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The Use Case of Artificial Intelligence in Improving Health

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Editorial

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Editorial

Artificial intelligence (AI) is areas of computer sciences that emphasizes the creation of intelligent machines that work and react like humans. There are some of the activities computers with artificial intelligence can do i.e. Speech recognition, Learning, Planning, Problem solving, Perception, Ability to manipulate and move objects.

AI makes Machines act and react like humans only if they have abundant information relating to the world. They have access to objects, categories, properties and relations between all of them to implement knowledge or extract knowledge for future use, this is called Knowledge engineering. Still AI based machines can not initiate common sense, reasoning and problem-solving power. Machine learning is also a core part of AI. Learning without any kind of supervision requires an ability to identify patterns in streams of inputs, whereas learning with adequate supervision involves classification and numerical regressions. Classification determines the category an object belongs to and regression deals with obtaining a set of numerical input or output examples, thereby discovering functions enabling the generation of suitable outputs from respective inputs. Mathematical analysis of machine learning algorithms and their performance is a well-defined branch of theoretical computer science often referred to as computational learning theory.

Robotics is also a major field related to AI and improved the way of health care. There are many different ways artificial intelligence will revolutionize the delivery and science of healthcare.

Mingle of Brain and Computer Power (Brain-Computer Interface)

If technology and human mind are creating direct interface between them, then it will not need any keyboard, mice and directly monitors the cutting edge technology of research which would be beneficial for significant applications for some patients. For example this Brain-computer interface would help in restoring the memory of patients affected by neurological disorders which take away their ability to move, speak, interact meaningfully with people, and understand their environment. This wouldbe possible because of handshake of BCI and artificial intelligence, which can decode the neural activates associated with the intended movement of ones's hand and by allowing this person to communicate as same way as many people communicating using the communication technology like a tablet computer or phone. There are evidences which proved that AI will help those patients improve better.

Improving In Radiological Tools

Images obtained by MRI scanners, CT scanners and X-ray offer non-invasive visibility into the inner working of the body called radiological images are very helpful in disease diagnosis. Still many diagnostic processes rely on tissue samples obtained from biopsies but they carry risk of potential infections. Here AI will bring insight by providing next generation radiology tools that gives accurate and detailed information. These radiology tools are in-built with AI algorithms which can get more accurate understanding of disease, i.e. tumour growth or how it behaves. AI can also be helpful in virtual biopsies.

This will give the birth of new innovative field called "Radiomics", which very well focuses on image based algorithms to characterize the phenotypes and genetic properties of tumours.

Providing Access to Health Care Providers

This is the big challenge in India like developing nations that we are lacking of clinical experts including ultrasound technicians and radiologists. AI can fill this gap by taking some of their duties. For example: AI based imaging tools can screen chest x-rays for signs of tuberculosis, this will achieve a level of accuracy as compare to humans. This capability could be deployed through an app available to health care providers in low-resource areas, reducing the need for a trained diagnostic radiologist on site.

Here, algorithm developers must be very careful regarding physiology and environmental factors that will affect the disease. Another important aspect to keep in mind is that Indian course of disease and population affected may be different than other countries. So it's very important for algorithm developers that data represent diversity of disease presentations and populations must be checked according to different geographical regions.

Support in Maintaining Electronic Health Data

Due to digitalization electronic health data is generated. Nowadays electronic health record developers using artificial intelligence to create more intuitive interfaces and automate the routine procedures. This will develop AI based models for knowledge generation which includes clinical documentation, order entry etc. Voice recognition i.e. siri, alexa like assistants are available to the bedside of clinicians with embedded intelligence. Hence AI and machine learning (ML) indexed to record clinical encounter videos for future information retrieval. These assistants can also do to-do list, medication refills, and notify the results.

Improving Antibiotic Resistance

Antibiotic resistance is one of the major threats, the world is suffering. In this scenario, artificial intelligence is improving the way of thinking to take medicine by observing the electronic data to identify infection patterns and check patient's symptoms to offer any antibiotic. ML and AI tools to drive these analytics can enhance their accuracy and create faster and more accurate alerts for healthcare providers. This will improve the way of intake of antibiotics; will definitely create the path for winning of antibiotic resistance in future.

Better Understanding and Analysis of Pathology Images

Health care results are based on pathology; if pathology results are more accurate then treatment should be more effective. That's what digital pathology needs AI tools to deliver better diagnostics results. So, sooner and better diagnosis will give the right treatment in right time. This is the opportunity to AI tools to deliver the proper treatment. AI tools have the capacity to identify the nuances that may escape from the human eye, is the biggest of AI tools. The progress of observing cancer whether rapidly or slowly can be checked by AI algorithms and patterns of patient's treatment would not only be based on clinical staging or the histopathology tests.

Making Machines and Medical Devices Intelligent

This will enhance the ability to identify deterioration, sense the development of complications can significantly improve the outcomes and also reduces the costs related to the hospital acquired penalties. While inserting these intelligent AI algorithms with power of machine learning, the burden of physicians will be reduced. And patients will receive care as timely as possible.

Advancement in Cancer Treatment

Immunotherapy is one of the best treatment for cancer. There are very small number of patients that respond to current immunotherapy options, and still oncologists do not have a precise and reliable method for patients respond to particular method. This gap can be filled by AI based tools and techniques which has the ability to synthesize the highly complex datasets because every individual has a unique genetic makeup. If this can be solved, the better treatment options would be available for treating any complicated disease like cancer.

Electronic Health Record and Reliable Risk Predictor

EHR are meshy data formats, somewhat structured and unstructured inputs, almost incomplete shows difficulty in understanding of data for predictive analysis and clinical decision support. For example huge amount of patient clinical data is available but what the proper use; this challenge will be sorted by deep learning techniques which employ to identify novel connections between seemingly unrelated datasets. This will surely open up the avenues for hidden risk prediction of diseases.

Health Monitoring from Personal Devices

In this era of artificial intelligence, we all are equipped with smartphones that can track the heartbeat around the clock, which will also generate health related data. This collection of data will need to be analyzed for improving individual and population health. Here again AI tools will help to improve the health by continous monitoring of the data.

Selfies Could Become Smart Diagnostic Tool

Images taken from Smartphone and other sources will be an important supplement to clinical quality imaging. The best thing in technology is that the qualities of cell phone cameras are increasing every year, and can be good enough for analysis by artificial intelligence algorithms. Researchers from the United Kingdom have developed a tool based on AI that can able to identify developmental diseases by analyzing images of a child's face. This algorithm can detect discrete features such as jawline, eye and nose placement, and other attributes that might indicate craniofacial abnormality. For clinical decision support, the tool can match the ordinary images to more than 90 disorders.

In this digital world more than 2.5 million terabytes of data generated every day. It is believed that AI will provide more personalized, faster and smarter services to help underserved while reducing the time to diagnosis. It is in process to develop Smartphone that collect images of eyes, skin lesions, wounds, infection, medications or other subject. Here AI can focus in disease management at the point of care diagnosis.

According to the available data INDIA is among the third country with the growing revolution of AI. With health assistants like siri AIcure all are very essential to improve the diagnostic methods/devices and clinicians also to provide better treatment in right real time, this is the main aim of artificial intelligence based tools and techniques. AI will be the future of many diseases like cancer. HIV/AIDS would not be hidden to improve the diagnosis and treatment. Deep learning, Machine learning and artificial intelligence are the topmost and most wanted technologies of the upbringing of future. This will highly impact on traditional way of medicine and healthcare.