who had come to Bombay and become a successful director and producer came out with his remake of "Devdas" in Hindi (1955) starring the then famous actor Dilip Kumar with Suchitra Sen and Vyjayantimala as Parbati and Chandramukhi respectively. Dedicated to Barua and Saigal, Roy presented his "Devdas" to the new generation who had not seen the original nor read Sarat Chandra's classic work. The older generation rated Barua's "Devdas" far superior to the one by Bimal Roy.

**Kamal Bose - Cinematographer - Devdas Hindi (1955)**

Kamal Bose (1915–1995) was an Indian cinematographer, who shot most of Bimal Roy classics, including Parineeta (1953), Do Bigha Zamin (1953), Bandini (1963), Devdas (1955) and Sujata (1960). He successfully transitioned into the coloured film era, and shot Qurbani (1980), Janbaaz (1986) and Dayavan (1988).



**Picture: Kamal Bose - Cinematographer - Devdas Hindi (1955)**

During his career, he won the Filmfare Award for Best Cinematographer record five times, Bandini (B&W, 1964), Anokhi Raat (B&W, 1970), Khamoshi (B&W, 1971), Dastak (B&W, 1972), Dharmatma (1976).

**Binod Pradhan - Cinematographer - Devdas Hindi (2002)**

Binod Pradhan is an Indian cinematographer, director and actor. He has worked in several popular and acclaimed films as a cinematographer. Some of his award-winning films include 1942 A Love Story, Devdas, Rang De Basanti, Mission Kashmir, and Munna Bhai M.B.B.S.



**Picture: Binod Pradhan - Cinematographer - Devdas Hindi (2002)**

**Born:** Kalimpong, West Bengal, India, as Binod Kumar Pradhan.

**Education:** Film and Television Institute of India, Pune.

**Career:** Started as asst to Prem Sagar at Sagar Arts [Sagar Films] in Mumbai.

Ph music videos dir by Girish Mallik, a.o. Ph commercials dir by Raima Sen [for *Coca-Cola*], a.o.

**Awards:** Screen Weekly Award [1994] & Filmfare Award [1994] for '*1942: A Love Story*'; Screen Weekly Award [1998] for '*Kareeb*'; Screen Weekly Videocon Award [2000], International Indian Film Academy 'Award for Technical Excellence' [2001] & Filmfare Award nom [2001] for '*Mission Kashmir*'; Filmfare Award [2002], International Indian Film Academy 'Award for Technical Excellence' [2003], Zee Cine Award 'Best Cinematographer' [2003] & V.Shantaram Award [2003] for '*Devdas*'; Zee Cine Award 'Technical Award' [2004] & Screen Weekly Award nom [2004] for '*Munna Bhai M.B.B.S.*'; 13th Star Screen Weekly Award, Filmfare 'Best Cinematography' Award [2007], International Indian Film Academy 'Best

Cinematography' Award [2007] & Zee Cine Award 'Best Cinematography' [2007] for '*Rang De Basanti*'.

### **3.3 Different technical parameters used for comparing Devdas (Hindi) movies released in 1936, 1955 and 2002.**

**Following are the Key elements in Cinematography**

#### **Exposure:**

While the director makes key decisions regarding the camera, the cinematographer actually makes it happen. One of the major considerations for cinematographers is exposure — the art of manipulating the camera settings to get the desired look of the image.

One of the first things to consider when creating a shot is the exposure. We'll look at this separately from lighting, because while they're both related, exposure is controlled by the camera, while lighting is an environmental factor. If you have your camera on auto mode, it will attempt to regulate the exposure itself. You may notice this when you move your camera and see the image suddenly darken or become washed out.

If this happens while you're rolling, it can look a bit jarring in the recorded video. To have more control over the look of your footage, set the exposure yourself.

#### **Camera Movement:**

Your characters may not be the only thing moving during a scene. For each shot, you'll have to decide whether you want a moving or static camera.

In the early days of cinema, cameras had less freedom of movement than they do today. A tracking shot might involve setting up a lengthy dolly track. A 360-degree shot meant strategically hiding crew and camera equipment where it wouldn't be seen.

These days, with the rise of steadicams and even drones, anyone can do a tracking shot without breaking the fourth wall or relying on an elaborate camera setup.

Consider the "dolly zoom," a shot made famous in Alfred Hitchcock's *Vertigo* and Steven Spielberg's *Jaws*. In this shot, the camera moves toward or away from the

subject on a dolly, while the lens zooms in the opposite direction, causing of sense unease.

You could do a zoom the easy way, by keeping the camera motionless and zooming in toward your subject, but it doesn't have the same effect. For Trail Purpose – put your camera on a wheelchair or skateboard and move toward your subject while zooming out. Get the timing right and you'll have a particularly disorienting shot on your hands.

Another popular motion is the whip-pan, made famous in 70s martial arts movies and by contemporary directors like Wes Anderson and Edgar Wright. Consider the opening of *Hot Fuzz*, which incorporates multiple whip pans into an extended montage.

Typically, a whip pan is produced by shooting two shots separately, and using the blurred footage during the “whip” motion to transition between them. When you shoot them, make sure that you turn the camera in the same direction, and at relatively the same speed, to allow for a smooth transition in the editing room.

Finally, consider the long take or the tracking shot. These kinds of shots were incredibly difficult in the days of film, when a reel only held a limited quantity of film stock. Now, you can shoot a movie in a single take, or follow your characters all over the city.

When shooting a tracking shot, don't just wing it. See if you can block out the path your actor will be taking, and find a well-composed shot to begin and end on.

If you're struggling to keep your actor in frame, it will be obvious to the viewer. Keep an eye on composition the entire time, and don't forget to adjust your exposure if you move from one lighting condition to another.

Camera movement—or the choice to remain static—can also change how an audience views a film. Consider the difference it would make while shooting a car chase if the Cinematographer decided to keep the camera in a single location instead of following the action.

Would the scene hold as much intensity if the audience watched the chase from a distance as the cars gave pursuit instead of staying in the thick of the conflict with the vehicles?

That is why action and adventure movies typically involve a great deal of camera movement to maintain that feeling of rapid motion both from a storytelling point of view, as well as the literal change of one location to the next by the characters.

A Cinematographer might also make a choice not to move the camera. For example, this tactic could work well in a courtroom drama, as a static camera could be used to heighten tension. With nowhere to escape, the audience is immediately forced to watch and wait while both sides argue their case to convince the jury to hand over a guilty or innocent verdict.

Camera movement can heighten the emotion and suspense in a scene. Choose to move the camera with the characters and gain perspective. Keep the camera static, and now we're separated from them, peering in.

### **Colour:**

The use of colour often gets overlooked as an element of cinematography. Isn't that the set designer's job? Or, in the case of clothing, the costume designer?

While some decisions may be made by the director and other crew members, the way that colour shows up on camera is a vital part of your role as a cinematographer.

First, you'll need to consider the colour temperature of your shot. Fluorescent light, tungsten light, and natural light all create different colour temperatures, as do clouds, shade, and direct sunlight.

Traditionally, film stock was produced specifically for indoor or outdoor use. Now, most cameras have built-in settings to adjust to a variety of lighting conditions.

If you aren't using automatic settings, then you'll need to understand a little bit about colour temperature and how to properly white balance your shot.

The hue of a light source is measured in degrees Kelvin, and typical light sources range from 1000K (the flame of a candle) to 5000K (fluorescent light) to 15,000K (clear sky). The higher the colour temperature, the more of a blue tint the image will have; a lower colour temperature, such as that of tungsten light, will produce an orange hue.

In order to avoid any unusual colour variations between shots, you'll need to give the camera a reference point. You can either do this by selecting the setting that matches your lighting conditions (i.e., sunny or cloudy), or doing it manually.

To set it manually, you'll find an object that is naturally white (such as a white picket fence, or a piece of paper) and press the white balance button on your camera. Now, the camera knows to adjust the colour temperature relative to that shade of white.

But incorporating colour into your cinematography doesn't end there. You'll also need to consider colour contrast and saturation. A scene that's vividly coloured in real life can look dull and drab on camera if not shot properly.

Some of the colour can be manipulated in post-production, but it's important to talk with your director and set designer to make sure you're on the same page.

A noir movie may call for a grey colour palette with low colour saturation, while a sci-fi movie may use a variety of colours with a lot of contrast between them. Directors like Akira Kurosawa use colour to establish themes and create symbolism.

When designing your shot, pay attention to how the colours of your subject's clothing and props interact with their environment. Do they pop out or blend in? Adjust your lighting and colour settings and see how that changes the look of the shot. Remember that what you see on camera will be different than what you see with the naked eye.

### **Shot Composition:**

The second most powerful element of cinematography is the composition of the shot. How are the separate pieces of the image arranged? Are your subjects in the center of the image or the side? Background or foreground?

Composition is especially noticeable on the big screen. On a smartphone, it can be easy to overlook the sides or the background of a shot. On a big screen, you're more likely to notice the extras in the distance or the characters on the edge of the frame.

A talented cinematographer pays attention to how the characters move throughout the scene and adjusts the position of the camera accordingly.

Many traditional cinematic techniques derive from painting and portraiture. It's common for close-up shots to adhere to the rule of thirds, with an actor's eyes lined up a third of the way down the screen. It's ok to break these rules, but keep in mind that leaving too much headroom or too much negative space to either side of an actor can leave the frame feeling empty or off-balance.

Likewise, keep an eye on how buildings, trees, clouds, and even mountains appear in the frame. If the horizon is visible in your shot, make sure that its level – unless, of course, you're going for a sense of imbalance or unease.

Consider how Gus Van Sant makes use of these outdoor elements in *My Own Private Idaho*, particularly in shots of River Phoenix's character lying down on the road or looking toward the horizon.

When characters move through the frame, don't just have them move left to right along an x-y axis. Including some diagonal movement in your shot adds some depth to the scene and keep it from looking too staged.

One of the most important choices that a Cinematographer makes for every single shot is its composition—or what will be seen in it. Composition refers to how each shot is framed and all the elements within that frame. This aspect of cinematography plays a crucial role in determining what the audience knows and when they know it.

While important in all genres of film, composition can be especially critical in horror movies. Let's say a young teen is walking through a supposedly abandoned house by himself. A Cinematographer might make the decision to tightly frame the Actor so that the audience has no idea of what's around him or what danger might be lurking until it confronts him.

Or the Cinematographer might choose to have a wider frame that shows each room that the protagonist walks past. And while he may not see the murderous villain hiding in the corner, the audience does! Both options can heighten suspense, yet each differently informs how the audience will react to the story.

Composition refers to the way elements of a scene are arranged in a camera frame. Shot composition refers to the arrangement of visual elements to convey an intended message.

One visual element that must be arranged particularly is your actors. Where will they be in the frame?

### **Shot Size:**

How much of the scene is actually seen? Are we in a close-up watching a subject's face change expression? Maybe it's an extreme close-up on a subject's attire indicating to the audience that they should pay attention to this.

**Focus:**

At first glance, the issue of focus might appear very cut and dry. A film should always be in focus, right? Otherwise, the audience may become frustrated by the blurry images and assume that the production must have suffered from a filming mistake.

But for a Cinematographer, playing with focus can actually enhance the impact of the story being told. Let's say that the scene in question is an older person who is retelling a tale from her youth. A Cinematographer might intentionally make that flashback somewhat blurred or hazy to mirror the protagonist's fond yet fuzzy recollections of the past.

Focus can also be used to emphasize certain elements in a scene. Take a seemingly mundane shot such as someone sitting at a table and paying their bills. However, behind them is a window.

A Cinematographer might choose to put the focus on the background element of the window to show the character's long-lost spouse walking to the front door, thus highlighting the impending emotional reunion between the two. At the same time, the person at the table might be slightly unfocused to reinforce their ignorance regarding what is about to happen.

Part of a cinematographer's job is to play with focus to emphasize different aspects of the story. A basic example of this is showing how intoxicated the character is by going in and out of focus. There are many types of cameras focus available, each with their own particular storytelling value.

**Lighting:**

While the Gaffer—or Lead Lighting Technician—is in charge of the execution of the lighting design, the Cinematographer typically is the person who decides what that design will be.

Lighting has become such a fundamental component of supporting a film's story that many people take for granted its use in different genres. For instance, to highlight their lighter tone and emotion, comedies are often filmed with high-key lighting that removes any areas of darkness or shadows. In direct contrast are thrillers or noir films, which tend to favor low-key lighting to emphasize the moodiness and mystery of the stories being told.

Regardless of genre, lighting is always a fundamental consideration that a Cinematographer can use to subtly influence the tone of the film and the audience's emotional response to it.

While there is a separate lighting person, cinematography demands this knowledge. After all, cinematography is what we see on-screen, and how well or horribly the scene is lit is a huge aspect of the craft.

3-point lighting is a very common lighting setup but there are many styles and approaches to lighting. For example, Rembrandt lighting brings a lot of dimension to lighting a subject's face and chiaroscuro lighting is ideal to convey dark and dangerous situations.

### **Camera Placement:**

A film is only a live performance without a camera to capture it for future viewing and enjoyment. But where a Cinematographer chooses to place the camera in relation to the action or conversation unfolding in front of it can heighten the meaning of a particular scene.

For instance, perhaps the scene being shot is a date at a restaurant. If the Cinematographer decides to place the camera far from the couple at dinner, the audience may sense that they are spying on an intimate moment. Or the space between the camera and couple might be used to mirror the emotional distance between the two individuals on the date.

Conversely, should the Cinematographer decide to place the camera right at the dinner table, the effect could be one of claustrophobia. That one or both of the individuals on the date feels pressure to be or act a certain way. With every single shot, the Cinematographer is making a choice about how the camera placement will influence the emotional weight of the scene.

Where they place the camera greatly affects how the audience reacts to the shot, and therefore the rest of the scene. It can have significant emotional impact or even convey character behavior.

For example, if the story calls for a character to be seen as rude, or ill-mannered while out on a date, placing the camera close to the subject's mouth while chewing would be effective.

### **C.G Technology:**

Back in the days, when the digital computer technologies were on the embryo stage, all the props, fantastic environments or creatures in the science fiction films and horror movies were created for real out of rubber, silicon and on the base of hydraulic system and aid of robotics. In fact, the result gave these conditions:

- Limitations
- Poor technologies
- Big expenses
- Time consuming
- Unrealistic look
- Lack of movements.

