THE FACILITATING ROLE OF ARTIFICIAL INTELLIGENCE IN EDUCATION ON TEACHING EFFECTIVENESS

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THE FACILITATING ROLE OF ARTIFICIAL INTELLIGENCE IN EDUCATION ON TEACHING EFFECTIVENESS

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Abstract
In recent years, the information systems (IS) research community has given AI more focus. However, there is increasing worry that research on AI may not experience the kind of cumulative building of knowledge that has previously eclipsed IS research. By performing a thorough literature review of AI research in IS between 2005 and 2020, this study addresses this concern. A synthesis of the key themes relevant to this research is provided. The search strategy produced 1877 studies, of which 98 were classified as primary studies. Thus, this study contributes significantly to (i) the present reported business value and contributions of AI, (ii) the research and practical implications of the use of AI, and (iii) the opportunities for the future application of AI. This is a review article on AI as it has grown in popularity as a result of Big Data, advanced algorithms, and increased computing power and storage, AI systems are becoming an embedded component of digital systems, and have a significant influence on human decision-making. As a result, there is a growing need for information systems researchers to investigate and comprehend the implications of AI for decision-making, as well as to add to AI's theoretical advancement and practical success.

Keywords:- Feeling; intellect; human intelligence; artificial intelligence

Introduction:-
Artificial intelligence:-:
The ability of computer algorithms to learn and think is referred to as artificial intelligence. In theory, he asserted, every aspect of learning or any other characteristic of intelligence can be so precisely described that a machine can be constructed to simulate it.

Various modern devices use AI in some capacity. For instance,
Computers can now function without the need for scripting thanks to machine learning. Three categories of machine learning exist:

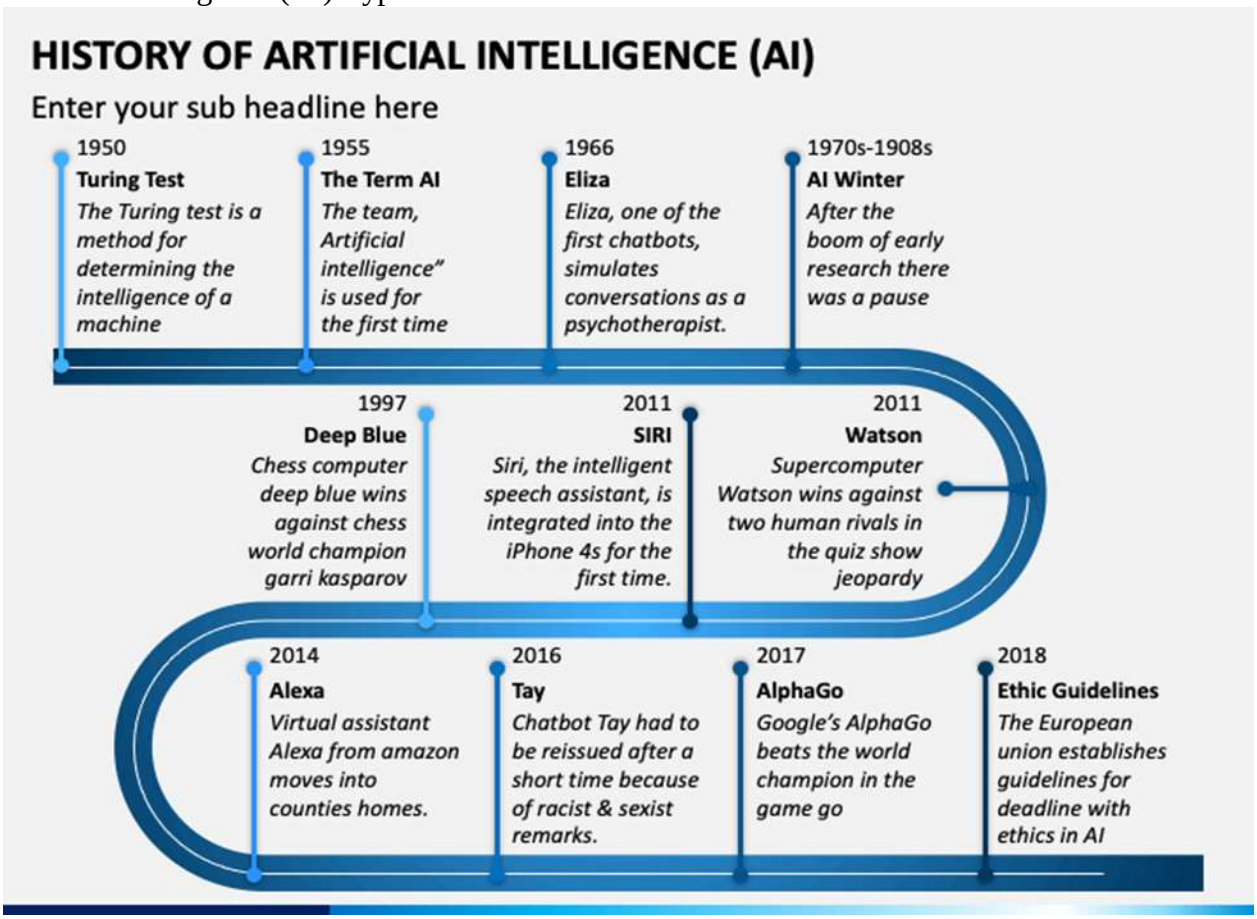
- • Supervised learning - New data sets can be classified by using labelled data sets to find patterns.
- Data groups can be sorted based on how similar or dissimilar they are using unsupervised learning.
- Reinforcement learning: After an action is taken, the AI system receives input.

