Assignment 1 paper review and summary

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Summary 1 - AI in health and medicine

As part of a two-year effort to track and share key developments in medical AI, this study provides a comprehensive overview of the state of medical AI. In this paper, prospective studies and advances in medical image analysis are discussed, which have reduced the gap between research and the deployment of modern AI in healthcare and medicine.

Based on this study, medical AI has made considerable progress toward large-scale deployment, especially through prospective studies using Randomized Controlled Trials (RCTs) and medical image analysis utilizing unsupervised deep learning models. However, validation and implementation of medical AI remain in an early stage.

Despite the study's findings, many issues and limitations remain due to the need for humans to actively participate in working with AI systems. It is hoped that artificial intelligence will reduce medical costs, but the devices required to provide input for AI systems can be prohibitively expensive. Particularly, in many health systems, the equipment needed to capture images of whole slides is not available, posing a barrier to both data collection and the deployment of AI-based pathology systems.

A number of technical challenges remain in the field of medical AI, including the creation of training datasets and the ability to build user trust in AI systems. There are also questions regarding the regulation of AI in medicine and the way in which AI may shift and create responsibilities throughout the healthcare system, affecting researchers, physicians, and patients alike. Finally, there are important ethical concerns regarding data use and equity in medical artificial intelligence.

The study shows that medical AI data use is also constrained by a number of specific, practical challenges involving the building of model trust, accountability, fairness, and shifts in responsibility. As a result of these trust factors, key questions arise, such as how we can trust AI model predictions, given that AI models are complex and difficult to understand. According to the study, accuracy and consistency are essential factors for potentially guaranteeing the trustworthiness of AI models. Moreover, as AI systems assume greater responsibility, health care providers may become more dependent on AI systems for making medical decisions, which rely on complicated AI models that are difficult to understand. In addition, there are concerns about the accountability for AI models that produce inaccurate results. Furthermore, who should be held accountable for these transgressions that occur from bad predictions which may have a detrimental effect on the lives of patients? Additionally, we have regulatory challenges: how do we ensure that AI systems and humans protect patient information? What about fairness and the ethical guidelines for using these AI systems and handling patient data?

In my role as an AI practitioner/ graduate student, I find these issues concerning and full of opportunities to solve real-life issues. It is in our nature as practitioners of AI and computer science to solve and engineer problems. In spite of the fact that these concerns are important, I see much opportunity for me to take on the challenges as a future graduate student. In addition, I intend to use this knowledge to move forward while developing and implementing new models and solving problems for future endeavors. This article serves as a good reference for designing professional AI models within the healthcare industry. It would be prudent for all of us to refrain from asking these same questions and to ensure that we are developing processes and standards that are consistent with the ladder.

Summary 2 - High-performance medicine: the convergence of human and artificial intelligence

The literature review contrasts the promises of AI technology with the real-world applications that have so far been realized. There are many different aspects of the current state of artificial intelligence in contrast to current healthcare that were discussed. A large number of models were compared in real world clinical settings, which are proving useful in terms of clinical scans and x-rays, such as Deep Neural Networks (DNNs) for clinical scans and x-rays. This review discussed the advantages and disadvantages of using AI unsupervised and supervised models for clinicians, pathologists, dermatologists, ophthalmologists, cardiac surgeons, gastroenterologists, mental health specialists, and health management systems with various research studies that have implemented the latest state-of-the-art artificial intelligence algorithms in their respective fields of medicine for predictions and detection of patient outcomes, treatments, and and health issues. As a result of the review, it is evident that the development of deep-learning algorithms for enabling the public to take control of their healthcare has lagged behind that for clinicians and health systems. However, there are a couple of such algorithms that have been FDA-cleared or have been undergoing clinical trials at the latest times.

The review also touches on the notions expressed in the previous review about the limitations and challenges of adopting artificial intelligence in the verbose aspects of the medical and health industries. From a clinician's perspective, AI algorithms are basically viewed as being developed in a black box box, which is why they are viewed as a black box. As of yet, there have been inaccuracies in AI models that have potentially caused the death of patients if they were not corrected, resulting in malpractice caused by flawed algorithms that raises questions about trust, responsibility, ethics, and accountability when these algorithms and models are deployed in the clinical environment.

In this review, multiple technologies and models are discussed while emphasizing that artificial intelligence is at the forefront of healthcare and possibly predicting outcomes for patients and treatments, yet has yet to prove faultless with low proof of concept and data in real world scenarios. A

review of the literature indicates that there cannot be exceptionalism when it comes to AI in medicine as it requires rigorous studies, publication of the results in peer-review journals, and clinical validation in a real-world setting.

In my opinion, this paper is a very comprehensive review of what has been tried to date leading to an optimism in building AI models in the future that is yet to be achieved. My personal opinion is that the remaining issues offer AI engineers and developers a number of opportunities. Health care management and the application of AI can also give us a more patient-centric approach in certain fields. This paper is very useful in establishing standards on models and applications that can be used in future research. In my opinion, this paper provides me with a comprehensive guideline for exploring new ventures that I intend to undertake involving my proposed final project of building more patient-centric applications with blockchain and artificial intelligence, which will provide factors of trust and ethical standards that are greatly needed.

Summary 3 - Recent Advances in Artificial Intelligence and Wearable Sensors in Healthcare Delivery

This study presents an overview of the advancements in artificial intelligence and wearable sensors in the delivery of healthcare. Healthcare service delivery is gradually shifting from a hospital-based model to one based on portable devices and artificial intelligence (AI). This transformation, according to research, might be able to provide clinicians with an integrated framework that provides automated solutions for assessing the general health of their patients through an intelligent framework, according to research. In order to keep track of numerous clinical records of patients, electronic systems are often used. According to this study, the recent trend of integrating artificial intelligence techniques with wearable sensors has been reshaping healthcare delivery systems in a progressive manner.

In this study, three main sections were discussed: wearable biosensors, artificial intelligence, and the challenges and benefits of integrating AI in healthcare systems. A wearable biosensor is an

IoT-enabled device that transmits health-related information to the cloud for further processing. Wearable sensor devices can capture different kinds of biosignals such as motion, pulse rate and temperature changes. Furthermore, several biosensors are presently used as quick, point-of-care tools capable of being used on a large scale to screen the populace or to detect viruses such as the latest SARS-CoV-2. There is a discussion of advancements in enzyme electrodes used in wearable devices that are capable of detecting enzymes, antibodies, DNA/RNA, aptamers, proteins, ions, metabolites, and whole cells. This review discusses the inner mechanics of the advanced transduction process used in these wearable biosensors as well as categorizing them based on their bio-analyte/biofluid, the material of choice, the transduction platform, design, and functionality.

The review discusses various AI models used to process the flow of sensor and realtimes datetime data to do predictions and analysis of a person's current health and medical proclivity. This review has shown that wearable sensors can monitor vital health parameters, which can help in the detection of many illnesses such as chronic clinical disorders, diabetes, hypertension, and many others, via monitoring of vital health parameters, that can help the detection of diseases such as chronic clinical disorders, diabetes, hypertension, and many others. Furthermore the research shows that AI and ML concepts are utilized in wearable devices for clinical decision-making by automatically processing and visualizing health-related data. Various forms of ML techniques have been examined in this review in order to provide an overview of the field. An overview of the applications of artificial intelligence and wearable IoT devices in healthcare is presented here in a concise and comprehensive manner.

With the help of the research, I intend to collaborate with another student in our class, Chris Maxwell, on developing a blockchain-based health management system that is patient centric, adapts AI models to process patient sensor data, thereby providing more secure access to health providers that leads to better patient care.