However, because of CGI, there is almost no use of these materials anymore. It is much cheaper to generate the “Pandora” world with all its’ “Avatars” using computer graphics than creating it for real. These days, digital effects are so intelligent and delicate that it is hard to recognize the unreality of them, but it should be taken into consideration that it was not always like that. There were several movies in the history of cinematography that one by one started completely changing the industry of digital effects and computer generated imagery. One of the first and the most significant steps for digital effects was the legendary “Star Wars” in 1977. Spaceship battles in Star Wars were created using the motion-control photography technique and, moreover, it saved a lot of time for movie creators in contrast if they had done space wars manually.

Afterwards, in 1991 the “morphing” technique was first used in “Terminator 2 -The Judgment Day”. It was layered in the scenes of transformation from a human looking view to a liquid robot humanoid. In 1997 the outstanding “Titanic” managed to make a huge jump to the field of digital effects and 3D development in the feature films. It is not possible even to try mentioning all the scenes in which it was so useful for movie creators to use CG because they are numerous.

All the difficult parts for filming scenes like moments with a huge mass of people, Titanic crash, people falling overboard, the water, which fills up the ship, and many other parts, movie creators did with the help of CG. It was CG that made this movie so attractive for people of all ages, because it was one of the newest ways to display

things and fulfil them with believability, but for the creators it was at the same time the cheapest and easiest way to materialize their vision. Of course, “Titanic” as a movie was not the first which used the CG option in the filmmaking process, but obviously one of the first which took the maximum possibilities from the computer usage and made it on a professional way, the way which allowed “Titanic” to be the leader of box-office takings for 13 years.



### **Film Education:**

Film education plays vital role in cinematography. Film, also called motion picture or movie, series of still photographs on film, projected in rapid succession onto a screen by means of light. Because of the optical phenomenon known as persistence of vision, this gives the illusion of actual, smooth, and continuous movement. Film is a remarkably effective medium in conveying drama and especially in the evocation of emotion. The art of motion pictures is exceedingly complex, requiring contributions from nearly all the other arts as well as countless technical skills (for example, in sound recording, photography, and optics). Emerging at the end of the 19th century, this new art form became one of the most popular and influential media of the 20th century and beyond.

The director of photography, or DP, is responsible for capturing the script on film or video. The DP must pay attention to lighting and the camera's technical capabilities.

When the director wants a shot to achieve certain visual or atmospheric qualities, the DP achieves it through his or her choice of lighting, film stock and careful manipulation of the camera. This craft is referred to as cinematography.

As a commercial venture, offering fictional narratives to large audiences in theatres, film was quickly recognized as perhaps the first truly mass form of entertainment. Without losing its broad appeal, the medium also developed as a means of artistic expression in such areas as acting, directing, screenwriting, cinematography, costume and set design, and music.

### **Film Schools and Film Institutes for teaching Better Visual Communication.**

If film making is all about storytelling through the vision of the director, it is the cinematographer who brings this vision alive on screen. In the ever-growing showbiz industry, the cinematographer is without any doubt one of the most sought-after positions and lucrative at as opposed to the popular belief, cinematography is not only about recording with a camera or handling of camera for that matter.

It involves a lot of technicalities -

1. Composing a shot within a frame
2. Controlling the exposure
3. Manipulating the colour temperature
4. Arrangement of lighting set up as per the demand of the scene and to create the desired mood

All these necessitate proper training and hands on practical exposure for somebody aspiring to become a professional cinematographer. Cinematography is known to be the most difficult to learn among the many film making courses. With the advancement of technology and inventions almost every other day the need of specialized training is today more than ever before.

### **Among the few film schools imparting training on cinematography in World: -**

1. Film & Television Institute of India (FTII), Pune.
2. Satyajit Ray Film & Television Institute of India (SRFTII), Kolkata.
3. MGR Government Film Institute, Chennai.

4. American Film Institute.
5. New York University, Tisch School of Arts.
6. Los Angeles Film School.
7. London Film School.
8. Vancouver Film School.
9. National Film and Television School (NFTS), London.
10. Sydney Film School, Australia.

In short, cinematography can make or break a film. The person in charge of the cinematography called the cinematographer/camera man or D.O.P (Director of Photography) is largely responsible for the film turning out what it is.

### **Setting**

In this study, each interview took place separately using a set of questions to be answered by each filmmaker and professor. One interview was done via cell phone, two were done via face to face during a convention. Two participants were interviewed in their office. Each interview was using a voice recorder to transcribing. Since each person answered the questions, the researcher took hand notes. This research applied the qualitative method to collect in depth information and perceptions from key parties involved. However, the only requirement for the participants is they need to be a professional in the film industry and willing to offer their personal insights.

### **Sample**

#### **Interview Questions for Filmmakers:**

**Topic 1:** In the money-driven movie industry, the emergence of digital video technology allows filmmakers to save money in the shooting and editing processes.

- 1) What do you think is the major reason that the industry is more likely to use the digital camera to shoot film instead of the traditional film camera?
- 2) Why the digital camera was not popular in the film industry at its invention?
- 3) Besides price, what are the other advantages of digital cameras over old film cameras?

**Topic 2:** The rise of digital video technology changed the way that film make-up and post-production are made.

1) As a director, can you simply describe the film appearance design in the pre-digital camera era?

2) Which aspect of the appearance design was most affected by the digital video technology?

**Topic 3:** Digital video technology offers a great chance for those low-budget independent moviemakers and amateurs who could not afford the high production costs before to produce their own movies.

1) In a director's point of view, what are the major barriers that might prohibit the independent moviemakers from producing their films?

2) With digital technology, how do you think that might change the industry environment for independent moviemakers?

3) Since digital platforms like YouTube have risen up, the amateurs can upload their own videos on it. Therefore, how do you think this phenomenon can be attributed to digital cameras & digital video technology?

**Topic 4:** In the future, the newest digital video technology like UHD/4k still will affect film production.

1) UHD technology has extremely high quality for the image and video, and as a director, can you briefly explain why there are not too many famous film studios and companies willing use UHD cameras to produce movies right now?

2) What are the major difficulties for film and TV industry to distribute and broadcast 4k content for audiences?

**Topic 5:** Technological Innovation on Camera, lighting and related accessories helped to improve visual quality/Impact on audience behavior

1) From Black & White to Color film, how innovation take places over camera, lightning and its accessories?

### **Data Analysis**

When the data collected from the interviews with the filmmakers and professors, the researcher transcribed what they said during the interview into written language that can support the arguments and hypothesis of this study. Also, this method makes it easier for the researcher to track the useful information. Then each response from those interviewees was categorized to match the order of the interview questions.

## **Chapter 4: Data Analysis**

### **Digital Technology Brings the Opportunity for Creating Spectacles on Film**

In the past, production of traditional films was limited by numerous technical conditions and mostly completed by things that actually existed in real life. Audiences then evaluate films in terms of the closeness of the film scenes and compare them to existing materials in real life.

The long shots of André Bazin, the montage theory of Eisenstein, and the realistic filming of Akira Kurosawa were all established on the basis of shooting existing objects in real life, and the film subjects were all related to human life.

However, with the introduction of digital technologies, including electronic imaging technology, CG special effects and green-screen technology, such limitations were done away with; filming can be completed without physical entities, but produced by powerful computers freely according to the demand. Therefore, all kinds of natural disasters, wonders of the universe and other scenarios that could hardly be presented in early films can now be easily performed in the big screen; further, myths and legends, alien worlds and other topics that were hardly involved in films of the past can now be presented by using synthetic technology without the preparing the real objects. Just as the scholar Shi Keyang proposed in his “impact of digital technology on cinema aesthetic” (2012), a new kind of film aesthetics—“virtual”, aesthetics—has come into being.

### **The Impact of Camera Digital Technology on Film Language and Narrative Approach**

The traditional film language system is built on the basis of long shots and montage and is edited in a linear manner, while digital technology adopts a non-linear editing mode that maximizes the freedom of the filming process to jump entirely throughout according to the story and replicate without restriction, thus providing audiences with unprecedented visual spectacles. Accordingly, the traditional bias toward the opposition of “long shot” and “montage” is no longer as important as in the past (Jianfeng Du, personal interview, October 14, 2015).

## **What qualitative changes have happened in various links of film production?**

### **Pre-Production**

In over one hundred year's history of film development, the post-production shooting of film could not proceed without camera. The collections of images and sounds of traditional films were mostly through video camera and voice recording equipment collecting in actual environments, yet the emergence of digital technology hugely overturned this conventional shooting way. The traditional video camera used film recording means, and the 35mm film was superior to magnetic tape signal whatever in colour rendition or image clearness degree. But with the development of science and technology, traditional 35mm film's status has been challenged, from the emergence of high-definition camera to charge-coupled device (CCD) full-width digital movie camera like 35mm cine-film launched by Sony. These changes produced huge shocks to traditional film photography. At the same time, in shooting pattern, the emergence of digital technology also overthrew past shooting methods.

### **Post-Release**

The impacts from digital technology on film are not merely during the shooting and producing stage. The huge impact is on the post-production of showing and releasing, and about forming a new set of layout of film releasing and showing under this impact. The release pattern of traditional movies could only depend on selling the copies to cinemas to proceed releasing, the transportation and storing of copied films were frustrating and costly. However, after digital technology arose, digital films brought a brand new releasing way, there would be no more need of being worried about the transportation and storing of films, and the transmission of film entered into diversification. But for another, we could conclude from the analyzing of the above that the digital technology doesn't reduce the production cost of film industry in every aspect. Most of the top-level commercial films in Hollywood maintain very high budgets, because the cost for film's post special effect increases a lot than for that of traditional movies, and the prices of relative corollary equipment are very expensive, which objectively causes the costs of digital technology in some links of film producing being higher than of traditional film making.

#### **4.1 Specific Influences of Digital Camera technology on Filming Cost:**

As we know, the cost for anything increases rapidly from the decade. Cinematographer Binod Pradhan used 30 lakh watts of power supplied by 42

generators to light the humongous set - the unit had to hire additional space at Film City just to park the generators as compare to total film budget of film Devdas 1935 and 1955.

Since traditional film-making requires shooting in real conditions, extensive manpower and resources are involved, and thus the budget rises. Some shootings should be completed under certain natural conditions and thus the crew often has to wait for a long time, which can also increase the filming costs and delay the production process. With the advent of digital technology, most shootings can be completed in the studio, and pre-production can be obtained by processing characters with green-screen technology. This greatly helps the industry to reduce the cost of production, as certain scenes can even be produced entirely by the computer. Also, digital technology has substantially reduced the access threshold of the industry.

As consumer-level high-definition digital cameras have become popular, many amateur enthusiasts of the filming industry and those independent film-makers, who could hardly afford the expensive filming equipment in the past, can now take the opportunity to enter the film industry.

In general, the rise of digital technology has trained a new generation of directors, photographers and post-production staff for the entire film industry. Meanwhile, it can be seen from the above analysis that digital technology does not necessarily help decrease the overall production costs of the film industry. Nowadays, most of the top Hollywood commercial films still maintain a very high budget level.

The major reason for this phenomenon is that the costs of post-production effects of filmmaking are actually much higher than in traditional films. As mentioned above, much of the relevant high-end film-making equipment is so expensive that the startup companies cannot afford the price, and it also causes another situation where only big companies, such as Warner Brothers, and 20th Century Fox, can make a huge profit from their top commercial films.

### **Filmmakers Connect with Audiences**

Audience identification with the characters in a story is fundamental to successful filmmaking. Successful stories subliminally invite audience members to participate mentally with the movie's main characters. In the darkness of the theatre 95% of our sensory receptions are tuned into the movie's visuals and sound. We find ourselves "in the story" and helping the characters make decisions—rooting for them when they

make the right decision and cringing when they don't. We get emotionally involved, we identify, and like Mia Farrow's character in Woody Allen's *THE PURPLE ROSE OF CAIRO*, and we want to get up on the screen, be in the story, and rub shoulders and barbs with Jeff Daniel's character. There are three ways filmmakers get audiences to connect with the story. In one-word filmmakers *SUTURE* the audience into the movie. But they use three different techniques.



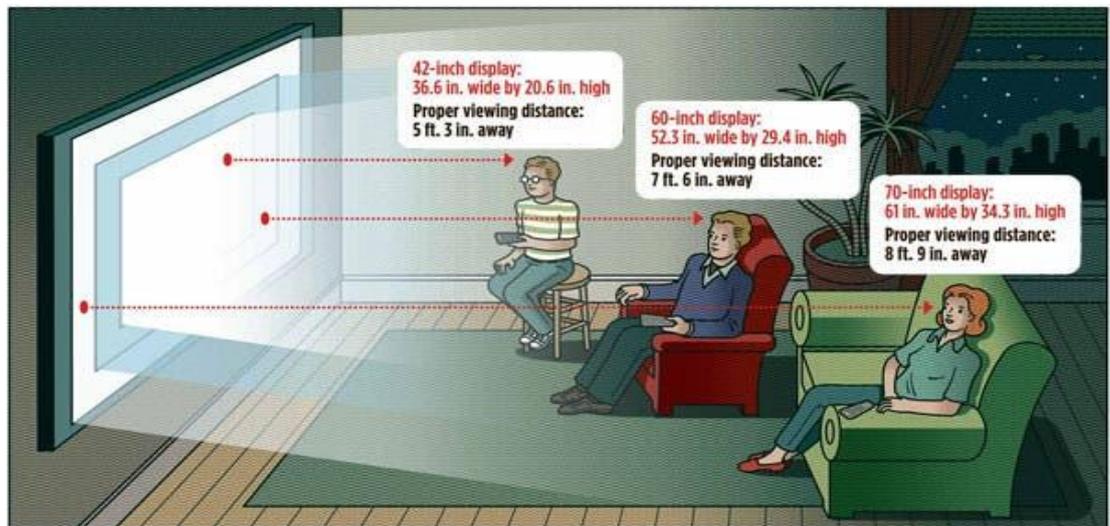
### **Physical Suturing**

This consists of employing camera and sound techniques to put the audience "physically" in the movie.

- a) We see things the protagonist sees with POV (Point of View) shots, or over the shoulder shots.



- b) There are long wide takes to simulate us being in the room and watching from a distance.



- c) Long extreme close-ups (ECU) of a character allow us to ponder a situation or decision along with the character.