Automation - Tasks can be enhanced by combining automation tools and AI. Machine vision is the recording and analysis of visual data using a camera, digital signal processing, and analogue-to-analogue conversion. From medical research to signature analysis, it is employed.

Self-driving Autonomous cars use deep learning, image recognition, and machine vision to keep the car in its lane and avoid hitting people.

Robotics - Robotics is an engineering discipline with an emphasis on the creation of robots. Machine learning is now being used to create machines that can communicate with humans.

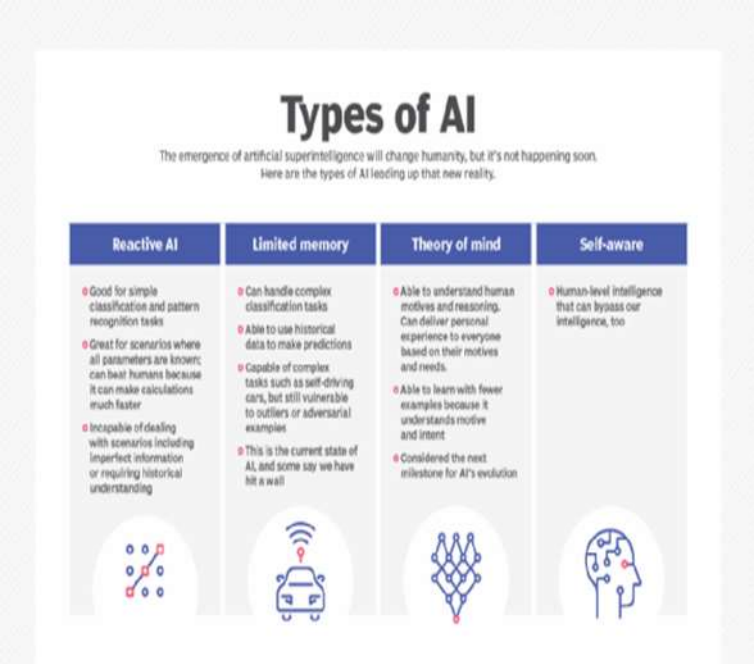
Artificial Intelligence (AI) Types



Source:- https://www.sketchbubble.com/en/presentation-history-of-artificial- intelligence.html

AI comes in four flavours:

Machines That React	**Minor Memory**	**Concept of Mind**	**Self-Awareness**
Simple pattern recognition and categorization exercises	Difficult categorization assignments	Comprehends human motivations and thinking	There is currently no intellect at the human level that can surpass human intelligence as well.
When all factors are known, excellent	Makes forecasts using historical information	Fewer instances are required to be learned because it understands the motives	Sense of self-consciousness
Cannot cope with incomplete knowledge	AI condition at the moment	The following step in the development of AI	Does not exist yet



Source:- https://www.techtarget.com/searchenterpriseai/tip/4-main-types-of-AI- explained

Artificial intelligence's background

As was already stated, John McCarthy first used the term "artificial intelligence" in 1956 at the first-ever AI conference at Dartmouth College. The first AI software program, dubbed "Logic Theorist," was developed later that year by JC Shaw, Herbert Simon, and Allen Newell.

