ARTIFICIAL INTELLIGENCE IN MEDICINE

Abstract

- **History:** The journey of artificial intelligence began to take shape in 1950
- **Application of AI in different walks of life:** The impact it has in medical science in the wake of modern medicine
- **Complexities of the artificial intelligence: The** various pitfalls of AI in modern medicine as we see it.

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The artificial intelligence has taken the world by a storm and how. This development has reinvigorated the discussion of the existing and the potential roles of AI in all walks of life. Among the various possible applications of AI, medicine stands out as one with endless potential and considerable challenges.

In recent times, there is virtually no area that is not being touched by the AI. Everything, right from capturing the dictation of the medical notes, to interpreting the radiographs, histology images, without clinician intervention, tools the use of AI has gained significant importance.

Although these tools seem to be significantly effective and provide us with insights that are much complex to achieve with the more long-established methods that have been in use for quite a long time now.AI is not entirely an elixir; it has its own pitfalls, with the built-in databases that do not take into account different marginalized groups and ethinic groups suggesting that the system is not entirely suitable to the different problems faced by the people living in different latitudes of the world.

I. HISTORY

Artificial intelligence (AI) started to take its shape in 1950; however, various shortcomings in early models put a stop to its widespread acceptance and its integration with medicine. With the beginning of a new decade in 2000, many of the limitations were nipped in the bud with the introduction of new theories and learning's and technology. Now that AI systems have grown, with various different analysing complex, we are certainly entering a new age in modern medicine.

II. APPLICATION

Unlike humans the AI needs no sleep, so the amount of load that it takes off the humans is significant. The continuous monitoring, organization of data and the accuracy, speaks of its metal.

1. **AI in the world of radiologic imaging:** AI is already come a long way in imaging .Research has Proven that the new technology inspired by AI is just as efficient as human radiologists. In addition to helping clinicians spot early signs of disease, AI has also helped in the management of the reports by sorting the relevant pieces of information pertaining to the case.

2. **Clinical trial efficiency:** Clinical trials need a lot on table, right from time to money ,to manpower. AI can help kick start this process up by providing a quicker and more relevant process to the trial.

3. **Development of new drugs:** Drug discovery is often one of the most time consuming and expensive parts of the drug development. AI could play a pivotal role in the process by searching for effective drug combinations. With AI, many of the big challenges that the companies are facing at the moment could be dealt with head-on.

4. **Reducing Room for Mistakes:** There have been studies in the recent past which have lead us to believe that AI also ensures patient safety to a measurable extent. AI-powered decision support tools can Significantly help by increasing the rate of detection of errors and a holistic management of drugs .

   With built-in algorithms, the room for mistakes is reduced to a considerable extent.

5. **Economically- friendly:** There are a lot of potential ways AI could help to reduce the expenditure that is put into the healthcare industry every year. One of the most promising opportunities include reducing medication errors, promoting customized virtual health assistance and a better managerial and administrative authority for a organized workflow.

6. **Doctor-Patient Relationship:** Many patients have questions outside of their medical queries . AI can help provide around-the-clock support through chatbots that can provide answers to the basic questions that they have and introduce them to resources when their physician isn't available. AI is continuously being manipulated so that it could also potentially be used to triage questions and code the information for further assessment, which could help the management to put forward health changes that are the need of the hour.

7. **Circumstantial Relevance:** AI can also provide us with a more organized and distinctive approach to different types of information. For example, if a clinical note includes a list of a patient's medications along with a new medication that their physician directs, a well-trained AI algorithm can use natural language processing to identify which medications is relevant to the patient's medical history.

8. **Use of Artificial Intelligence in Preoperative Planning:** With the advent of various algorithms, preparation of the patient fir surgery, his evaluation, has been a lot less cumbersome.

   The patient's clinical history and imaging investigations is essential for the carrying out the surgery successfully.

   All the preoperative workup of the patient, various investigations, organization of the entire database is much more efficient with the help of AI.

9. **Intraoperative Guidance:** Minimally invasive surgery (MIS)has reduced surgery related trauma to a considerable level. It has been appreciated by the patient as it increasingly suits to their need of having a scarless procedure.

   These techniques are now being integrated with robotic assistance with great gusto. Computer-aided guidance has necessarily been a cornerstone in the woke of Minimally invasive surgery.

   Development of various imaging modalities which work closely with the modern surgical procedures have made it more successful than ever .

10. **Artificial Intelligence and its Integration with Robotic Surgery:** With the advent of the development of AI techniques, surgical robots are set to achieve superhuman performance during minimally invasive surgery. The objective of AI is to enhance the expertise of the modern-day robotics in comprehending the in vivo settings, and completing the said command with accuracy, precision and safety.

    In times where modern day surgery is taking new forms, making the procedures more precise and less invasive to the patients, Robotic surgery has further enhanced the quality of care.

    By making it possible to conduct maneuvers that were physically difficult for the humans to perform, providing access to areas which is beyond the traditional surgical approach; inclusion of AI has surely been an advantage for the modern surgery.

11. **Artificial Intelligence in Diagnosis:** Dr. Vathsala Patil of the Manipal Academy of higher education in Karnataka was able to see this new technology for what it was and its ability to strengthen the work of the radiologists. In her recent article, she mentions, ”Evolution in hardware and software application has lead to escalating number of tasks performed by machines that were initially unimaginable.”

    Among her views, of particular interest was the inclusion of learning algorithms. Many of the tasks that were previously considered to be performed by humans only, can now be taken up by this up and coming technology.

    The tools offered by the AI are relatively less exigent to master and can outdo the performance of the humans.

III. ARTIFICIAL INTELLIGENCE -A COMPLEX WORLD OF ITS OWN…

1. **Health Inequities:** Various studies indicate that without proper mitigation on potential biases relevant to underrepresented and marginalized groups such as women and minorities, application of AI in healthcare can result in life or death consequences.

    This is because database-driven AI models which make their inferences by finding ‘patterns’ from the data they analyze, but disparities such as those on racial and ethnic basis have been existing in the world of health care since forever. Without effective mitigation approaches, inferences that we draw from such biased data are inevitably channeling the embedded inequities into the decisions that we make.

    After coming so far in the development of artificial intelligence, we are still yet to have a more precise and clearer take about these database driven biases and the implications it might have on the society we live in. The biases of AI models are not quantified and reported with the same enthusiasm as the accuracies. Likewise, studies about the impact that the use of AI has in healthcare, from multiple practical and theoretical perspectives, are still relatively limited compared to the impressive expansion of this field: more thought is needed for a fair, holistic and critical consideration of these new technologies.

IV. THE FUTURE OF AI IN MEDICINE

As we are entering in theses advanced times where nothing is beyond the reach of artificial intelligence, the development and integration of medical sciences with the AI is a promising area for orchestrating new solutions for the modern healthcare problems.

Where AI can revolutionize healthcare, the health policies have to undertake the responsibility for tackling the ethical and financial issues that come along with it.

REFERENCES

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