- d) In some movies we hear what the character hears like Mel Gibson's character in *WHAT WOMEN WANT* or Jim Carey's character in *BRUCE ALMIGHTY*.



- e) There are also visual and narrative gaps that the audiences automatically fill in, as when a character drives across town, but we only see him get into and out of his car. While these techniques help connect audiences in an explicit or visual way, they do not get at the heart of why audiences are emotionally engaged. Below picture is from *Killing Field* Movie when shark arrives.



### **Emotional Suturing**

This sounds like what we're looking for. But it's a misnomer, as you'll soon see. We might say this is a subset of No. 3 below. Filmmakers emotionally suture the audience into the story by creating characters and situations that generate sympathy, jeopardy, and reliability. Audiences are drawn to characters who are "attractive"— characters that are funny, powerful, skilled, beautiful, charming, and hospitable. When we create characters with such attributes, our audience wants to be close to and identify with them. It is a purely emotional reaction based on the character's outward appearance and behavior. While Nos.1 & 2 are techniques always employed, they are both derivatives of No. 3. So, get No. 3 right and Nos. 1 and 2 will follow.

### **Moral Suturing**

At the heart of every successful movie is a conflict of values that was universally chosen to be understood by the audience. It is this conflict of values that describes what the movie is "really" about. The value conflict engages audiences at a value or heart level by allowing the audience to identify with the various characters and helping them decide what moral choices to make. Thus, moral suturing, is not a passive experience, but an active decision making and rooting experience.

Successful moral suturing occurs easiest with a writing and story structuring technique called "The Moral Premise," which describe the core values around which the story produces conflict. This is because all physical action and conflict begins as psychological decisions derived from the character's moral values. Thus, the Moral

Premise Statement (MPS) is a single sentence, or statement, that describes the natural consequences of a character choosing a virtue vs. a vice as motivation for pursuit of a goal.

For instance many good movies pit the selfishness of the antagonist against the selflessness of a protagonist. Or, perhaps the conflict of values is greed vs. generosity, or prejudice vs. respect. *THE INCREDIBLES* (F, 2004, Brad Bird) While moral premise theory is fairly simple, it's application, to be successful requires diligence and creativity to ensure that every character arc, every setting, the art direction, the music, every scene, every dialogue exchange, complies to true moral premise statement (MPS). It also means that in a redemptive film the protagonist starts out applying the vice side of the MPS (the first clause) is his pursuit of the goal; but at the midpoint of the film (the Moment of Grace) catches a whiff of the transcendence that could change his life. Then in the second half the protagonist learns how to live by the positive side of the moral premise. For example, in *LIAR! LIAR!* (1997, Tom Shadyac) the MPS is:

Before his Moment of Grace, Jim Carey's character believes that lying is the way to get ahead in his professional, personal, and family life. But he learns that lying leads to rejection. After his "Moment of Grace" where he realizes ("I've been a bad father") he learns (slowly) to live without telling a lie. And when he succeeds, we have a redemptive ending. Now the MPS can't be just any juxtaposition of values and consequences.



**Picture: LIAR! LIAR! (1997, Tom Shadyac**



- a) Inventions and new technology had added new dimension on creating better visuals.
- b) Our study is whether this new better visual helps to recollect more memories, thus creates better emotions on human behaviors?
- c) Better visuals are created by cinematographers using their own creativity along with the cameras and other lighting equipment's available with them.

### **Descriptive Statistics**

There were 54 participants in each conditional group. The High Key condition was comprised of 59% (n = 32) men and 41% females (n = 22) with an age range of 18-72. The Low-Key condition had 61% males (n = 33) and 39% females (n = 21) with an age range of 18-70 years old, and the Available Light condition of Camera included 43% males (n=23) and 57% females (n=31) with an age range of 10-47 years old.

### **Hypothesis 1**

Hypothesis 1 predicted that audiences would report higher levels of Lightheartedness during the viewing of the High Key stimuli. The results are significant but do not support Hypothesis 1. To test this hypothesis, an Analysis of Variance was conducted with the 3 lighting styles as the independent variable and lighthearted emotional sub-dimension as the dependent variable. There was a significant difference ( $F = 2.98$ ,  $df = 2$ ,  $p = 0.05$ ) between the lighting styles with participants who watched the High Key light condition reporting the lowest levels of perceived Lightheartedness ( $M = 62.37$ ,  $SD = 24.07$ ) than those who saw Low Key ( $M = 74.35$ ,  $SD = 22.04$ ) or Available Light ( $M = 69.60$ ,  $SD = 29.48$ ).

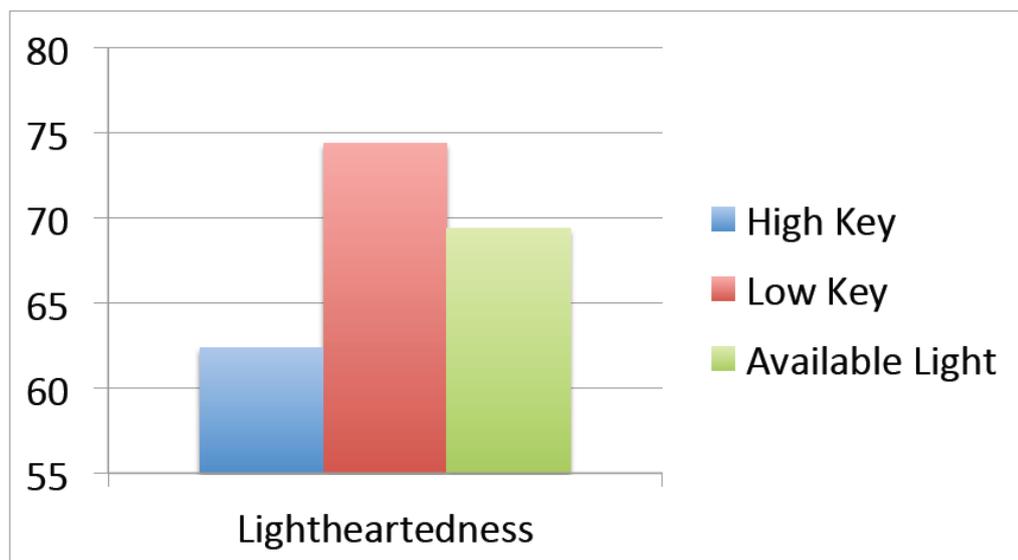
Hypothesis one is Not supported with these Results

**Table 1:** Source table for of Emotional Responses and Lighting Conditions of Camera Completely Between-Subjects.

Source	SS	df	MS	F	p	eta
Lighthearted	3841.54	2	1920.77	2.98	.03	.03
Suspense	6791.71	2	3395.86	2.89	.05	.03
Rawness	5648.44	2	2824.22	3.94	.02	.04

*Table 4: Source table for of Emotional Responses and Lighting Conditions of Camera Completely Between-Subjects.*

**Figure 1: Lightheartedness Emotional Response to Each Condition**

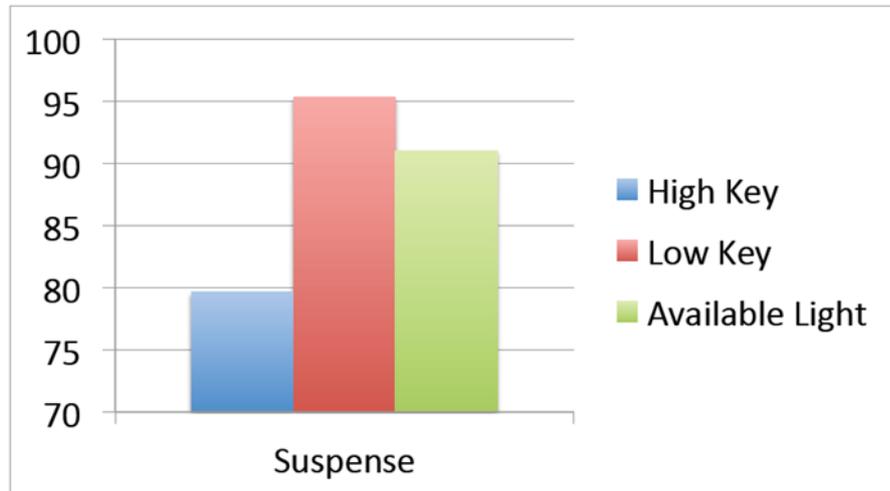


*Figure 15: Light-heartedness Emotional Response to Each Condition*

### **Hypothesis 2**

Hypothesis 2 predicted that audiences would report higher levels of Suspense during the viewing of the Low-Key stimuli. The results are significant and support hypothesis 2. To test this hypothesis, an Analysis of Variance was conducted with the 3 lighting styles as the independent variable and Suspense emotional sub dimension as the dependent variable. There was a significant difference ( $F = 2.88$ ,  $df = 2$ ,  $p = 0.05$ ) between the lighting styles with participants who watched the Low-Key lighting condition reporting the highest levels of perceived Suspense ( $M = 95.32$ ,  $SD = 36.23$ )

than those who saw High Key ( $M = 79.66$ ,  $SD = 27.34$ ) or Available Light ( $M = 91.61$ ,  $SD = 38.27$ ). Hypothesis two is supported with these results.



*Figure 16: Suspense Emotional Response to Each Condition of Camera*

### **Hypothesis 3**

Hypothesis 3 predicted that audiences would report higher levels of Rawness during the viewing of the Available Light stimuli. The results are significant but do not support hypothesis 3. To test this hypothesis, an Analysis of Variance was conducted with the 3 lighting styles as the independent variable and Rawness emotional sub dimension as the dependent variable. There was a significant difference ( $F = 3.94$ ,  $df = 2$ ,  $p = 0.02$ ) between the lighting styles with participants who watched the Available lighting condition reporting lower levels of perceived Rawness ( $M = 76.08$ ,  $SD = 27.76$ )

than those who saw Low Key ( $M = 84.02$ ,  $SD = 27.88$ ) but higher levels than those who saw it in High Key ( $M = 69.361$ ,  $SD = 24.7$ ). Hypothesis three is not supported with these results.

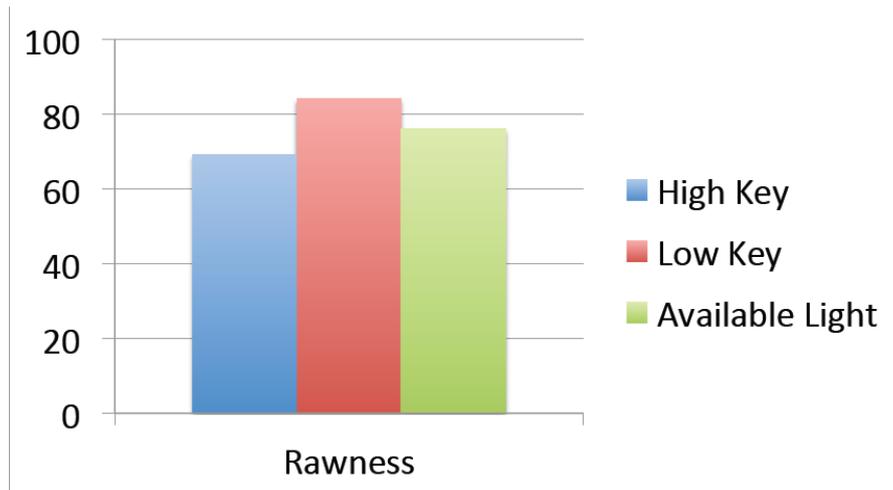


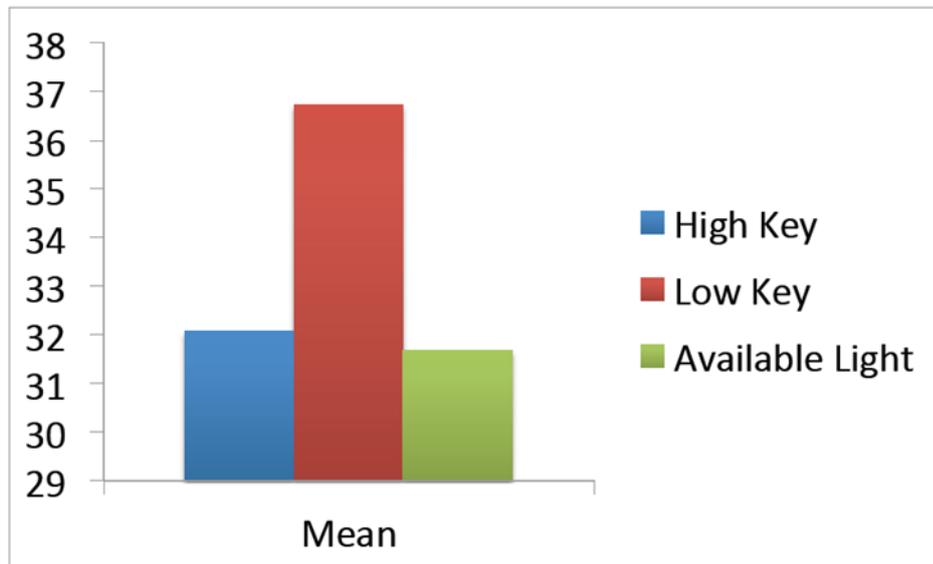
Figure 17: Rawness Emotional Response to Each Condition

#### Hypothesis 4

An Analysis of Variance was conducted with the 3 lighting styles of Camera as the independent variable and believability as the dependent variable to test Hypothesis 4 which predicted audience members would report higher levels of perceived believability while watching the stimulus created in the lighting style that matches the plot-line, in this case Low Key. There was a significant difference ( $F = 3.11$ ,  $df = 2$ ,  $p = 0.047$ ) between the lighting styles with participants who watched the Low-Key light condition reporting higher levels of perceived believability ( $M = 36.72$ ,  $SD = 12.60$ ) than those who saw High Key ( $M = 32.07$ ,  $SD = 12.15$ ) or Available Light ( $M = 31.68$ ,  $SD = 9.54$ ). Hypothesis 4 is supported with these results.

Source	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	<i>eta</i>
Believability	831.08	2	415.54	3.11	.047	.039

Table 5: Source table for of Believability and Lighting Conditions Completely Between-Subjects.