However, the Mayan society is where the concept of a "machine that thinks" first appeared. Since the invention of electronic computers, several significant events have occurred in the modern period that has had a significant impact on the development of AI. These include:

- A Logical Calculus of the Ideas Immanent in Nervous Activity was released in the Journal of Mathematical Biophysics by two mathematicians Walter Pitts and Warren S. McCulloch during the period of artificial intelligence's maturation (1943–1952). They used straightforward logical operations to explain how human neurons behaved, which led English mathematician Alan Turing to publish "Computing Machinery and Intelligence," which included a test. To determine whether a machine is capable of displaying intelligent conduct, the Turing Test is used.
- From 1952 to 1956, artificial intelligence was developing. Allen Newell and Herbert A. Simon developed Logic Theorist, the first artificial intelligence software. It enhanced the proofs for additional theorems and proved about 52 mathematical theories. At the Dartmouth conference, Professor John McCarthy first used the phrase "Artificial Intelligence," which has since gained academic acceptance.
- Early excitement during the golden years (1956–1974): Researchers became more interested in AI after the development of high-level languages like LISP, COBOL, and FORTRAN and created methods to address challenging mathematical issues. The first chatbot, called "ELIZA," was developed in 1966 by computer expert Joseph Weizenbaum. A year afterwards, Frank Rosenblatt created the "Mark 1 Perceptron," a computer. Based on the biological neural network (BNN), this machine learns by making mistakes and trying again, a process that was subsequently called reinforced learning. The first sentient humanoid robot, known as "WABOT-1," was created in Japan in 1972. Since then, numerous industries have developed and trained robots to carry out challenging jobs.
- An AI boom (1980–1987): After the first AI winter (1974–1980), governments began to realize the potential of AI systems for the business and military. Software and expert systems have been designed

to mimic the capacity of the human brain for making decisions in machines. Backpropagation, an algorithm that makes use of neural networks to comprehend a problem and discover the ideal solution, was used.

- The AI Winter (1987-1993): By the end of 1988, IBM had accurately translated a set of bilingual sentences from English to French. As AI and machine learning continued to progress, Yann LeCun used the backpropagation algorithm to successfully identify handwritten ZIP codes in 1989. The system took three days to generate the findings, but given the hardware restrictions at the time, it was still quick enough.
- The rise of intelligent agents (1993–2011): In 1997, IBM created Deep Blue, a chess-playing computer, which twice defeated Garry Kasparov, the reigning world champion. In 2002, artificial intelligence made its first foray into household appliances by creating the "Roomba" vacuum cleaner. MNCs like Facebook, Google, and Microsoft began utilizing AI algorithms and Data Analytics by the year 2006 to better comprehend consumer behaviour and their recommendation systems.
- Deep Learning, Big Data, and Artificial General Intelligence (2011-Present): Thanks to ever-more-powerful computing systems, it is now possible to process massive quantities of data and teach our machines to make wiser decisions. Some of the most difficult issues in the modern world are solved by supercomputers using AI algorithms and neural networks. Recently, Elon Musk's company Neuralink successfully demonstrated a brain-machine interface by having a monkey control a video game of ping pong balls with his thoughts.

How is artificial intelligence implemented?

Computers are proficient at following procedures, or lists of steps to carry out a job. A computer should be able to quickly complete a task if we give it the necessary steps to do so. Algorithms are all that the stages are. An algorithm can be as straightforward as printing two digits or as complex as predicting the results of the upcoming election!

What are some of the main branches of artificial intelligence

Large data sets are the foundation for artificial intelligence, which is then coupled with quick iterative processing and clever algorithms to enable the system to learn from the data's patterns. The system could then produce outputs that were precise or nearly accurate. As it might sound, artificial intelligence (AI) is a very broad topic with a lot of advanced and complex processes. It is also a field of study that contains a lot of theories, methods, and technologies. The following

Machine Learning: - Computer learning is the process by which a computer can educate itself using examples and prior knowledge. It is not necessary for the software created for it to be specific or static. When necessary, the computer tends to modify or correct its algorithm. Machine learning is used in almost every industry and is a potent tool that creates a wide range of possibilities. People with Machine Learning Certification have the opportunity to kick-start their careers in the field of ML

The two words that are most frequently misunderstood are artificial intelligence (AI) and machine learning (ML). Confusion results from people's general tendency to believe that they are the same. When the subjects of Big Data, Data Analytics, or some other related topics are discussed, both terms are, however, recalled concurrently and repeatedly.

