EDITORIAL

AI in Healthcare; Will it Make us Dispensable?

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Artificial Intelligence (AI) is the virtue of machines like computer systems, which mimics human intelligence in the form of visual perception, speech recognition and language translation.

Machine learning (ML) is a type of AI which gives computers the ability to learn from and improve with experience, without being explicitly programmed[1].

The term "Artificial Intelligence" was first coined by John McCarthy for a conference on the subject held at Dartmouth in 1956 as "the science and engineering of making intelligent machines". The computer performs tasks based upon algorithms which are the building blocks of AI.[1]

They mimic human cognitive functions like experiential learning. Based upon the data fed and the patterns of correlations, AI can make predictions. In machine learning, neural network acts as a classifier while in deep learning, it becomes a feature extractor as well.

There is an argument that AI will replace doctors, especially in diagnostics like radiology and pathology. The merits of AI over the human mind lie in the capacity to store immense data and lack of fatigue. Besides, AI will eliminate the need for unnecessary investigations due to reduction in false positive alarms. AI may improve patient outcomes and reduce treatment costs and time. AI is going to be a game changer.

In radiology, AI carries out automatic segmentation in CT and MRI scans, isolates the pathological sites and performs pre-analysis of a scan before being finally reported by radiologist. Large datasets in AI can help in early detection of breast cancer.

Studies report that, usually, an average radiologist must interpret one image every 3–4 seconds in an 8-hour workday to meet workload demands. Therefore, errors are inevitable, especially under such constrained conditions. The development of AI is driven by the desire for greater efficacy and efficiency in clinical care.[2]

Similarly in pathology, the ever-increasing data related to genome and biomarkers makes it difficult for a pathologist to keep pace with. Overwork and fatigue can lead to judgement errors.

Regarding the diagnostic improvement in clinical specialties, there is significant improvement in prediction of risk for cardiovascular disease with ML which will save the management time of a cardiologist. It improves the sensitivity and specificity of diagnosis. Applications in ophthalmology, dermatology and all other specialties include diagnosis, quantification and progression analysis of various diseases in an efficient manner so that the doctor can treat in time.

As far as patient management in clinical specialties is concerned, newer promising roles of AI include precision medicine, cognitive assisted robotic surgery and AI documentation. AI written notes, investigations and prescriptions reduce the documentation time.

Communication in healthcare, education and research has been revolutionized by Generative pre-trained transformer (CHAT GPT) by providing human-like responses. It delivers text response by its language model, just like humans. It generates precise diagnosis and individual management plan by its deep learning algorithms and helps in medical education. CHAT GPT relieves the burden of memorizing facts and promotes continuous learning and better patient care. Advantages of Chat GPT are diagnostic accuracy, personalized treatment, cost reduction and enhancement of medical knowledge.

CHAT GPT provides health-related guidance by language translation to patients in remote areas, answering FAQs to the patients (thus reducing the OPD burden) and can prioritize and schedule the appointments.

Other uses of Chat GPT are providing research-driven better conclusions and assisting in biomedical research by identifying disease markers, drug interactions, selecting possible topics for future research & creation of hypothesis.

The pressing question is **whether AI is going to make**

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humans dispensable? The answer is complex.

A large part of quantitative job in diagnostics can be covered by AI, but the qualitative part i.e. subsequent management of patient and overall governance will stay with the human mind. These virtues include innovative thinking, ethics, communication with patients, counselling, governance, data feeding and decisions about when to treat and how aggressively to treat (depending upon age, financial constraints and family circumstances).

At one end, AI is easing the diagnostic steps and at the other, it can assist the physician to better focus on management and communication with the patient.

The role of radiologists may elevate to industrial level in the development of newer technologies according to the clinical issues and ethics. In 2018, Liew[3] presented the idea of 'Radiologist-in-the-loop' according to which the radiologist would stay as an authority in the larger picture of diagnostics, managing verification of reports, judgement calls and multidisciplinary approach. Continuous improvement in deep learning is only possible when radiologists in different institutions collaborate[4] to share and enhance the normal and abnormal data to create training sets and practice guidelines. This is going to be a very labor-intensive job involving transformation of the role.

Each set of images is associated with a clinical scenario. The number of potential clinical scenarios and the variety of tasks that each of the image might offer is astronomical and might be impossible to tackle by one organization with any AI algorithm.[5] A similar change in role might be expected for pathologists.

As for cardiologists, ophthalmologists, dermatologists and other specialties, the diagnostic systems are very expensive and lack the normative data for local populations. Feeding that data is a continuous and uphill task. Moreover, considering a holistic picture, the final decision about management stays with the doctor.

Traditional physical examination of patients would still be required by physicians for complex diseases, CNS evaluation, rare problems, drug side effects, tachyphylaxis and any disease were AI lacks precedence.

Overall clinical decision making depends upon a variety of combinations of symptoms, rare presentations and disease patterns (pertaining to one disease or a variety of concomitant diseases) which affect patient agony, treatment misery and life expectancy. This requires the wisdom of the human mind.

As far as the role of Chat GPT in patient management is concerned, it has its own limitations. Chat GPT operates on the basis of statistical pattern of data. The human mind is essential to monitor Chat GPT output and to verify any false positives and negatives. Although ChatGPT can assist in research projects, but human mind is essential for innovative input and project execution. The healthcare professionals can spend more time on the actual research thus saving overall time.

AI poses very serious concerns related to ethical, technical and legal issues. The ethical issues include loss of 'doctor-patient relationship', privacy of patient, security of data and psychological impact of loss of empathy & trust. How will the patients trust the system whether their preferences are being respected?

The technical problems can be in the form of biased information, lack of originality, issues of informed consent for data feeding, cybersecurity, infodemics, reliability, validity of normative/representative data etc. Besides, there are issues of digitalization of healthcare data in poor and developing countries.

A patient comes to a hospital in a vulnerable state and expects protection of his rights[6]. There will be legal issues as to whom to hold responsible and accountable in cases of negligence/malpractice.

An innovative mind will always be required for complex cases and perpetual development of digital systems, data input, program evaluations and legal frameworks to address all these issues. This will be in the form of healthcare professionals, policy makers, IT professionals and patients who will work in unison, in order to achieve better patient outcomes.

Conclusion

Medicine is a science as well as an art and AI will be a partner in medicine. New courses need to be amalgamated in the individual modules by medical schools in AI technology learning and data management . AI would provide a great opportunity to support and augment the physicians. It would

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reduce the element of memorization and fatigue. Bypassing the preliminary routine work and investigations, the physician would spend more precious time with their patients, improving the human touch. That would create a time gain to initiate the management at the earliest.

AI should not be considered a monster created by Frankenstein. However, the medical professionals must make themselves abreast of the advances in modern technology in healthcare, for otherwise, physicians who shun AI may be replaced by those who don't. Have we braced for the game change?

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