*Figure 18: Means of Believability between all three light conditions*

### **Hypothesis 5**

Hypothesis 5 predicted that participants would identify the genre in accordance with the associated lighting style. A Chi-square analysis was conducted with the light condition and genres. Using a cross tab analysis, the responses of the audiences' members from each viewing group were broken down to clarify how many people were able to identify the genre from the lighting style. The Chi Square test is significant  $\chi^2 (2, N = 108) = 32.00, p = .001$ . The result of this analysis demonstrates that participants were able to identify High Key as comedy and Low Key as film noir, and the hypothesis is supported. The participants were able identify the genre of the two conditions (See Table 5 and Figures 7-10). The figures demonstrate that most people were able to identify High Key as comedy and Low Key as film noir.

		Genre Reported			Total
		comed y	film noir	realistic drama	
high key	Count	40 <sub>a</sub>	10 <sub>b</sub>	<5	54
	Expected Count	25.5	23.0	5.5	54.0
	% within hi key and low key lighting only	74.1%	18.5%	n<5	100.0 %
	% within Genre Reported	78.4%	21.7%	n<5	50.0%
	% of Total	37.0%	9.3%	n<5	50.0%
low key	Count	11 <sub>a</sub>	36 <sub>b</sub>	7 <sub>b</sub>	54
	Expected Count	25.5	23.0	5.5	54.0
	% within hi key and low key lighting only	20.4%	66.7%	13.0%	100.0 %
	% within Genre Reported	21.6%	78.3%	63.6%	50.0%
	% of Total	10.2%	33.3%	6.5%	50.0%
Total	Count	51	46	11	108
	Expected Count	51.0	46.0	11.0	108.0
	% within hi key and low key lighting only	47.2%	42.6%	10.2%	100.0 %
	% within Genre Reported	100.0 %	100.0 %	100.0%	100.0 %
	% of Total	47.2%	42.6%	10.2%	100.0 %

Table 6: CrossTab Analysis for Identification of film genre

Each subscript letter denotes a subset of Genre Reported categories whose column proportions do not differ significantly from each other at the .05 level.

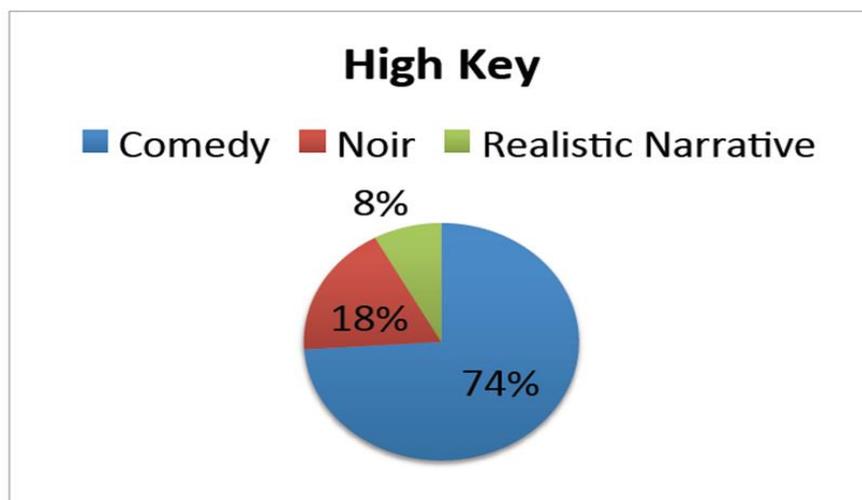


Figure 19: High Key Genre percentage

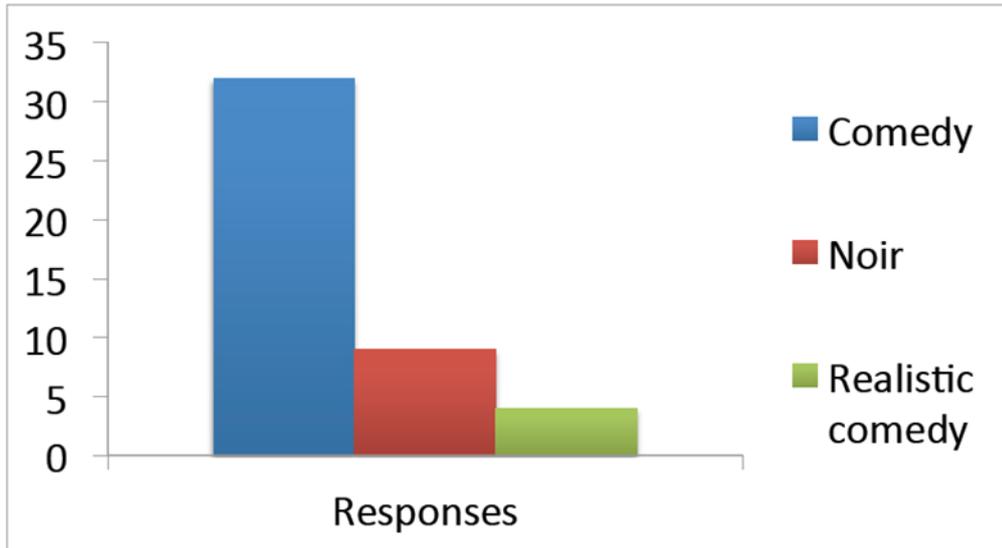


Figure 20: High Key genre respondents

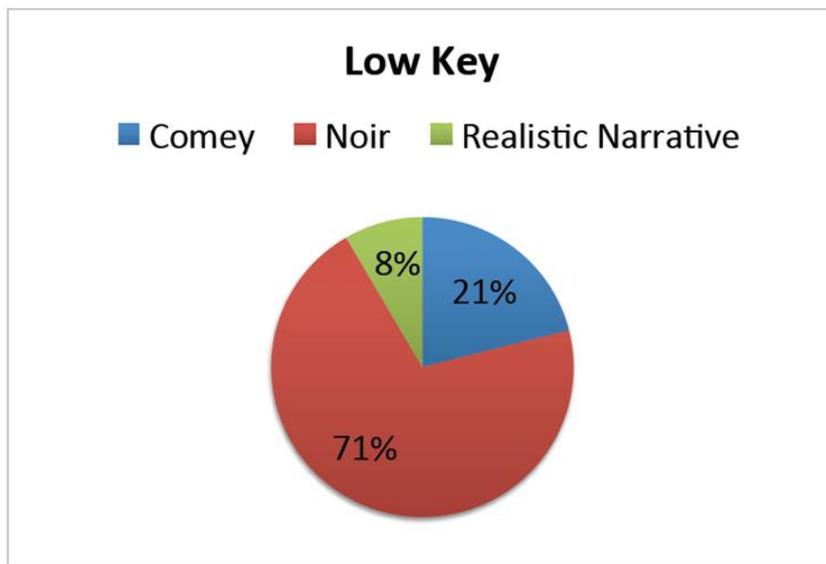


Figure 21: Low Key Genre percentages

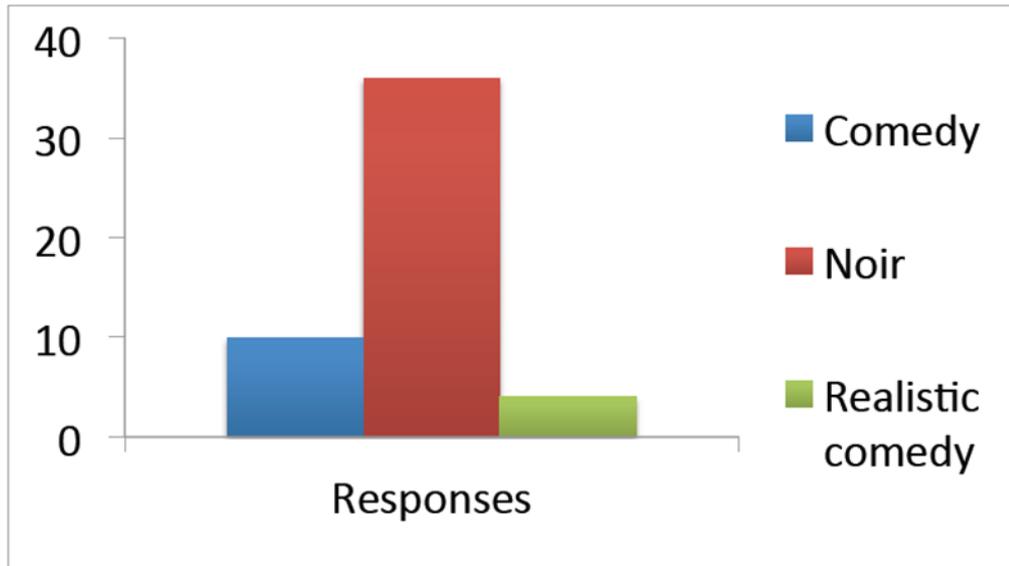


Figure 22: Low Key genre numbers of respondents

**Descriptive Chart:**

**1) Composition of Shot is better in**

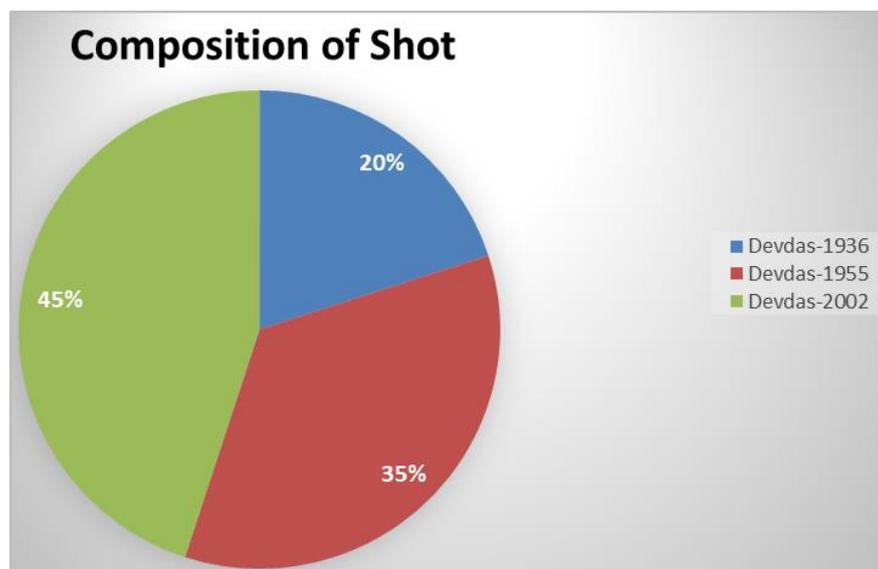
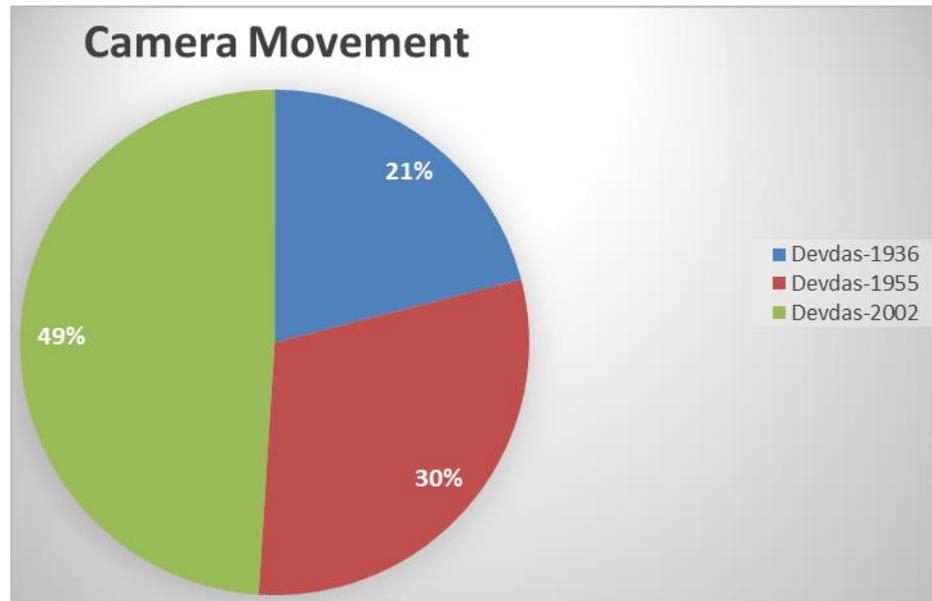


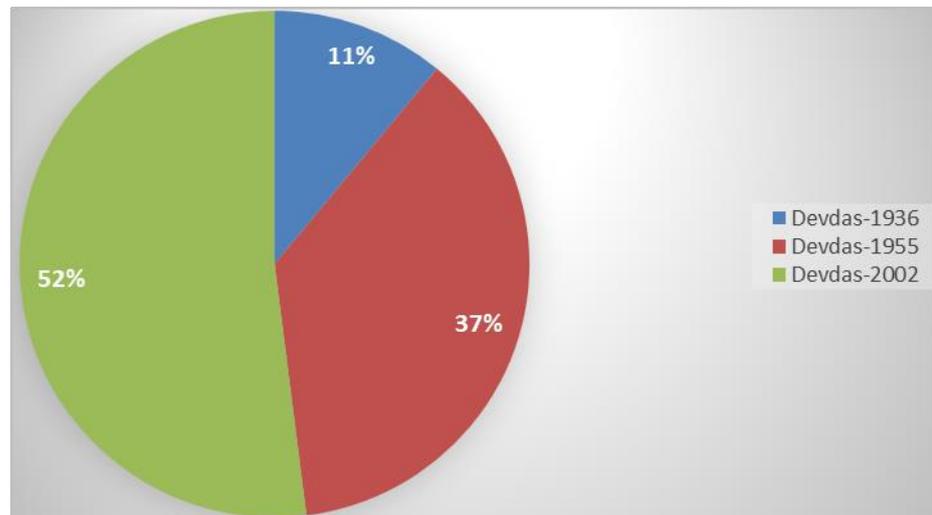
Figure 23: Composition of Shot

**2) Camera Movement got advanced in**



*Figure 24: Camera Movement*

**3) Visual Presentation Quality is better in**



*Figure 25: Visual Presentation Quality*

- 4) **Color vs. Black and white effects on Memory retention of memory due to the presence or absence of color after watching movies from three different era**

