Ethical Challenges of Artificial Intelligence (AI) in the Field of Health Care: A Narrative Review

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Abstract - This article presents a narrative review of the ethical challenges of artificial intelligence (AI) in health care. The vital aim of this summarized review is to provide the final outcome of current debates and to identify open questions for future research. An important question that has been asked so far in an ethical debate is, some of the essential AI applications in Health are imaging, diagnostics and surgery will transform the patient and clinician relationship. Even informed consent will be one of the most immediate challenges in integrating with AI into clinical practice. At the same time, how will the use of AI to help with the sense of caring with patients interface with the principles of informed consent? The use of AI in the clinical practice of healthcare has huge potential to transform it for the better, but it also rises ethical challenges are address in this article. This article will point out the ethical challenges posed by AI in healthcare and recommend guidelines for rectifying them.

Keywords: *Artificial intelligence, DeepMind, Machine Learning, Black-box, Garbage*

1. INTRODUCTION

The medicinal organization of hospitals to the implementation of health applications is to evaluate the disease symptoms from an individual patients, many believe that artificial intelligence (AI) is going to reform the healthcare in new manner. In the year 2014 and 2021, the analysis from economic forecasters is that the market growth of AI in healthcare is 10 times more than previous years [1]. With this growth faces many challenges, and it is essential that AI is implemented in the healthcare system ethically.

AI is usually implemented as an overall schema comprised together software and hardware. In the software perspective, AI is mostly concerned with algorithms. An artificial neural network is a simple framework for constructing AI algorithms. This Artificial Neural Network (ANN) is structured like as human brain schema that is interconnected network of neurons connected by weighted communication channels. AI uses a variety of algorithms to find out the complex non-linear correlations in huge amount of datasets. Machines always concern to gain to learn by rectifying slight algorithmic errors by training, by this means

boosting the prediction model accuracy in the manner of confidence [2], [3].

This manuscript aims to tackle some of the ethical challenges that arise whenever AI technology is used to implement in the field of health care and also in medical education. A number of the most difficult concerns raised in this issue include addressing the include the problem that faced to patient privacy and confidentiality, analyzing the limitations in between two zone such as the physician's and role of machineries in patient care, and adjusting the education of future physicians to proactively confront the imminent changes in the practice of medicine. In addition, discussion on these concerns will thoughtful of the responsibility of AI will play vital in the field of health care will develop physician and patient, also helping stakeholders to build up a sensible of what AI be able to and cannot do. Finally, anticipating possible ethical errors, finding the feasible solutions and contributing policy recommendations will be of assistance to physicians utilizing AI technology in their perform as well as the patients who accept their care. The most major topic to be addressed in this problem is how to balance the benefits and risks of AI technology.

2. ETHICAL CHALLENGES

WHO hopes that these ethics will be used as a foundation for governments, technology builders, organization, communal society and inter-governmental organizations to accept ethical approaches to use of AI in health? The key ethical principles for the use of AI for health are safe guard human autonomy, developing human well-being and safety and the communal interest, Ensuring transparency, interpretability and accessibility, encouraging the development of responsibility and accountability, Ensuring inclusiveness and equity and Promoting AI that is responsive and sustainable. We will discuss four primary challenges: informed consent to use, safety and transparency, algorithmic fairness and biases and data privacy.
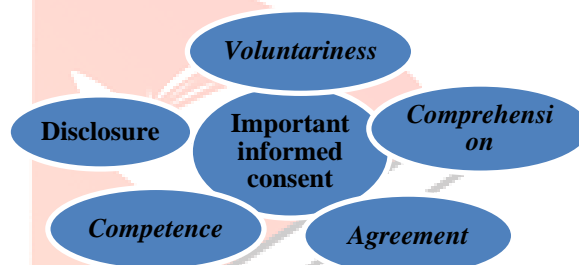
2.1 Informed consent to use

Imaging, diagnostics and surgery are the major applications of AI in health care these are make over the relationship of clinician and patient, at the same time in which manner the uses of AI to help with the concern of patients interface with the ethics of informed consent? This is a vital question that has not received sufficient attention in the discussion about ethical challenges , even though informed consent will be one of the most immediate confrontation in integrating AI into clinical practice (there is a distinct question about informed consent to guide AI we will not focus on here; [6]). The essential condition for a "valid informed consent" is mentioned in below (refer: Table 1 and Figure 1).

