

Artificial Intelligence (AI) Innovations in Clinical Research

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ABSTRACT

Most drugs take about 10 years or more to come to market, cost billions, and have a potential to financially damage an organization where the late-stage trials fail. Also, patients hardly can wait 15 years for a lifesaving drug. Thus, now is the time to focus on medication revelation and other productive processes which can be easily achieved through Artificial Intelligence (AI). AI can significantly reduce the time spent in the drug development process and can cut the expenses by more than half. In this poster, I aim to explain the different areas of a clinical task to which expert systems can be applied. This poster also states the various ways we may adopt AI in the field of Medicine.

INTRODUCTION

What is Artificial Intelligence (AI)?

Artificial Intelligence is a branch of applied computer science wherein algorithms are trained to perform tasks typically associated with human intelligence.

From the very earliest moments in the history of computers, scientists have dreamed of making an “electronic brain”. Of all the trendy technological quests, this search to make AI computer systems has been one of the foremost ambitious.

It seems that very early on, scientists and doctors alike were captivated by the potential such a technology might have in healthcare. With intelligent computers able to store and process enormous stores of knowledge, the hope was that they might become perfect doctors in a box, supporting or surpassing clinicians with tasks like diagnosis.

With such enthusiasm, a small but brilliant community of computer experts and medical professionals set about shaping a research program for a new discipline referred to as Artificial Intelligence in Medicine (AIM).

HOW CAN WE APPLY AI TO THE FIELD OF MEDICINE?

AI programs have been developed and applied to analyze relationships between prevention or treatment techniques and patient outcomes. AI is also applied to practices such as diagnosis processes, treatment protocol development, patient monitoring and drug development.

IBM's Watson for Oncology is a solution that is fueled by information from relevant guidelines, best practices, and medical journals and textbooks. The system evaluates data from a patient's health record, assesses medical evidence, and demonstrates potential treatment options ranked by level of confidence, always providing supportive evidence. The oncologist can then apply their own expertise and insights to identify the most suitable treatment options.

WHAT ARE MANY DIFFERENT TYPES OF CLINICAL TASKS TO WHICH AI CAN BE APPLIED?

Generating alerts and reminders:

In actual situations, an expert system attached to a monitor can warn of changes in a patient's state. In less severe conditions, it might scan laboratory test results or drug orders and send reminders or warnings through an e-mail system.

Diagnostic support:

When a patient's situation is critical, rare or the person making the diagnosis is simply inexperienced, an expert system can help come up with likely diagnoses based on patient data.

Treatment assessing and planning:

Systems can either look for variations, errors and omissions in an existing treatment plan, or can be used to formulate a treatment based upon a patient's specific condition and accepted treatment guidelines.

Agents for information retrieval:

Software 'agents' can search for and retrieve information, for example on the Internet, that is considered relevant to a problem. These agents encompass knowledge about its user's preferences and needs and may also need to have medical knowledge to be able to evaluate the importance and utility of what it finds.

Image recognition and interpretation:

Many medical images can now be automatically interpreted, from plain X-rays to more complex images like angiograms, CT and MRI scans. This is of value in mass-screenings, for example, when the system can flag possible abnormal images for detailed human attention.

Also, AI can be used in Radiology, AI for Pathological image analysis, Clinical decision support, Tomographic image reconstruction, Image segmentation, Image registration, Thoracic applications, etc.

KEY ISSUES IN IMPLEMENTATION OF AI IN MEDICINE

Above and beyond building AI algorithms, making them for clinical use is incredibly complex. This process requires the availability of a massive amount of data, integration into complex existing clinical work flows and compliance with regulatory frameworks. There are issues like data sharing, transparency, patient safety, data standardization and integration into existing clinical work flows and final issues in AI technology implementation.

CONCLUSION

Man-made brainpower (AI) innovations have made huge advances and a stream of companies are focusing, applying these advances to business challenges and, all the while, pioneering new trails. While numerous individuals might consider computerized reasoning as something recondite and in the domain of sci-fi, there are genuine applications that can offer organizations some assistance with solving complex issues, for example, understanding enormous information, increasing human choice making, or furnishing clients with master guidance.

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ACKNOWLEDGMENTS

I would like to thank all my colleagues at Covance for their support and encouragement.

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