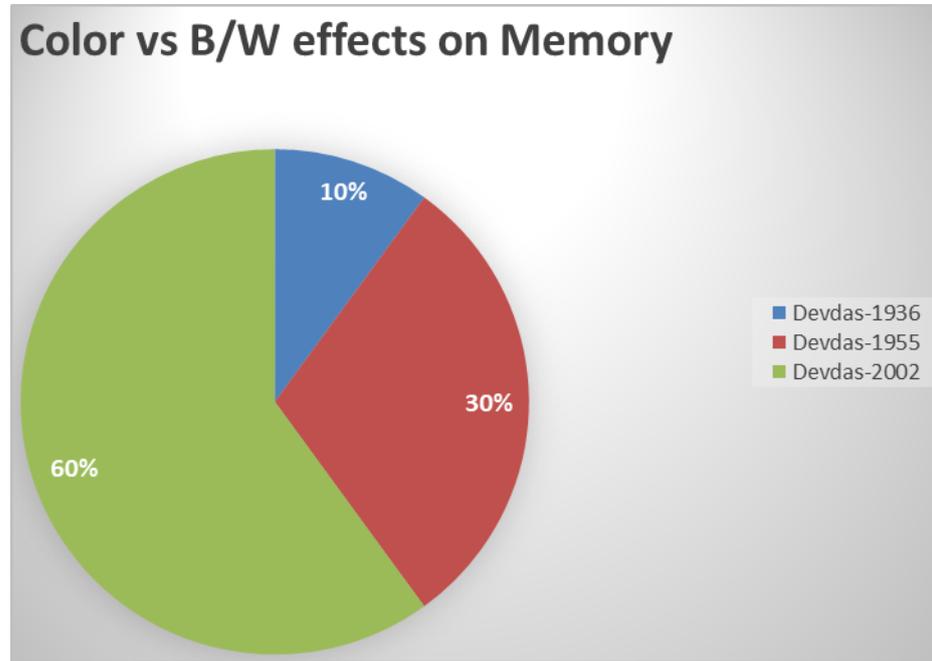


Figure 26: Color vs. Black and white effects on Memory

- 5) **The transition of visual communication right from era or digital to computer graphics has appealed more to the audience.**

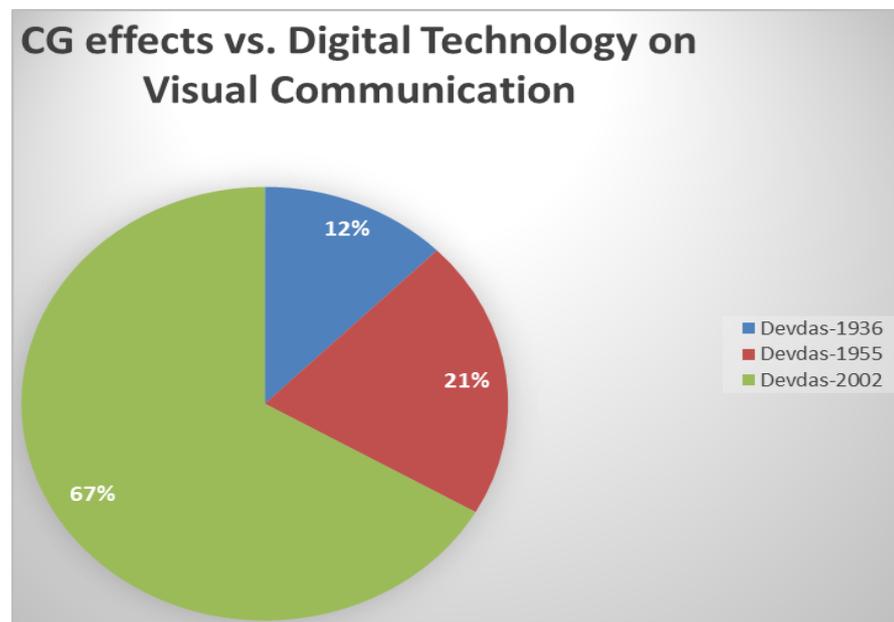


Figure 27: CG effects vs. Digital Technology on visual communication

- 6) Respondent audience is more interested to see the future cinema with advance technology such as 3D

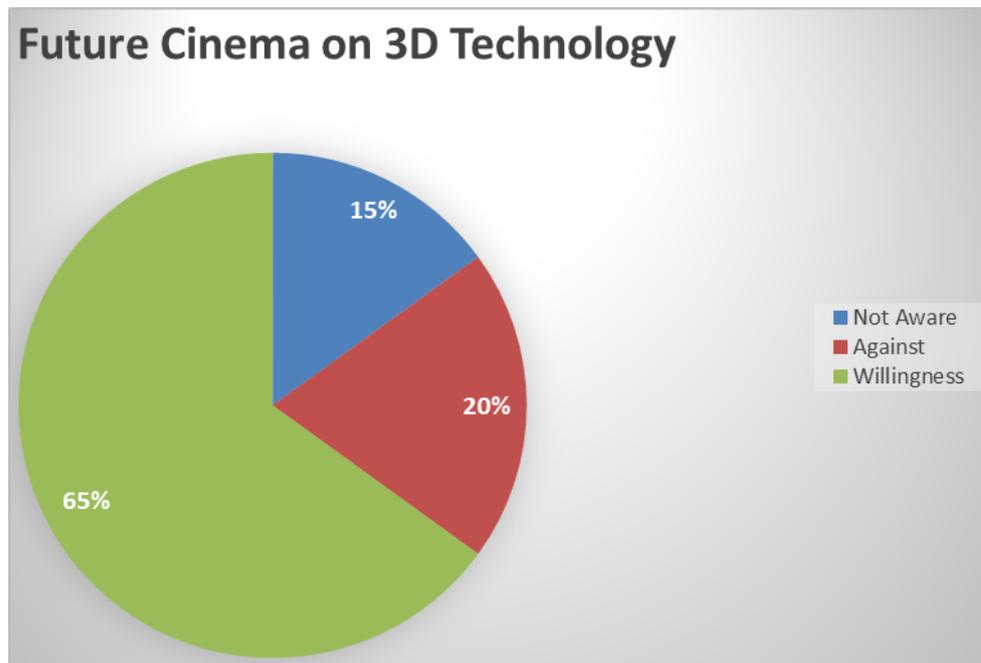


Figure 28: Future Cinema on 3D Technology

- 7) Human Feelings are elevated on watching cinema on mobile vs. IMAX.

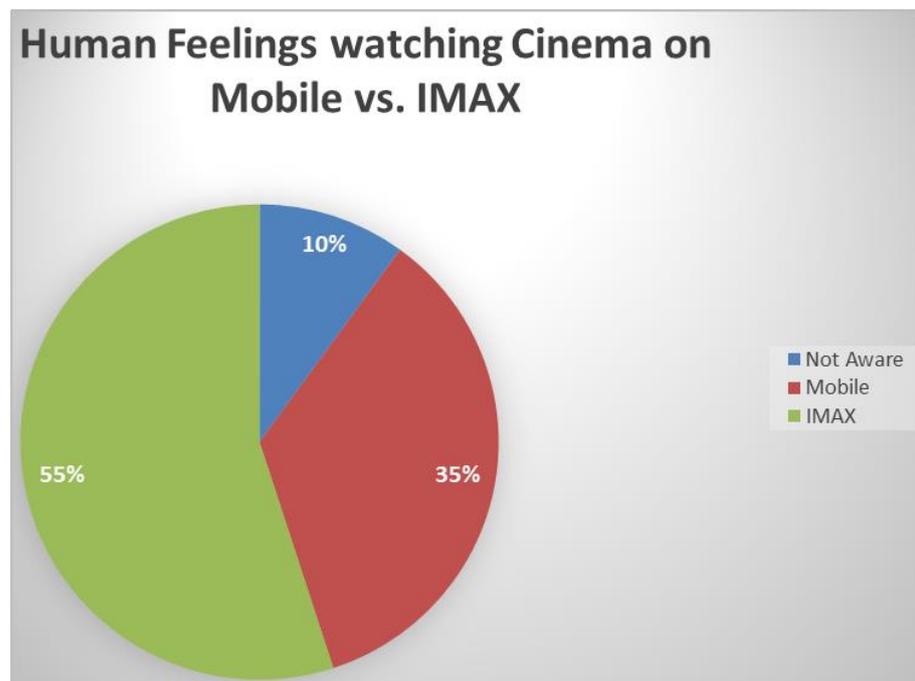


Figure 29: Human Feelings on watching cinema on mobile vs. IMAX.

## **DISCUSSION:**

### **The beginning of cinema**

#### **From silent era to heavy special effects: Black & White to 3D Revolution.**

Cinema has already been through two major revolutions in its relatively short life. First there was the transition from silent to talkie, then from black and white to color. Now Jeffrey Katzenberg, CEO of DreamWorks Animation, believes "3D is the next revolution in the cinema-going experience".

Of course, 3D is nothing new. It must be pointed out. In the 1950s, it was first dealt with. For the last 30 years IMax movies have seen 3D films. But now, with immersive 3D technology built in cinemas nationwide, and the larger and much greater option of films in 3D, people need to go to the multiplex and get their gaze sunk into the whole new form of watching the newest studio blockbuster.

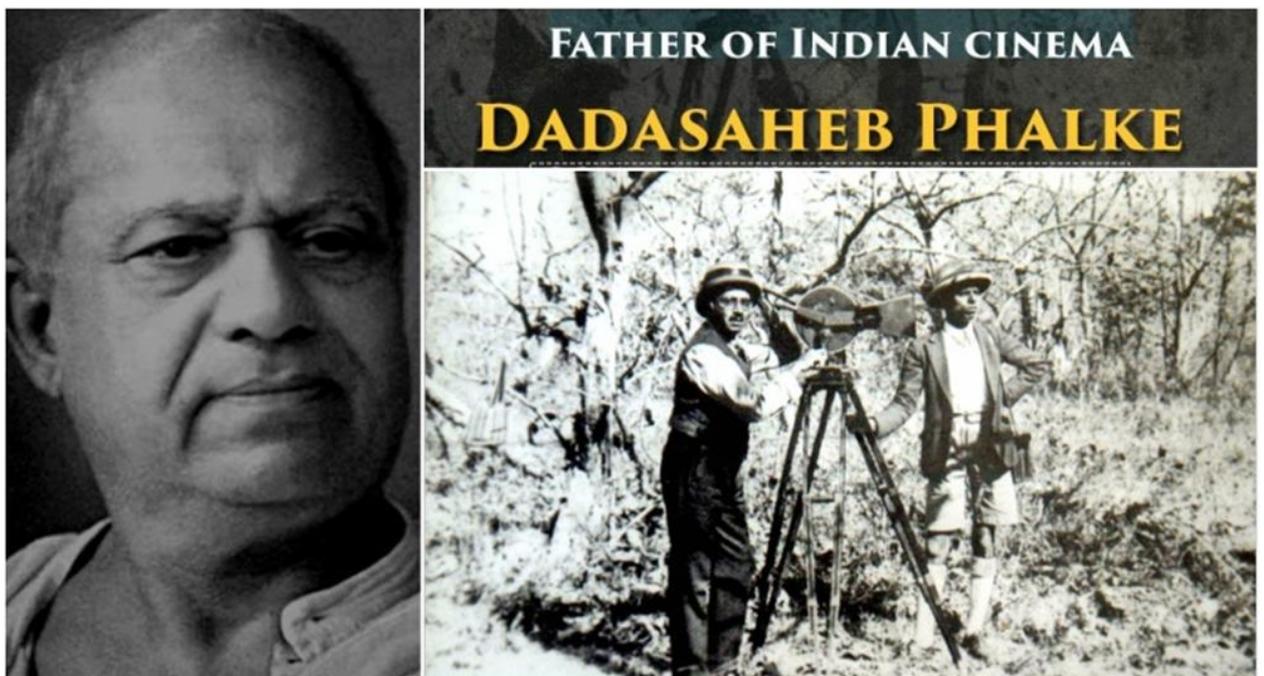
"This is digital 3D stereo scoping. It is a long way from the 1950s 3D era and there is nothing ghosting and headaches," said Mark Batey, Chief Executive Officer of the Film Distributors' Association. "This is digitally pin sharp and crystal-clear 3D imagery. Phil Clapp, CEO of the Cinema Exhibitors' Association, shares this opinion. "You also feel immersed in the scene, when the action is taking place behind you rather than before you, because it is in 2D." "I watched some of this film, Monsters vs Aliens, and this is awesome.

65 optical 3D displays are now in the UK and more than 2,000 around the world. Industry analysts estimate that by 2012 at least ten thousand would occur. Some consider this dramatic growth and development of 3D technologies as a reaction to the decrease in film attendance and the increase in new viewing channels such as the internet, PlayStation or cable TV.

"Just as it was in the 1950s when the advent of television shook the cinema world to its bones, so in today's world of rapid digital communication, 3D is the cinemas' response to say we are bigger, brighter, bolder and better than anything you will experience at home," Batey says. Unlike the cumbersome, labour-intensive 3D systems of the 1950s, which required two cameras projecting on to the same screen, making synchronisation difficult, the new digital projectors, of which there are three different models – RealD, Dolby Digital Cinema and Imax 3D – require just the one projector run through a computer.

Movies as we know them now are a result of a constant change in technology and creativity over decades. From the very inception of a moving image to today's special effects that can transport you to any fantasy world, Indian cinema has come a long way. In this week's #BigStory we explore and revisit some of the important chapters of Indian cinema that are like bookmarks in the history of film making. We also speak to experts from the industry - actors, directors, special effect technicians to get their perspective on the journey of cinema through this transition.

The great legend Mahadev Patwardhan discovered the art of cinemas in 1885 while the era of films began with Harishchandra Sakharam Bhatavdekar aka Save Dada's first short film on wrestling. He was the first one to make a motion picture in Indian cinemas as he was one of the first witnesses to the Lumiere Brothers film that premiered in Mumbai. Hmm... Now we know from where the inspirations to make movies came from. After which he brought a camera and a projector and started his film journey by making films based on day to day life. Interestingly, his film "The Wrestlers" was shot during a wrestling match that took place in Mumbai and was the first film to be shot by an Indian. Or we can say, the roots of making realistic films go back in this era as Save Dada's films were mostly based on reality.



**Picture: Shri. Dhundiraj Govind Phalke (Dadasaheb Phalke)**

### **The Silent Era - 1900-1930:**

Dadasaheb Phalke introduced the people of India to the beauty of cinematic experience and evolved the largest entertainment industry in the world. He had made India's first full-length feature film *Raja Harishchandra* (1913). He was a great Indian film producer, director, movie writer, storyteller, set designer, dress designer, editor, distributor, etc.