Neural Networks: The organic neural network, or the brain, served as inspiration for the development of Artificial Neural Networks (ANNs). To discover patterns in the data that are far too complex for a human to understand and teach the machine to recognize, ANNs are one of the most crucial tools in machine learning.

Deep Learning: In Deep Learning, a lot of data is analyzed, and in this case, the algorithm would repeat the job while tweaking/editing it slightly each time to improve the result.

How is this accomplished? A machine can simulate human thought processes using self- learning algorithms, pattern recognition by neural networks, and natural language processing. Here, digital simulations of the cognitive process are used.

Computer vision: Computer vision enables machines to perceive, classify, and analyze images like human vision. It then produces the desired result. AI and computer vision are tightly related. Here, the computer must comprehend what it observes to properly analyze it.

Natural language processing is the process of creating tools that enable us to use real human languages like English to interact with machines.

Artificial intelligence, machine learning, and data science

Although there are connections between data science, machine learning, and artificial intelligence, each technology has a distinct function.

Literature Review:-
Koehler and Hoffmann (2000) handle one of the long-standing issues in AI planning: computing goal orderings. The article makes two new contributions: it formally defines and discusses two distinct goal orderings, and it develops two different methods for computing reasonable goal orderings. The complexity of these orderings is explored, as well as their practical significance.
A study on non-approximability results for partially observable Markov decision processes, (2001) demonstrates that polynomial-time algorithms for finding control policies are unlikely to or simply do not have guarantees of finding policies within a constant factor or a constant sum of optimal for several variations of partially observable Markov decision processes.
Cemgil and Kappen (2003) offer a probabilistic generative model for timing inconsistencies in expressive music performance. The suggested model has the structure of a switching state space model. They construct two well-known music recognition issues as filtering and maximum a posteriori (MAP) state estimation tasks, namely tempo tracking and automatic transcription (rhythm quantisation). The simulation findings indicate that sequential methods produce better results.
Leisink and Kappen (2003) present an algorithm for computing bounds on the marginals of a graphical model in their paper on Bound Propagation. This can be thought of as a collection of constraints in a linear programming problem with the marginal probability of the centre nodes as the objective function. They demonstrate how to acquire sharp bounds for indirect and directed graphs that are used in practical applications but for which exact computations are impossible.
There are numerous papers on artificial intelligence programming. Because programming is empirical, the majority of articles have sprung up for modelling or mathematical frameworks. Sato and Kameya wrote an article in this area as an example (2001). the study is based on the parameterization of logic programs for symbolic- statistical modelling. Clause programs containing probabilistic facts with a parameterized distribution were specified by the authors.

The main distinctions between data science, artificial intelligence, and machine learning are listed below:

Data Science	**Artificial Intelligence**	**Machine Learning**
Data sourcing, cleaning, processing, and visualization for analytical reasons are all done using data science.	AI uses intelligent programs and iterative processing to mimic the workings of the human brain.	A component of AI called machine learning employs mathematical models to enable a computer to learn with or without routine programming.
For analytics, data science works with both organized and unstructured data.	To discover the best answer to a problem, AI employs logic theories and decision trees.	Computer learning trains a computer using statistical models and neural networks.
Tableau, SAS2, Apache, MATLAB, Spark, and other well-known tools in data science are just a few examples.	Keras, Scikit-Learn, and Tens or Flow are a few of the well-liked libraries used to execute AI algorithms.	Machine learning, a branch of AI, makes use of the same frameworks in addition to applications like Amazon Lex2, IBM Watson, and Azure ML Studio.
Data operations depending on user needs are a part of data science.	Predictive modelling is a component of AI that uses historical and present data to forecast Future events.	An area of AI is machine learning.
It is primarily utilized in BI research, healthcare, and fraud detection.	Chatbots, voice aides, and weather forecasting are examples of AI applications.	A few applications of ML include facial recognition, NLP, and online suggestions.

Artificial Intelligence's Future

You'll observe when you look around that artificial intelligence has affected almost every industry and will continue to have an impact in the future. One of our time's most exciting and cutting-edge technologies has evolved as a result. AI is the gasoline that powers all of these technologies, including robotics, big data, the Internet of Things, etc. Numerous businesses around the globe are investing heavily in machine learning and artificial intelligence research.

AI enables computers to produce enormous amounts of data and use it to analyze, discover, and make choices in a fraction of the time it would have taken a human. Our society has already been greatly impacted by it. It has the potential to greatly benefit human civilization in the future if used responsibly.

