

ARTIFICIAL INTELLIGENCE IN HEALTHCARE

Kshitija Patil Asst. Prof. Department of Computer Science Tilak Maharashtra Vidyapeeth

ABSTRACT: The use of Artificial Intelligence has already been started in healthcare industry. There are few companies who have designed few equipments whose working is based on Artificial Intelligence and machine learning. In upcoming future this use is going to be increased on large scale which is going to help the healthcare field to perform their task more efficiently and faster and few healthcare tasks better than humans. Artificial Intelligence implementation on professionals losing their jobs so few limitations are also discussed.

KEYWORDS: Artificial Intelligence, Healthcare Applications, Machine Learning, Deep Learning, Decision Making

INTRODUCTION:

OVERVIEW OF ARTIFICIAL INTELLIGENCE:

Artificial Intelligence (AI) is the development of computer systems that are capable of performing tasks that normally require human intelligence, such as decision making, object detection, solving complex problem and soon. Artificial Intelligence gives us prediction with an increased level of accuracy. Artificial Intelligence gives us prediction with an increased level of accuracy. Artificial Intelligence helps us in decision making processes it has to solve complex problems and it performs high level computations that will take days for human to solve. Artificial intelligence is something that makes our lives easier by performing high level computations and solving complex problem.

OVERVIEW OF ARTIFICIAL INTELLIGENCE IN HEALTHCARE:

In present scenario we can see that Artificial Intelligence is getting improved day by day and the areas where it can be used are also expanding. Considering the future, the most important field where Artificial Intelligence is going to play a very important role in Healthcare. Artificial Intelligence could be beneficial in mining medical records; designing treatment plans; predicting health events; doing online consultations; assisting in clinical decision making; medication management; drug creation; making healthier choices and decision; and solving public health problems etc.

Healthcare is one of the most important fields Artificial Intelligence has going to be transformed. Healthcare is getting more importance in a more advanced manner. Artificial Intelligence presence in healthcare has the potential to reduce cost of treatment, detect disease. Artificial Intelligence can also improve patient experience, including generation of faster test results, greater clinical collaboration, improved workflow and give more patient centered approach thereby improving quality of life. Artificial Intelligence has helped in detecting diseases at an early stage. Artificial intelligence plays a very important role in the early predictions of medical conditions such as heart attack.

The led to the sudden importance of Artificial Intelligence in healthcare industry is the high availability of medical data now. All of us have tons and tons of medical data in the form of medical history whenever we go to any hospitals our history is written down in accounts so basically with the availability of data implementing Artificial Intelligence becomes much easier. The Artificial Intelligence is based on technologies such as deep learning and machine learning which require tons of data so with the availability of data it become easier to implement or it became easier to use Artificial Intelligence in the healthcare industry.

APPLICATIONS USING ARTIFICIAL INTELLIGENCE IN HEALTHCARE:

SMART WATCH:

Artificial Intelligence based wearable health trackers that are being developed to monitor the health of a person and display any warning when the device collides something unusual or something unlikely.

Smart Watch use artificial intelligence in order to build a watch that monitors an individual health.. smart watch collects data like person's heart rate, sleep cycle, breathing rate, activity level, blood pressure and it keeps a record of all these measures 24 by 7. By wearing Smart Watch all of this data is automatically collected by the watch then machine learning processing, analyzing and making predictions from data. So this collected data is processed and it's analyzed using machine learning with the help of data you are going to predict whether a person has chances of getting a heart attack or not now.

RETINA SCANNER:

Recently Google has announced their work on a Retina scanner device which is under field trials which can be used in areas where the trained doctors are scarce. The Artificial Intelligence can be used in diagnosing Diabetic Retinopathy which a leading cause of blindness. Similarly, it can also be useful in Predicting cardiovascular risks. A retina image can be useful in detecting the Age, Biological sex, if a person is smoker, Type1 or Type2 diabetic, BMI and systolic blood pressure. As per the research the actual data and the results obtained from the device were very much accurate.

Also the Artificial Intelligence can also be used in predicting the events like, if the patient is getting better, if the patient is ready to get home or he is getting sick again.

MAYO CLINIC: ARTIFICIAL INTELLIGENCE CERVICAL CANCER SCREENINGS

Mayo clinic has developed an Artificial Intelligence based solution to identify precancerous changes in a woman's cervix. Gynaecologic cancer is the cancer which happens in women's reproductive organs. It is observed that around 94000 women's worldwide are diagnosed with gynaecologic cancer annually. There are basically 5 main types of cancer which are cervical, ovarian, uterine, vaginal and vulvar. But cervical cancer is the only cancer type which can be prevented through screening and vaccination. The machine learning technology can be used to detect the cervical cancer at the early stages and when detected early it can be treated easily. So for the machine learning process around 60,000 cervical images are used from National Cancer Institute (NCI) for the identification of precancerous stages. Compared to the trained humans, it is observed that machine learning algorithm are having much higher success rates. For humans the success rate is 69% whereas for machine learning algorithm it is 91%. So this huge difference proves that it is very beneficial at detecting the cancers at early stages.

iCAD : BREAST DENSITY VIA MAMMOGRAPHY

iCAD in year 2015 announced the launch of iReveal which can be used to detect breast cancer by monitoring breast density via mammography. iReveal uses the advance software for detecting the breast density. This detection is based on the range established by American College of Radiology Breast Imaging Reporting and Data System (BIRADs). This data is obtained from various experienced radiologist. Additional screening and diagnosis is required for the patients having dense breast tissue. Sometimes exams like breast tomosynthesis is recommended. iReveal uses the advance software for detecting the breast density. This detection is based on the range established by American College of Radiology Breast Imaging Reporting and Data System (BIRADs). This data is obtained from various experienced radiologist. Additional screening and diagnosis is required for the patients having dense breast tissue. Sometimes exams like breast tomosynthesis is recommended.