That's why one of the most prestigious awards in the Indian film Industry "Dadasaheb Phalke Award" was started on his name which is a 'Life Time Achievement Award' presented to the eminent persons of Indian Film Industry for their valuable contribution in the promotion and development of Indian Cinema.

### **10 interesting facts about Dadasaheb Phalke**

1. Dadasaheb Phalke was born on **30 April, 1870** at Trimbakeshwar town near Nashik district of Maharashtra. He had completed his basic education in **1885** at Sir J.J School of Arts, Mumbai and in 1890 he went to Vadodara, Gujarat to study about drawing, painting and photography.

2. In Godhra (Gujarat), Dadasaheb Phalke began his career as a *Photographer*, but after the death of his first wife and child due to an outbreak of plague, he had left photography work. Then he went to Germany to get introduced with new technologies.

3. From the school time itself, he had acquired a variety of interest in magic. At that time he also experimented variety of special effects. In Germany he met *Carl Hertz* a magician and also worked with him. After some time he got an opportunity to work as a *Draftsman* in an **Archaeological Survey of India** but due to lack of interest he left the job and came back to Maharashtra. There, he started a business of the **printing press**.

4. When he watched a silent movie "**The Life of Christ**" by Ferdinand Zecca in Mumbai's 'America-India Theatre' his life turned and decided to make "**Raja Harishchandra**" a silent and the first full length feature film. No doubt he had fulfilled the dream of Indian Cinema.

5. He had given several advertisements for seeking handsome actors for the lead role. But, these advertisements brought inadequate and non- professional talent and so, he was forced to add a line "*ugly faces need not to apply*".

6. Then, finally Dadasaheb's entire family took part in making the film Raja Harishchandra. Do you know that Producer, Director, Writer, Cameraman etc. of the film 'Raja Harishchandra' was Dadasaheb only.

7. His wife handled the costumes of the actors, the posters and production of the film. He played the role of Harishchandra and even his 7 year old son Bhalchandra Phalke played a major role of Harishchandra's son in the film. Also, a man was selected for the lead role of Taramati as no woman was ready to work in the film that time. This film was first shown publicly in Coronation cinema, Mumbai on **3 May, 1913**.

8. Do you know that Dadasaheb Phalke spent **15 thousand rupees** in making the whole movie Raja Harishchandra? Today, the biggest award of Indian cinema is given on his name to honour him. 'The Dadasaheb Phalke Award' is an annual award given by the Government of India, to the devout cinema personalities for their lifetime contribution in the field. Even, in **1971** a postage stamp bearing his face was released by India Post to honour him.

9. This award was established in **1969** to commemorate the contribution of Dadasaheb Phalke to the contemporary Indian cinema. It is conferred by the Directorate of Film Festivals, Ministry of Information and Broadcasting, Government of India. In 1969, Devika Rani a first lady of Indian Cinema was the first recipient of this award. *The award contains a shawl, cash prize of about Rs. 10 lakhs, a Golden Lotus (Swarna Kamal).*

10. The Dadasaheb Phalke Academy gives three awards in the name of Dadasaheb Phalke: *Phalke Ratna Award, Phalke Kalpataru Award and Dada Saheb Phalke Academy Awards.*

The early three decades were considered as social protests in the history of Indian cinema as only three big banners namely, Kohinoor films, Prabhat Talkies, Bombay Talkies and New Theatres to name a few ventured into making silent films based on Indian mythology and social issues. Films like 'Balika Vadhu', 'Mahabharata', 'Ramayana', 'Krishna Sudama'. Vichitra Gutika were made. Accordingly, the first ever Indian silent film was produced and directed by the iconic filmmaker Dadasaheb Phalke.

Yes, we are mentioning the very famous and most talked about movie of Indian cinema, 'Raja Harishchandra'. Back in the silent era, due to the lack of sound and

music, actors need to put more efforts in acting as that was the only means to express and tell their story to the audience, the film was a commercial success and paved the way for everything that makes up Indian cinema today.

### **The beginning of talkie films**

The year 1931 was considered as an experimental era for Indian cinemas with the release of India's first ever sound (talkie) film, 'Alam Ara' by Ardeshir Irani. The film took months to be made and had around 7 songs. By 1934, the “talkies” had taken over the screens. In the year 1939, 'Pukar' was one of the first to use larger than life, spectacular sets and it was also Kamal Amrohi's first film as a scriptwriter. While 1931 saw its first talkie film, technology was progressing simultaneously with yet another movie achieving a milestone.



**Picture: 'Alam Ara' by Ardeshir Irani: 1931**

The year saw the film 'Apradhi', directed by Debaki Bose, which was the first film shot using artificial lights. Actor, writer, director, producer, Pramathesh Chandra Barua who played the main lead in the film had observed the production techniques in a London studio and bought lighting equipment in the studio which was used for the film. P.C Barua, not only introduced this new light technique in Indian cinemas but also used cinematic liberty for the first time with his film, 'Roop Lekha' in the year 1934. The film saw the first flashback scenes of Bollywood. Flashbacks are indeed an important part of story-telling these days.

Filmmaker Madhur Bhandarkar who is known for his socially relevant and hard-hitting films shared his views on evolving techniques in Bollywood, he expressed, “With evolving technology, films have also changed. From silent films with live music to now 3D and 4D, we have come a long way. We never know what future holds but change is the only constant so with everything else changing, films will also reflect those changes. Every new technology will help create new innovations and perhaps make the experience better.

### **From Black- and-white films to colour**

#### **Adding colour**

Colour was first added to black-and-white movies through hand colouring, tinting, toning and stenciling.

By 1906, the principles of colour separation were used to produce so-called ‘natural colour’ moving images with the British Kinema colour process, first presented to the public in 1909.

Kinema colour was primarily used for documentary (or ‘actuality’) films, such as the epic *With Our King and Queen through India* (also known as *The Delhi Durbar*) of 1912, which ran for over 2 hours in total.

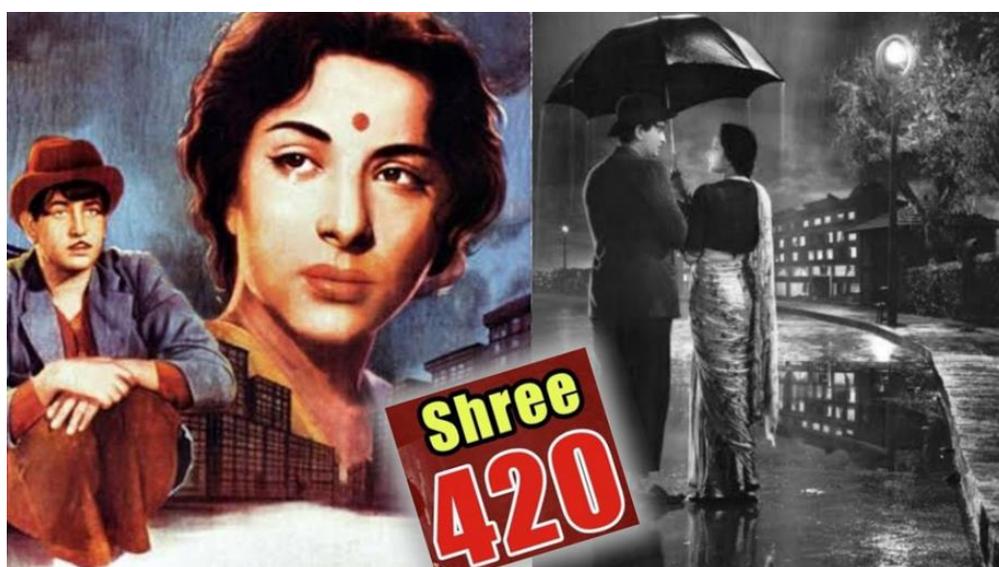
The early Technicolour processes from 1915 onwards were cumbersome and expensive, and colour was not used more widely until the introduction of its three-colour process in 1932. It was used for films such as *Gone with the Wind* and *The Wizard of Oz* (both 1939) in Hollywood and *A Matter of Life and Death* (1946) in the UK.

The first colour film of India is considered as 'Kisan Kanya' that was released in the year 1937 and was made by Modi B Gidwani and Produced under the banner Imperial Pictures by Ardeshir Irani. However, due to lack of technology, the film didn't appeal to the masses. The year 1937 also saw Bollywood's first film with special effects. All thanks to Babubhai Mestry, who was known as India's Father of Trick photography and special effects Director. After starting his career as an assistant art director for 1933's 'Haatim Tai', he used some innovative technique to create some special effects on the screen for the movie 'Khwaab Ki Duniya' which released in 1937, where he used dim light and black curtains as the background on which objects were given the illusion of movement with the help of a black thread.



**Picture: 'Kisan Kanya' first colour film of India (1937)**

Gradually, with the projectors, makers started experimenting with adding projection backgrounds to show the needed scenes. The technique was widely used for moving car sequences, just like we all saw Madhubala driving a car in the movie, 'Chalti Ka Naam Gaadi'. The technique was used in films like 'Naya Daur', 'Awaara', and 'Shree 420' to name a few.



**Picture: Shree 420: (1955).**

The era starting from 1950 was considered as a golden era with a lot of films made in Technicolour. This was the time when Technicolour was introduced in Indian cinemas. However, the topic of which was the first Bollywood film to be produced in Technicolour is debatable. Some say, it is Dilip Kumar starrer “Devdas”, 'Aan', while some say, the old classic, 'Jhansi Ki Rani' by Sohrab Modi is the first Technicolour film.

However, the answer really doesn't make a difference now as Indian cinemas have really evolved over the years and are reaching heights. This was followed by some of the biggest successful films of Bollywood like V. Shantaram's 'Jhanak Jhanak Payal Baaje', ' Navrang'. The elephant that comes out of lord Ganesha's statue in the middle of the song, 'Are Jaare Hatt Natkhatt...' was the result of the developed technology during that era. The vast sets and colourful backdrops were considered as a magnificent work of the time. Then came the Eastman Colour era ORWO and Fuji colour and photographic film manufacturing units are almost closed. And this new technology offered the quality as well as the affordability to the producers. This change was like adding a new feather to the evolution of the technology used in Indian cinemas.



**Picture: Shri. V. Shantaram.**

### **Introduction of VFX (Visual effects) to films and its evolution**

As we mentioned in our introductory paragraph that the history of VFX is rooted back in the silent film era. While Hollywood was experimenting with the VFX technology, India too followed them and Dada Saheb Phalke's silent movie 'Kaliyamdhan' in the year 1919 is one such example as the visual effect technology was used back then. Though with little knowledge and technology of special effects, it was not used often in cinemas. The technology was then welcomed by the South film industry with their films like 'Pathala Bhairavi' and 'Maya Bazaar' that hold a great spot in Indian films even today.

With the introduction of computer graphics, the first Indian film which was made using the technology in the early 80s was 'Gentleman'. Tamil cinema did films like 'Kadhalan', 'Jeans;' 'Indian' and 'Mudhalvan' by S. Shankar later. We can rightly say that the South Industry introduced this technology way before Bollywood could experiment with it. The first Bollywood film to experiment with VFX was Ajay Devgn and Kajol starrer, 'Pyaar Toh Hona Hi Tha' and the earliest film to use heavy VFX shots was Priyanka Chopra and Harman Baweja's 'Love Story 2050' in 2008, that had around more than 500 VFX shots.



**Picture: Jeans (1998)**

Harman Baweja, who made his acting debut opposite Priyanka Chopra in 'Love Story 2050' likes to try hands on technology while making films, he said, "The mainstream film industry is constructed by budgets and now, probably the last two years now, we

are opening up to a global audience. Again I would say the budget that mainstream Hollywood films have are nowhere close to what we get here in Bollywood. So doing Love Story 2050, was the biggest challenge, as the film had very high VFX. So while we got a lot of support from a few international studios, one of them were the guys who did 'Lord of the Rings'. Even they were happy knowing that India is keen on creating something in the field. And there was one known studio from India, who helped. In Love Story 2050, that was made back in 2008, had almost four to five hundred VFX shots, which was unheard of back in the time. I don't know whether so many shots are done by anyone even today. But again it was a collaborative effort.

We went around the world as a team from Australia came down to India for Animatology and another team from Australia working for VFX, again Prime Focus was the spine of the VFX, so it was indeed a collaborative effort. Again, my dad travelled everywhere, literally from New Zealand, Australia to Los Angeles and everything in between. So when you set out to push something a lot you list a lot because you know how it is going to pan out and I think, we all know the film didn't do well particularly at the box office but it did set a few benchmark mark in terms of quality and also gave a confidence to the industry that this kind of films can be done here as well.

But I am sure if the film would have done great, it would have pushed the VFX in the country to some other level. But now techniques are so advanced that people don't even understand sometimes that a VFX is being used in a film. Now people are more aware, the directors are more aware about the technique.



**Picture: Love Story 2050 (2008)**

"We recently did an Animation film called 'Chaar Sahibzaade', we did motion capture for that. We also did another Animation film which is yet to release. I think I have always pushed the boundaries in terms of technology. I would also like to share a trivia here that our film, 'Qayamat' 2003 with Ajay Devgan was the film that used DI technology for the first time in Bollywood. It was used to grade the film."



**Picture: Bahubali (2017)**

Later on, Bollywood mastered the art of VFX. With films like 'Padmaavat', 'Chennai Express', 'Housefull 4', 'Fan', 'Jodha Akbar', 'Bajirao Mastani', 'Tanhaji', 'Krissh', 'Koi Mil Gaya', 'Tiger Zinda Hai', 'Bahubali' series and many more films.

Keitan Yadav (COO - Redchillies.vfx & VFX Producer), who has worked on noteworthy films like 'Ra.One', 'Fan' and 'Zero' to name a few said, "The technology in filmmaking has developed immensely. Technically if you see, right from the days of back-projections, there was no chroma (the green screen). Actors used to act in the front with the projections happening in the back-ground. From celluloid to digital cameras, Bollywood has progressed a lot. As far as the VFX department is concerned, initially chroma was unheard of. But with VFX films like 'Ra.One', 'Krrish 3', 'Fan' & 'Zero', Robot which wouldn't have been possible without VFX, people got acquainted with these technologies.



**Picture: Krrish 3 (2003)**

The buck doesn't stop there. Bollywood is also using specialized equipment's for Motion Control like the Techno Dolly & Bolt, which are a huge technological marvel. So we can surely say, we are not lagging in technology. The latest cameras are available; Motion control rigs are available; every latest technology is available here in India. We are now on the same page with Hollywood in terms of filmmaking technology.



