Editorial

Artificial intelligence changing the landscape of clinical decision for a better tomorrow

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A R T I C L E   I N F O

1. Introduction

Artificial intelligence (AI) is changing the way clinical decisions are made in general, leading to improved healthcare facilities and better patient outcomes. AI is beneficial in enhancing diagnosis, treatment planning and patient monitoring by analyzing massive datasets and identifying complex patterns that are impossible for humans to fathom. Even though AI offers great potential in the clinical space, it also poses ethical, legal and practical challenges that warrant consideration. This editorial will focus on the positive impact of AI on clinical decision making as well as the benefits and challenges it faces in the future.

1.1. The role of AI in clinical decision-making

Clinical decision making has been found to be a complex process and requires details from the patient's history, clinical assessment, lab investigations and imaging. However, AI algorithms particularly those using machine learning (ML) and deep learning (DL), are capable of such tasks. They can extract significant value from complex information, work fast, analyze huge data sets and generate findings that help health workers reach more accurate and evidenced based decisions.

1.2. AI has vast implications on clinical decision making in a number of key areas

1.2.1. Diagnostics

AI experts are developing AI models that are proficient for use in clinical settings and enhancing early diagnosis of critical illnesses such as cancer. AI models have been making strides in detecting diseases like cancer and cardiovascular disease through advanced diagnostics methods and algorithms that analyze medical images such, as X rays and MRIs with accuracy levels similar to those of human radiologists expertise. In breast cancer screenings specifically AI has been employed to identify potentially concerning areas which requires timelier intervention.

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1.2.2. Predictive analysis in healthcare

Predictive AI technology can help to predict disease advancement accurately. Revealing how predictive models for conditions like sepsis are instrumental in pinpointing patients vulnerable to intervention. Predictive analytics also play a role in foreseeing rehospitalizations and aiding in developing tailored care strategies that alleviate pressures on healthcare facilities.

AI plays a role in customizing treatment plans for patients based on factors in areas such as oncology and expedites the process of drug discovery by swiftly screening molecular libraries compared to conventional approaches. The COVID 19 outbreak highlighted the effectiveness of AI in expediting vaccine development timelines.

Continuous monitoring of patients and remote care are facilitated by AI driven devices, for individuals with long term health conditions, technology and remote monitoring apps collect information on vital signs, physical activity and various health indicators. This data is then analyzed by AI to detect any irregularities notifying healthcare professionals for prompt intervention. The system proves especially beneficial for individuals at high risk who require ongoing supervision.

Challenges in AI implementation in healthcare practice AI implementation into clinical decision-making process appears promising but there are several barriers in its use:

1.2.3. Patient privacy and security

In order for AI to function, patient information is necessary, however privacy and security comes first. For example, users have to also remain compliant with HIPAA regulation in the USA as well as GDPR regulation in the EU and healthcare users must be vigilant to prevent attacks from cyber adversaries that may lead to loss of sensitive data.

1.2.4. Algorithmic bias and fairness

AI systems are only capable of being objective as far the datasets that they are trained on are objective. Where the datasets are not properly representative, they are bound to be other consequences such as disparities in care to the more disadvantaged. AI lacks independent judgement, so it can only mirror patterns from its training data without fully understanding or correcting it.

1.2.5. Interpretability and transparency

Black box is a state of many models that are AI-based, majority of those which are deep learning based whereby such models tend to have the capability of achieving predictions quite well but not necessarily interpretable which brings quite challenges to clinicians trying to comprehend how recommendations are formulated. Hence building AI applications for healthcare settings entail enhancing research focusing on fostering improvement in

the prediction models visibility and comprehend on AI has been and continues to be vital.

1.2.6. Regulatory challenges

AI in clinical practice is a fairly new concept, so regulations are still taking shape. Some AI medical devices are cleared by the FDA, but there is no consistent model in the regulation of AI-based solutions in medicine. There is a need to develop unambiguous guidelines that govern the use of such applications in place.

1.2.7. Integration into current clinical processes

The use of artificial intelligence should be able to adapt itself within the existing clinical practices or workflows. Many, if not most invasive AIs will have an uphill battle with a particular stakeholder, the clinician.

The following areas should be the focus of continued research and development in order to optimize AI's potential in healthcare:

1.2.8. Ethical AI development

It is imperative to create ethical standards that put patient welfare first, avoid biases and protect data security as AI's use in healthcare expands. To create these frameworks, researchers, legislators and medical practitioners must work together.

1.2.9. Combining AI and genomics

By improving predictive models and offering deeper insights into complicated diseases, combining AI and genomics will accelerate advances in personalised medicine.

1.2.10. AI-augmented human expertise

AI should supplement human expertise rather than take its place. Adoption will be more evenly distributed with a hybrid strategy that combines the analytical powers of AI with the clinical expertise of humans. Healthcare professionals can make more educated judgements with the help of collaborative AI tools.

1.2.11. Education and training

Healthcare workers must receive AI literacy training in order to promote the adoption of AI. Future medical professionals will be more equipped to work with AI technologies if AI courses are included in medical curriculum.

2. Conclusion

Use of AI in clinical decision-making is already revolutionizing the healthcare industry by increasing patient monitoring, personalizing therapies and boosting

diagnostic accuracy. But in order for AI to reach its full potential, medical community needs to solve the practical, ethical and legal issues that surround its use. AI has the potential to usher in a new era of wise, efficient clinical decision-making with responsible and open application, which will ultimately benefit both patients and healthcare professionals.

Author's biography

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