Artificial intelligence benefits

- Less chance of human error: When people perform tasks that call for precision, there is always a chance of error. However, if correctly programmed, machines don't make mistakes and can easily complete monotonous tasks with few, if any, errors.
- One of the biggest benefits of artificial intelligence is the ability to replace people with intelligent robots. To prevent disasters, AI robots are now performing dangerous tasks in places like coal mines, the deepest parts of the ocean, sewage treatment, and nuclear power plants in place of people.
- Replacing repetitive duties: We have to perform several repetitive tasks daily without any variation in our work. For instance, you don't need to be inventive and come up with novel; simple ways to do things every day wash your clothes or mop the floor. There are production lines in even large industries where the same amount of tasks must be completed in a precise order. These duties have now been automated so that people can use this time to pursue their creative interests.
- Digital assistance: By using digital assistants to communicate with users around- the-clock, businesses can avoid using human resources and provide consumers with faster service. Customers and the company both benefit from the circumstance. Most of the time, it is very difficult to tell whether a client is speaking with a chatbot or a real person.

Artificial intelligence's drawbacks

- The high expense of creation: Although it may sound a little unsettling, the rate of advancement for computational devices is astounding. To keep up with the most recent requirements, machines need to be repaired and kept over time, which consumes a lot of resources.
- No feelings: There is no denying that computers are much faster and more powerful than people. They can work on several things at once and finish projects quickly. Robots with AI capabilities can also lift more weight,lengthening the manufacturing cycle. Machines, however, are unable to develop empathic connections with other people, which is essential for managing teams.
- Box thinking: With a specific set of constraints, machines can perfectly carry out the duties or operations that have been assigned to them. If they learn anything about the pattern, though, they start producing unclear results.
- Can't make its own decisions: Artificial intelligence seeks to process data and make decisions consciously, just like we humans do. However, it is currently limited to the duties that are programmed for it. These systems are unable to make choices based on feelings, empathy, or compassion. For instance, a self- driving car won't halt even if it hits a deer and knocks it off if it is not programmed to regard creatures like deer as living organisms.
- What uses does artificial intelligence have?
- It's time for us to become familiar with different AI real-world applications.
- Detecting fraud

You get a message from your bank inquiring if you've made that transaction every time you use your credit or debit card to make an online or offline purchase. If the deal has not yet been completed, the bank also requests a report.

Banks provide informationabout both fraudulent and legitimate transactions to their artificial intelligence (AI) tools. Based on these massive training datasets, these systems learn from this data and then forecast which transactions are fraudulent and which are not.

Recommended Music and Films
Did you know that Mark Zuckerberg developed the music player Synapse, which recommended tracks based on what users were likely to listen to? Users can also receive music and movie recommendations from Netflix, Spotify, and Pandora based on their prior hobbies and purchases. These websites achieve this by collecting user options from the past and feeding them into the learning algorithm.

Retail and AI
By 2025, the market for AI software is anticipated to be worth up to US$36 million. Retailers are now paying heed to AI due to the market hype. As a result, most large- and small-scale industries are implementing AI tools in cutting-edge methods throughout the entire product life cycle, from the assembling stage to the customer-service interactions following a sale.
Flight on Autopilot
With AI technology, a driver only needs to switch the system to autopilot mode, and the AI will handle the majority of the flight's operations. According to the New York Times, the typical Boeing plane journey requires only 7 minutes of human intervention (mostly for takeoff and landing).

Artificial Intelligence in Healthcare
AI can detect diseases such as tumours and ulcers in their early phases using radiological tools such as MRI machines, X-ray machines, and CT scanners. There is no cure for diseases like cancer, but the risk of death can be greatly reduced if the tumour is discovered in its early stages. Similarly, by analyzing their R-Health data, it can recommend medication and tests.
AI is also used to investigate the impacts of various drugs on the human body and to develop replacements for pre-existing ones.

Transportation AI
Autonomous vehicles are genuinely bridging the gap between science fiction and reality. Vehicles can gather data from their surroundings, analyze it, and make decisions using sophisticated AI algorithms, cameras, LIDAR, and other sensors.
After takeoff, an autopilot in a commercial aircraft can take over control and ensure that all parameters are in sync. Furthermore, sophisticated navigation systems are used for quick adaptations to save time and adapt to shifting ocean conditions that could be dangerous for cargo ships.