**Picture: Enthiran - Robot 2.0 (2018)**

Shining more light on VFX evolution, the expert states, "Going back to the era when there was no VFX, no post production; if double roles had to be done then, they used to shoot the same scene twice. Covering one half of the film and exposing the other half, then covering the other half & exposing the remaining one. That is how the double role was created on screen. If something with live effect had to be shown, for example if an arrow had to go and hit someone, they would place the arrow on the screen and the film was shot around that suspended arrow.

As and when story telling got evolved, the makers started touching up on bigger topics and developing these techniques. As time passed, high speed cameras were developed (slow motion) Also Equipment's like Jimmy jib, Panther, Dolly, different kinds of rigs, started developing with time. Lighting started getting better and better. Eventually when the film analog cameras were all shelved out, 'Digital Cameras' made their appearance. Today many companies like the Red, Arri, and Sony have come up with their high-tech cameras that added greatly to the quality of the film. Finally came digital post production, where Film colour-grading started happening (Di)

Hence, as explained, advancements have been an integral part of growth of VFX, the latest one being, Virtual Production which opens up endless possibilities to shoot films in a new way.”

### **The rise of the film industry**

By 1914, several national film industries were established. At this time, Europe, Russia and Scandinavia were the dominant industries; America was much less important. Films became longer and storytelling, or narrative, became the dominant form.

As more people paid to see movies, the industry which grew around them was prepared to invest more money in their production, distribution and exhibition, so large studios were established and dedicated cinemas built. The First World War greatly affected the film industry in Europe, and the American industry grew in relative importance.

The first 30 years of cinema were characterized by the growth and consolidation of an industrial base, the establishment of the narrative form, and refinement of technology.

### **What's next in Indian Cinema?**

In the past 20 years, film production has been profoundly altered by the impact of rapidly improving digital technology. Most mainstream productions are now shot on digital formats with subsequent processes, such as editing and special effects, undertaken on computers.

Cinemas have invested in digital projection facilities capable of producing screen images that rival the sharpness, detail and brightness of traditional film projection. Only a small number of more specialist cinemas have retained film projection equipment.

Although digital technology of camera has become popular in today's global film industry, the author does not believe that we should accept new technologies without reservation. In fact, the traditional film technologies are still of great value. Although computer technology comprehensively dominates the film industry, this does not mean that traditional film technologies are receding.

On the contrary, it is the knowledge and principles of traditional film technologies that support the development of films. Without these technologies, the film industry would no longer exist. As a matter of fact, for the film industry, digital technology itself has many limitations. First, the revolution in technology has not become a revolution in film aesthetics after all, and it will not necessarily lead to an overall revolution in film art. Besides, if the problems in film aesthetics are not solved new technologies and the manifold film forms and techniques they have generated will conceal the problems of the film art itself. These real problems will not attract attention and will fail to be resolved, which will lead to the decline of film aesthetics and the degeneration of film art. In brief, the revolution in technology has never challenged the artistic nature of films and therefore has never shaken the foundations of film aesthetics.

In the past few years there has been a revival of interest in 3D features, sparked by the availability of digital technology. Whether this will be more than a short-term phenomenon (as previous attempts at 3D in the 1950s and 1980s had been) remains to be seen, though the trend towards 3D production has seen greater investment and industry commitment than before.

## **Chapter 5: Conclusion**

From the Consideration of all the above points we conclude that the research result should clearly show that the present era of visual communication has lots of advantage over the previous methods and new technological innovation made a great impact on the viewers.

In conclusion, all humans experience the world in three dimensions (3D) from birth, and in true colour. Hence the urge to see realistic visuals on screen exists in our hearts. I believe that a cinematic experience that is a realistic depiction of a fantastic scenario is not so far away in film production. Digital technology, which started to develop since the late middle period of the last century, has penetrated deep into every aspect of people's life.

As one of the industries that are the closest to people, modern film industry is also experiencing changes under the influence of digital technology. The arrival of the digital age has been considered in the filmdom as the third great revolution following the transition from silent films to sound films and the replacement of black-and-white films by colour films. Although this revolution has just begun and appears to be immature and inadequate in technology, and is also troubled by the problem of high cost, the immaturity implies unlimited development space.

The development potential created by digital technology for films is much greater than the former two revolutions, but it will take a lot of time to explore such potential and there will still be a long way to go. Even though more manpower and material resources are required for perfecting the storage of digital images and for establishing a complete system of digital film production, distribution and projection, the return on such inputs will be enormous.

The most essential influence of digital technology on film industry is that it makes the relations among various film industry chains even closer and optimizes the overall structure of the film industry. Today, digital technology has entitled us to the audio-visual enjoyment of higher quality than ever and is gradually changing our audio-visual habits. Perhaps in the near future, the film industry chain of pre-production, shooting, post-production and distribution will be replaced by new digital 3D technology and more complex forms to deliver much better audio-visual experience to the viewers.

## Bibliography

- [1] Anderson, C. & Bushman, B. (2002). Effects of media violence on society. *Science*, Vol. 295, No. 3, pp. 2377-2379.
- [2] Berman, S. (2004). *Media and entertainment 2010*. Report, IBM Business Consulting Services.
- [3] Billard, A. (2003). Robota: clever toy and educational tool. *Robotics and Autonomous Systems*, Vol. 42, pp. 259-269.
- [4] Bloch, L.-R. & Lemish, D. (1999). Disposable love. *New media & society*, Vol. 3, pp. 283-303.
- [5] Breazeal, C. (2003). Toward sociable robots. *Robotics and Autonomous Systems*, Vol. 42, pp. 167-175.
- [6] Breuer, H. (2001). *Kultivation and Imagination in den neuen Medien [Cultivation and imagination in new media]*. PhD Thesis, O.-v.-G.-Universität Magdeburg, Germany.
- [7] Calvert, S., Jordan, A.B. & Cocking, R.R. (2002). *Children in the digital age: the role of entertainment technologies in children's development*. Praeger Publishers.
- [8] Clements, D. H. (2000). From exercises and tasks to problems and projects – unique contributions of computers to innovative mathematics education. *Journal of Mathematical Behavior*, Vol. 19, No. 1, pp. 9–47.
- [9] Cole, M. (1996). *Cultural psychology: a once and future discipline*. Harvard Press.
- [10] Cox, M. & Abbott, M. (2004, eds.). *A review of the research literature relating to ICT and attainment*. Report, retrieved April 27, 2004 from [www.becta.org.uk](http://www.becta.org.uk).

- [11] Cox, M. & Webb, M. (2004, eds.). An investigation of the research evidence relating to ICT pedagogy. Report, retrieved April 27, 2004 from [www.becta.org.uk](http://www.becta.org.uk)
- [12] Durkin, K. & Aisbett, K. (1999). Computer Games and Australians today. Report, Office of Film and Literature Classification, Sydney, Australia.
- [13] Garthwait, A. (2001). Factors influencing technology's effect on student achievement and a caution about reading the research. Occasional Paper No. 40, a publication of the College of Education & Human Development, University of Maine, USA.
- [14] Goldstein, J. (2000). Effects of electronic games on children. Testimonial Statement to US senate committee on Commerce, Science and Transportation, March 2000, USA.
- [15] Goldstein, J. & Raessens, J. (2004, in press). Handbook of computer game studies. Cambridge, MA: MIT Press.
- [16] Hartung, P. J. (2002). Development through work and play. *Journal of Vocational Behavior*, Vol. 61, pp. 424-438.
- [17] Johnson, D. W., Maruyama, G., Johnson, R.T., Nelson, D., & Skon, L. (1981). Effects of co-operative, competitive and individualistic goal structures on achievement: A met analysis. *Psychological Bulletin*, Vol. 89, pp. 47-62.
- [18] Kerlin, B A. (1992). Cognitive engagement style – self regulated learning and cooperative learning. Retrieved April 27, 2004 from <http://kerlins.net/bobbi/research/myresearch/srl/>
- [19] Klein, J., Moon, Y. & Picard, R. (2002). This computer responds to frustration: theory, design, results and implications. *Interacting with Computers*, Vol. 14, pp. 119-140.

- [20] Mares, M.-L. (1996). Positive effects of television on social behavior: a meta-analysis. Report Series No. 3, The Annenberg Public Policy Center, Pennsylvania, USA.
- [21] Nakatsu, R. & Hoshino, J. (2003; eds.). Entertainment computing-technologies and applications. Kluwer Academic Press.
- [22] National Science Foundation (2001). The application and implications of information technologies in the home: where are the data and what do they say? Report No. NSF 01- 313, Division of Science Resources Studies, USA.
- [23] No author (2003). Therapeutic robot. AIST Today International Edition, No. 9, pp. 2-3.
- [24] Pek, Z. (2003). What is entertainment technology? A short overview. Online document retrieved May 7, 2004 from [www.nb2bc.co.uk/pdfs/entertaintech.pdf](http://www.nb2bc.co.uk/pdfs/entertaintech.pdf).
- [25] Priest, J., Coe, R., Evershead, B. & Bush, N. (2004). An exploration of the use of ICT at the millennium primary school, Greenwich. Report available at [www.becta.org.uk](http://www.becta.org.uk)
- [26] Rauterberg, M. (2003). Determinants for collaboration in networked multi-user games. In: R. Nakatsu & J. Hoshino (eds.), Entertainment computing-technologies and applications (pp. 313-321). Kluwer Academic Press
- [27 ] Allan, M. (2008). Deserted Histories: The Lumière Brothers, the Pyramids and Early Film Form. *Early Popular Visual Culture* Vol. 6, No. 2, 159–170. Archer, J. (2014, November 17). 4K TVs: 9 Reasons You Should Buy One -- And 9 More Why You Shouldn't. Retrieved from <http://www.forbes.com/sites/johnarcher/2014/11/17/4k-tvs-9-reasons-you-should-buy-one-and-9-more-why-you-shouldnt/#1a81dc755615>
- [28] Allen J. S. (2005). *On Hollywood: The Place The Industry*. Princeton: Princeton University Press

- [29] Robertson, P. (1988). *The Guinness Book of Movie Facts & Feats*. London: Guinness Publishing Limited.
- [30] Bazin, A. (2004). *What is Cinema?*. Berkeley: University of California Press; Second Edition.
- [31] Buck, J. (2007). *Timeline: A History of Editing*, Melbourne. Australia: Enriched Books, ISBN 9781618420-44-2.
- [32] Barrios, R. (1995). *A Song in the Dark*. Oxford: Oxford University Press, ISBN 0-19-508811-5.
- [33] Bellis, M. (2014, December 15). *The Kinetoscope*. Retrieved from <http://inventors.about.com/od/kstartinventions/a/Kinetoscope.htm>
- [34] Brownett, M. (1980). *How technology has affected and influenced the film industry and cinema*. Digital Media: Research and Analysis.
- [35] Crafton, D. (1999). *History of the American Cinema*. Berkeley: University of California press. Cotton, A. (2013, June 19). *Defining the Future of Television*. Retrieved from <http://www.bbc.co.uk/rd/blog/2013/06/defining-the-future-of-television>.
- [36] Cook, D. (2004). *A History of Narrative Film*. New York: W. W. Norton. ISBN 0-393-97868-0. Dongli Wang. (2013). *An effect analysis of high-definition technology on the filmmaking*. West China Broadcasting TV, 13. 80-81.
- [37] Everson, K. (1978). *American Silent Film*. New York: Oxford University Press. ISBN 0-195-02348-X. Evans, R. (2005). *Practical DV Filmmaking*. Waltham: Focal Press. p. 14. ISBN 0-240-80738-3.
- [38] Guanglv Zeng. (1998). *The Special Effects in Today's Hollywood*. China: Motion Picture & Video.

- [39] Hendricks, G. (1966). *The Kinetoscope: America's First Commercially Successful Motion Picture Exhibitor*. New York: Theodore Gaus' Sons. Reprinted in Hendricks, *Origins of the American Film*.
- [40] Sadoul, G. (1972). *Histoire Du Cinéma Mondial: Des Origines à Nos Jours*. Paris: Flammarion.
- [41] James, J. (2005). *Digital Intermediates for Film and Video*. Oxfordshire: Taylor & Francis. Jieyi Wang. (2011). *An Analysis of the Impact of Digital Technology on Film Industry*. Nanjing University of the Arts, Nanjing.
- [42] Jugang Li. (2015). *The Discussion of 4K Technology*. Shanxi: Shanxi Broadcast & TV Network Intermediary Group Co. Luzi, E. (2011). *Independent Film and Hollywood: How Technology is closing the Gap on the Great Divide*. Retrieved from <http://www.theblackandblue.com/2011/01/05/independent-film-and-hollywood-how-technology-is-closing-the-gap-on-the-great-divide/>
- [43] Liu Fan. (2010). *The Economics of Film Industry*. Beijing: Culture Art Publishing House. Maltby, R. (2003). *Hollywood Cinema*. Hoboken: Wiley-Blackwell; 2nd edition.
- [44] Muybridge, E. (1887). *Muybridge's Complete Human and Animal Locomotion: All 781 Plates from the 1887 Animal Locomotion*. New York: Courier Dover Publications. ISBN 978-0-486-23792-3.
- [45] Ohanian, T. (2000). *Digital Filmmaking: The Changing Art and Craft of Making Motion Pictures*. Waltham: Focal Press; 2nd edition.
- [46] Praker, D. (2009). *The Visual Dictionary of Photography*. Louisiana: AVA Publishing. p. 91. ISBN 978-2-940411-04-7.

[47] Qingcheng Zhang. (2011). *the Impact of Digital Technology on Film Market*. Beijing: China Academic Journal Electronic Publishing House. Shao Junmu. (1982). *Essay on Western Film History*. Beijing: China Film Publishing.

[48] Schwartzel, E. (2016). *Virtual-Reality Movies: Get Ready for the VR Revolution*. Retrieved from <http://www.wsj.com/articles/virtual-reality-movies-get-ready-for-the-vr-revolution-1457030357>

[49] Spellerberg, J.E. (1980). *Technology and the Film Industry: The Adoption of Cinemascope*. University of Iowa, Iowa.

[50] Salt, B. (1992). *Film Style and Technology: History and Analysis*. London: Starword. Sadoul, J. (1972). *Dictionary of Films*. Berkeley: University of California Press.