PathAI:

PathAI was founded in 2016 and launched their first Artificial Intelligence powered pathology in 2017, partnering with top pharma companies to enhance drug development. Traditional manual pathology is prone to subjectivity and observer variability that can negatively affect diagnoses and drug trials. Hence PathAI was developed to minimize subjectivity that can result in high error rates. PathAI is the leading

provider of Artificial Intelligence-powered technology tools and services for pathology. The platform was built to enable substantial improvements to the accuracy of diagnosis and the measurement of therapeutic efficacy for complex diseases, leveraging modern approaches in machine learning.

Key factors:

Accurate: AI-based pathology can produce more accurate results, reducing the subjectivity that can result in significant error rates.

Reproducible: Artificial Intelligence and Image Analysis can improve the reproducibility of pathological diagnoses.[3]

Predictive: Artificial Intelligence-based pathology can precisely predict response to new therapies.

In the clinical setting, their technology aims to deliver faster, more accurate diagnoses and better personalized treatment plans for each patient.

ADMINISTRATIVE APPLICATIONS:

Artificial Intelligence can be very useful in administrative applications such as claims processing, clinical documentation, revenue cycle, medical records management and many more. An average US nurse spends 25% of work time on regulatory and administrative activities. The technology that is most likely to be relevant to this objective is RPA (Robotic Process Automation).

The experimentation with chatbots has been done by some healthcare organizations with patients. This application have been proved beneficial with some simple transactions like booking appointments and refilling the prescription etc. A survey was conducted on around 500 users of the top five chatbots used in healthcare and it was observed that people are revealing their confidential information, discussing complex diseases and healthy conditions.

LIMITATION OF ARTIFICIAL INTELLIGENCE IN HEALTHCARE:

Initial adoption: Any technology when it comes to the market, teething issue is always observed. To overcome this, new investors in Artificial Intelligence and successful case studies must be presented. Every new technology faces this issue, but when people start getting used it and accept it as a new way of healthcare facility then it will not remain a new technology for them anymore.

Data privacy: when it comes to the Artificial Intelligence and its technology, data privacy is always a concern. The patient's sensitive and confidential data must be protected by the hackers and attackers.

Reliability: As the Artificial Intelligence and machine learning technology does not have the ability to answer the question "Why?", it cannot justify the reason behind the results. Artificial Intelligence will not be able to explain how and why the decision was made which can lead to lack of confidence in the technology and making it unreliable and untrustworthy.

Stakeholder complexities: As a part of new technology, stakeholders are not easily investing in this which is obstructing it from growing on large scale.

CHALLENGES FOR GOVERNANCE

Artificial Intelligence has applications in fields that are subject to regulation, such as data protection, research, and healthcare. However, Artificial Intelligence is developing in a fast-moving and entrepreneurial manner that might challenge these established frameworks. A key question is whether Artificial Intelligence should be regulated as a distinct area, or whether different areas of regulation should be reviewed with the possible impact of Artificial Intelligence in mind. Further challenges include the need to ensure that the way Artificial Intelligence is developed and used is transparent, accountable, and compatible with public interest and balanced with the desire to drive UK innovation. Many have raised the need for researchers, healthcare professionals, and policy-makers to be equipped with the relevant skills and knowledge to evaluate and make the best use of Artificial Intelligence.

ADVANTAGES OF ARTIFICIAL INTELLIGENCE IN HEALTHCARE:

Artificial Intelligence very cost effective as highly expensive surgeries will be replaced by robots.

Use of robots will reduce the human errors on large scale.

Management in hospital records can become fast and efficient.

As we have seen the applications, diagnosis of diseases will be faster and earlier than getting diagnosed by a human which will help in fast treatment.

Real time data will help in making clinical decisions much faster and easier.

Artificial Intelligence will reduce the human work and it will provide time for doctors to improve the patient's mental health.

Artificial Intelligence used in wearable devices can help to use it on daily basis with convenience and will help in detecting the diseases much faster.

As the overall cost of treatment as well the diagnosis is reduced, healthcare facilities can be made available to impoverished community.

THE FUTURE OF ARTIFICIAL INTELLIGENCE IN HEALTHCARE:

In the future, it is likely that Artificial Intelligence systems will become more advanced and attain the ability to carry out a wider range of tasks without human control or input. If this comes about, some have suggested that Artificial Intelligence systems will need to learn to 'be ethical' and to make ethical decisions. This is the subject of much philosophical debate,[4] raising questions about whether and how ethical values or principles can ever be coded or learnt by a machine; who, if anyone, should decide on these values; and whether duties that apply to humans can or should apply to machines, or whether new ethical principles might be needed. It also seems increasingly clear that Artificial Intelligence systems will not replace human clinicians on a large scale, but rather will augment their efforts to care for patients. Over time, human clinicians may move toward tasks and job designs that draw on uniquely human skills like empathy, persuasion and big-picture integration. Perhaps the only healthcare providers who will lose their jobs over time may be those who refuse to work alongside artificial intelligence.

CONCLUSION:

Artificial Intelligence and machine learning is getting improved day by day and is being used in many other fields. Many people die daily due to wrong diagnosis which is caused by human error. This death rate can be minimized using an Artificial Intelligence but humans cannot completely rely on machines as they do have some limitations. An appropriate balance must be created which should help us to get the benefits from the Artificial Intelligence and machine learning. It is up to us, the stakeholders, experts and users of these technologies, to ensure that they are used in an equitable and appropriate fashion to uphold the human values that inspired their creation that is, better health and wellness for all.[2]

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