Research Methodology:-
An undergraduate questionnaire survey was conducted in response to the study team's survey. The data collected from 88 respondents those
Table 1. Respondent's descriptive statistical findings

Na me	Opti on	Freque ncy	Percentag e (%)
Gender	Male	35	39.77
	Female	53	60.23

From	E-commerce	18	20.45
	Logistics management	6	6.82
	Marketing	12	13.64
	Business management	28	31.82
	Accounting	10	11.36
	Humanresourc e management	7	7.95
Use of AI	No contact	7	7.95
	<0.5 years	3	3.41
	0.5–1 year	18	20.45
	1–2 years	21	23.86
	2–3 years	22	25.00
	>3 years	17	19.32

The term reliability mostly refers to whether the test is trustworthy and whether the data obtained is reliable. The extent to which a test or measuring instrument can truly measure what is being measured is referred to as its validity.

(1) H1 was confirmed. Generally, this conclusion is consistent with the conclusions of most studies. The reason is mainly that AI-assisted teaching allows teachers to use more personalized teaching plans. In particular, computer vision, natural language pro- cessing, and data mining in AI technology provide teachers with technological possibilities. Personalized teaching plans can be produced for teachers according to the class condition or individual situations, including teaching plans, classroom exercises, homework assignments, and others. In addition, the latest technologies, such as speech processing, computer vision, data mining, and VR technology, allow more new teachers to have trial teaching training and provide teachers with virtual classroom scenes for pre-practice teaching content.

(2) H2 was confirmed. AI technology can help teachers provide more accurate teach- ing services to review the activities of learners. Teachers can offer more scientific practice suggestions to each learner according to their mastered knowledge and help them to master key and difficult knowledge points in the course. Assisted by natural language processing and data mining of AI, teachers can realize batched intelligent homework checking more effectively. In particular, they can help teachers in checking objective questions more effectively. The natural language processing of AI can help teachers toanswer personalized questions from learners more effectively. Concerning questions of learners, the AI assistant imitates the behavioural mode of humans to make intelligent communication with learners and give them personalized answers, thus relieving teachers' pressure in some simple repeated learning processes.

Analysis Term	**Using Period of AI**	**Mean**	**Standard Deviation**	**F**	**P**
Teaching effectiveness	No contact	7	4.86	5.276	0.000**
	<0.5 years	3	6.67		
	0.5–1 year	18	5.37		
	1–2 years	21	5.51		
	2–3 years	22	5.12		
	>3 years	17	3.8		
	Total	88	5.31		

This demonstrates that samples with various AI-using durations all have substantial effects on teaching efficacy (p 0.01), demonstrating that teaching efficacy changes with the AI-using era. The primary reason

is that AI-assisted education is a reform of the teaching paradigm; yet, students who are the focus of learning activities must be somewhat familiar with AI technology. Additionally, students who had been using AI for 0.5-2 years demonstrated the strongest teaching efficacy, showing that students need to have a thorough understanding of AI technology. To achieve high-efficiency independent studies when teachers utilize AI- assisted teaching, students must assess the learning analysis results offered by the platform by their learning state, take the appropriate actions, engage in self-reflection, and alter their learning state. As stated by

Conclusion

Technology has advanced quickly and massively in recent decades. Throughout the course, for every position lost to technology, there were always new and exciting job roles emerging. If a new technology had replaced all human employment, the majority of the world would have been out of work by now. Even at its inception, the Internet received many negative evaluations. However, it is now clear that the Internet will never be supplanted. If that were the case, you would not be reading this site. Similarly, even though it automates many human skills, it will grow in potential and goodwill, benefiting humanity as a whole. Emotion AI and cognitive AI work together to mimic human intelligence. Emotion AI is devoted to discovering human emotions and enabling computers to comprehend, interpret, and synthesize emotions in the same way that humans do. Cognitive AI aspires to make computers analyze, reason, and make choices in the same way that humans do. We examine the evolution and relationship between emotional AI and cognitive AI in this article. Cognitive computing is widely regarded as the next generation of computing. Four critical parts of cognitive AI are discussed: engagement, regulation, decision-making, and discovery, all of which are complementary. To create an effective cognitive computing system, all four of the above factors must be considered. Finally, this study looks forward to the future of cognitive AI. Future cognitive AI research paths include data and knowledge mining, multi-modal AI explainability, and hybrid AI.

This study examined the effects of five AIED components on the efficiency of instruction based on the literature review. Additionally, it was anticipated that teachers' perceptions of ET had a moderating role in the ability of AIED to enhance teaching efficacy. The efficiency of instruction varied depending on the learners' use of AI at the time.

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