[51] Thursby, K. (n.d.). *Richard Moore dies at 83; cinematographer and co-founder of Panavision*. Retrieved August 31, 2009, from <http://www.latimes.com/local/obituaries/la-me-richard-moore31-2009aug31-story.html>

[52] *Rhythm & Hues Makes Skies Soar*. (2012, December 27). Retrieved from <http://www.cgw.com/Press-Center/Web-Exclusives/2012/Rhythm-Hues-Makes-Skies-Soar.aspx>

Wilt, A. (2003). *24p dissected*. *Digital Video Magazine*, 11, 88.

[53] Yi, C. (2012). *The promote and influence of HD digital technology on TV programs*. *Technology Innovation and Application*, 22, 27.

[54] Yanming Zhao. (2016, February 29). *The Reinvention of VR Technology*. *Guangming Daily*, p, 14. Zhengning Shi. (1998). *Digital Technology and Cinema Art*. Beijing Film Academy, Beijing.

## Web References-Author Books/Article

- **Arora**, - Devdas: Indian Cinema's Emasculated Hero, Sado-Masochism, and Colonialism, Journal of South Asian Literature,1995- JSTOR
- **Mascelli, J. V.** (1998). The five C's of cinematography. Loss Angeles: Silman James Press.
- **Emily Drago** (2015) -The Effect of Technology on Face-to-Face, Strategic Communications Elon Journal of undergraduate research in communications ,2015, VOL. 6 NO. 1 | PG. 2/2 | Elon University.
- **Hill & Bruce**, 1996. -American Psychological association Washington DC 20002-4242
- **William James**, 1890/1998, -Article/Book
- **Ryan A. Piccirillo** (2011) -The Technological evolution of film making and its relation to quality in cinema, Inquiries Journal/Student Pulse, 3(08).
- **Bradley et al.**, 1992; Cahill & McGaugh, 1995; -Article/Book
- **Kensinger et al.**, 2002-Article/Book
- **Anderson et al.**, 2006 **Buchanan et al.**, 2004; **Kensinger & Corkin**, 2003; **Talmi & Moscovitch**, 2004-Article/Book
- **LaBar & Phelps**, 1998- Arousal-mediated **memory** consolidation: Role of the medial temporal lobe in humans, Psychological Science **1998**. journals.sagepub.com
- **McGaugh**, 2004; **Wolf**, 2008-Article/Book
- **Buchanan**, 2007-Retrieval of emotional memories. TW **Buchanan** Psychological bulletin,2007- psycnet.apa.org
- **Strange & Dolan**, 2007-Article/Book
- **Dolan & Vuilleumier**, 2003; Kensinger, 2004; MacLeod & Matthews, 2004) -Article/Book
- **McGaugh, 2004** -The amygdala modulates the consolidation of memories of emotionally arousing experiences JL McGaugh- Annual review of neuroscience,2004- openlearning.ca

- **Kensinger & Corkin**, -Two routes to emotional memory: Distinct neural processes for valence and arousal EA Kensinger, S **Corkin**- Proceedings of the National...**2004**- National Acad Sciences
- **Ryan A. Piccirillo** et al (2011) -The Technological evolution of film making and its relation to quality in cinema, *Inquiries Journal/Student Pulse*, 3(08).
- **Richardson** et al., 2004). -Article/Book
- **Iidaka et al.**, 2001; **Vuilleumier** et al., 2004) -Article/Book
- **Richards, J. M., & Gross, J. J. (2000)**. Emotion regulation and memory: The cognitive costs of keeping one's cool *.Journal of Personality and Social Psychology*, 79(3), 410–424.<https://doi.org/10.1037/0022-3514.79.3.410>
- **Kensinger, Garoff-Eaton, & Schacter**, 2007; -Article/Book
- **Talmi** et al., 2008-Article/Book
- **Peter Byrne** (2009) -Why psychiatrists should watch films (or What has cinema ever done for psychiatry?) *Advances in psychiatric treatment* (2009), vol. 15, 286–296 doi: 10.1192/apt.bp.107.005306.
- **Buchanan**, 2007-Article/Book
- **Thomas Baumgartner Michaela Esslen Lutz Jancke** (2005) -From emotion perception to emotion experience: Emotions evoked by pictures and classical music,*International Journal of Psychophysiology* 60 (2006) 34 – 43
- **Barthes** (1994) and **Kristeva** (2000) -Article/Book
- **Evans, R.** (2005). *Practical DV Film making*. Waltham: Focal Press. p. 14. ISBN 0-240- 80738-3.
- **Smith** et al., 2006. -Article/Book
- **Luminet** et al., 2004; **Smith, Bibi, & Sheard**, 2003; **Tekcan** et al., 2003) -Article/Book
- **Sharot, Martorella, Delgado, and Phelps (2007)** -Article/Book
- **A Guinote**. - *Personality and Social Psychology Bulletin*, 2007 journals.sagepub. Power and goal pursuit.com

- **Alton John** 1995-Painting with Light, University of California Press.
- **Dolan & Vuilleumier**, 2003-Article/Book
- **Ferguson et al**, 2007; MacLeod & Matthews, 2004-Article/Book
- **Chan et al.**, 2007) -Article/Book
- **Cahill**, 2003; Hamann & Canli, 2004-Article/Book
- **Carstensen et al.**, 1999; Mather & Carstensen, 2005-Article/Book
- **Knez.I** -Effects of indoor **lighting** on **mood** and cognition- Journal of environmental psychology, **1995** - Elsevier
- **Sburlea Andreea Ioana**, Brighten up your mind! Effects of **light** priming and encouraging feedback on the neural and behavioral responses in a general knowledge task\_- 2012 - essay.utwente.nl
- **Lombard & Ditton**, 1997. -Article/Book
- **Ginthner**, 2013 . -Article/Book
- **Brian Sutton** (2013) -The Effects of Technology in Society and Education, The College at Brockport, [sutton.bps@gmail.com](mailto:sutton.bps@gmail.com), The College at Brockport: State University of New York.
- **Veitch JA** Personal control over workplace lighting: Performance and **mood effects-1991-** dspace.library.uvic.ca
- **Brown**, 2012-Article/Book
- **Cole DA**, Testing mediational models with longitudinal data: questions and tips in the use of structural equation modeling. SE Maxwell- Journal of abnormal psychology, 2003.
- **Maerez**, 2007, p. 82-Article/Book
- **Naremore J** - More than night: Film noir in its contexts 2008- books.google.com
- **Woodward**, 2011, p. D7-Article/Book
- **Jehoshua Eliashberg, Anita Elberse, Mark A.A.M. Leenders** (2005) -The motion picture industry: critical issues in practice, current research & new research directions..

- **Archer, J.** (2014, November 17). 4K TVs: 9 Reasons You Should Buy One -- And 9 More Why You Shouldn't. Retrieved from <http://www.forbes.com/sites/johnarcher/2014/11/17/4k-tvs-9-reasons-you-should-buy-one-and-9-more-why-you-shouldn't/#1a81dc755615>
- **Detenber 1996** -Article/Book
- **Guo-Ming Chen** (2008) -The Impact of New Media on Inter cultural Communication in Global Context, University of Rhode Island
- **Lang peter J., Mark H. McManis, Margaret M. Bradley, W. Keith Berg, Bruce N. Cuthbert,** *Psychophysiology*, 38 ~2001!, 222–231. Cambridge University Press. Printed in the USA.
- **Evans, R.** (2005). *Practical DV Film making*. Waltham: Focal Press. p. 14. ISBN 0-240- 80738-3.
- **Maltby, R.** (2003). *Hollywood Cinema*. Hoboken: Wiley-Blackwell; 2nd edition.
- **Gerben Bakker** (2003) -The Decline and fall of the European film industry : sunk costs, market size and market structure, 1890-1927,Working Paper No. 70/03.Department of Economic History, London School of Economics.
- **Jieyi Wang.** (2011). *An Analysis of the Impact of Digital Technology on Film Industry*. Nanjing University of the Arts, Nanjing.
- *Impact of Technology on creative industries (Source-Dr. Padma Rani)* -Article/Book
- **Samuel J. Leistedt et al** (2013) -*Psychiatry: behavioral sciences*,J Forensic Sci, 2013
- **Rajadhyaksha and Willemen** -Article/Book
- **Bhattacharya 15.** -Article/Book
- **Sinha 1994,** -Article/Book
- **Jianfeng Du,** personal interview, October 14, 2015.
- **Brad Bird,**2004,-Article/Book
- **Arnav Jhala and R Michael Young** (2005) -*A Discourse Planning Approach to Cinematic Camera Control for Narratives in Virtual Environments*,Department of Computer Science North Carolina State University Raleigh, NC – 27695, USA

- **Justin D. Weisz, Sara Kiesler, Hui Zhang** (2007) -Watching Together: Integrating Text Chat with Video, Carnegie Mellon University, School of Computer Science, Pittsburgh, PA 15213 & University of Minnesota,200 Union Street SE, Minneapolis, MN 55455.
- **Grotal**, 2015, -Article/Book
- **Chareen Snelson and Ross A. Perkins** (2010) -From Silent Film to YouTube TM : Tracing the Historical Roots of Motion Picture Technologies in Education, Scholar Works, Boise State University
- **Daselaar et al.**, 2007. -Article/Book
- **Michael D. Smith and Rahul Telang et al** (2008) -Competing with Free: The Impact of Movie Broadcasts on DVD Sales and Internet Piracy, H. John Heinz III School of Public Policy and Management, Carnegie Mellon University, Pittsburgh, PA 15213
- **Zhengning Shi.** (1998). Digital Technology and Cinema Art. Beijing Film Academy, Beijing.
- **Naremore et al** (2008) -Article/Book
- **Detenber** (1996-Article/Book
- **Shruti Vinayak Gokhale** (2010) -Comparative Study of the Practice of Product Placement in Bollywood and Hollywood Movies, SJSU Scholar Works,San Jose State University
- **Marc Fetscherin** (2010) -The Main Determinants of Bollywood Movie Box Office Sales, Faculty Publications Rollins Scholarship Online, Rollins College.
- **Santa Clara et al** (2011) -Article/Book
- **Celso M. de Melo and Jonathan Gratch et al** (2012) -Article/Book
- **Werner Robitza** (2012) -<https://www.scribd.com/document/3D-Vision>
- **Woodward et al** (2011) -Article/Book
- **Doi:** 10.1111/1556-4029.12359 Available online at: [onlinelibrary.wiley.com](http://onlinelibrary.wiley.com)
- **Maia Garau,John Poisson,Scott Lederer, Chris Beckmann**(2013) -Speaking in Pictures: Visual Conversation Using Radar, Tiny Pictures Inc.417 14th Street, San Francisco CA 94103

- **Daniel L. Bride, Sheila E. Crowell, Brian R. Baucom, Erin A. Kaufman, Caitlin G. O'Connor, Chloe R. Skidmore, Mona Yaptangco** (2014) -Testing the Effectiveness of 3D Film for Laboratory-Based Studies of Emotion,PLoS ONE 9(8): e105554. doi:10.1371/journal.pone.0105554
- **Kristin au et al** (2014) -Article/Book
- **C.S.H.N. Murthy and O.B. Meitei et al** (2016) - **Intertextuality of Film Remakes of *Devdas* : Romanticism from the Perspective of Indian Aesthetics**, <https://doi.org/10.1177/0262728015615477>.
- **Vikas shah et al** (2016) -Thought Economics-Article/website at <https://vikas.work>.
- **Hoeckner et al** (2017) -Article/Book
- **Kaichen Hu** (2016) -The Effects of Digital Video Technology On Modern Film, Master of Science in Television Management May,2016, Drexel University.
- **Matthias Rauterberg** (2016) -Positive effects of entertainment technology on human behaviour,,: Rene Jacquart (Ed.) Building the Information Society.© IFIP, Kluwer Academic Press, 2004, pp. 51-58,Technical University Eindhoven (The Netherlands).

## **Annexure A**

**Tilak Maharashtra Vidyapeeth, Pune.**

**Department of Journalism and Mass Communication.**

This survey is conducted with regard to Ph.D thesis title: “Changing Trends in Cinematography and its impact on audience with special reference to film Devdas (1936-2002)”

### **Questionnaire for Focus Group Discussion (FGD)**

Number of Participants in Focus Group Discussion:

Theme of Topic: Correlation between image-technology-memory-emotion.

Researcher Name:

Nature of Participants (Public/ Professionals Students of media /film studies)

Name and signature of the participants:

Duration of meeting : 1 Hour

Synopsis of theme:

Welcoming the participants,

Introduction of researcher and participants,

Presentation: Participants within this study had the choice of selecting either video clip 1 or video clip 2 or video clip 3, when asked the question.

Question-Answer session,

Conclusion,

End of Session.

## Open Ended Questions

- 1) Are you interested watching cinema in B&W or Color?
- 2) Do you like to watch special effects and 3D films?
- 3) How do you feel watching cinema on mobile phone vs IMAX screen?
- 4) What is the cinematographer's job ?
- 5) Is it important to have different styles of lighting approach to tell story on the screen?
- 6) Can the lighting style create mood in our mind?
- 7) Do you remember more about B&W picture or Colour picture? Why?
- 8) What is your opinion about camera movement, composition and visual presentation quality on the screen compare to the past and present film making?
- 9) If you want to make a movie, which format you will choose?Why?
- 10) What is your comment about watching the same story of Devdas shot in 1936, 1955 and 2002?

## **Interview questions for media and entertainment professionals and students**

1. Have the revolutionary changes to the film industry as a result of convergence and digitalization been advantageous or disadvantageous?
2. Which is more effective colour or B&W at generating an emotional response ?
3. What is the director's role when adapting a novel into film ?
4. In your opinion, what is the need of digital effects added in a film ?
5. Does the incorporation of digital effects in a film influence the director's method?
6. How do directors adapt their methods in directing digital effects films?
7. How does colour work, generally and specifically, to guide the story?
8. What are the major reasons that the motion picture industry is more likely to use digital camera to shoot film instead of the traditional film camera?
9. Do you think that digital cinematography can change the situation for independent moviemakers?
10. How has digital technology changed the pre-production, production and post-production process in the modern film industry?
11. Do you think 4k technology will dominate the TV & Film industry in the future?
12. Please comment on "Inventions and new technology had added new dimensions in creating better visuals on the screen".