It is an important thing to observe under what circumstances the principles of informed consent should be deployed in the clinical AI space. To what extent do clinicians have a conscientiousness to instruct the patient in the order of the difficulties of AI and also the mechanism of machine learning (ML) used by the schema of health care, the variety of raw data for inputs and the opportunity of biases or extra shortcomings in the data that is being accessed? In what situation have to a clinician inform the patient that AI is being accessed at all? particularly the above mentioned questions are challenging to respond in cases where the AI operates using "black-box" algorithms, which may well outcome from non interpretable machine-learning mechanisms that are very tricky for clinicians to understand fully [4], [5]. For example, Corti's algorithms are referred as "black box" because even Corti's inventors are in dilemma because they do not know how the software gets its final decisions to aware and alarm emergency dispatchers that someone has a cardiac arrest. This lack of knowledge might be troublesome for medical professionals [7]. For example, does a clinician require reveal that they cannot entirely interpret the diagnosis and treatment recommendations by the AI? To what extent transparency is needed? What about cases where the patient may be reluctant to allow the use of certain categories of genetic data and family history? How can we correctly equilibrium the privacy of patients with the security and efficiency of AI? Application of AI in health is also all the time more being used, ranging from diet guidance to health assessments to the help to get better medication adherence and analysis of data gathered by wearable sensors [8]. Such applications raise questions for bioethicists about individual's agreements and their relationship to informed consent. In contrast to the usual informed consent progression, a user agreement is a contract that an individual agrees to without a face-to-face dialog [9]. Most of the people do not spend their time to recognize user agreements, regularly avoiding them [9], [10].

In addition, repeated modification in the software create it even more complicated for individuals to track what terms of examine they have agreed [11]. What data should be known to persons by means of such applications? Do consumers sufficiently understand that the future use of the AI health application may be conditional on accepting changes to the terms of use? How personally should user agreements be similar to informed consent content of file? What would an ethically answerable user agreement look like in this context? Tackling these questions is tricky, and they become even more difficult to answer when information from patient-facing AI health application is fed back into clinical decision-making.

S. No	Principles	Description
1	Voluntariness	The consent must be given voluntarily and not by any force
2	Comprehension	The consent must demonstrate fully and detailed understanding of the study
3	Agreement	The consenters are asked to accept/decline participation.
4	Competence	The rational person must have mental and physical ability to provide consent
5	Disclosure	The experimenter's consent has to be offered in absentia of the experimenter by a group which represents many experiments.

Table 1: *The essential condition for a "valid informed consent*

Figure 1: *Important informed consent*

2.2 Safety and transparency

It is one of the very huge challenges for AI in healthcare. For example, IBM Watson for Oncology [12] uses to assess AI algorithms to retrieve data from records that belongs to patients and assist physicians investigates cancer treatment options for their individuals. However, it has freshly approach below analysis by reportedly giving dangerous and improper recommendations for treatment suffered by cancer [13]. The dilemma seems to be in the training of Watson for Oncology, as a substitute of using raw data about patient, the software was only qualified with a small number of "synthetic" cancer specimens, that is they were devised by doctors at the Cancer Center of Memorial Sloan Kettering [56]. It has confirmed that pitfalls only occurred as part of the system testing and thus no incorrect treatment recommendation has been given to an exact patient [14].

This real-time illustration has place the field in a non positive light. It also implies that it is of utmost significance with the purpose of AIs are secure and efficient. But how do we make sure that AIs remain their promises? To recognize the possible of AI and stakeholders, especially developers of AI, have to build certain two key things such as "the reliability and validity of the datasets" and "transparency". First, already accessed datasets want to be consistent and applicable. The good saying is "garbage in,

garbage out" applies to AI in this field. The enhanced the working out data is the enhanced the AI will achieve [15]. In addition, the algorithms frequently require additional minor change to create exact outcome.

Data sharing is one more huge issue in this discussion, in cases anywhere the important needs of AI to be very confident, for example, the scenario is driving vehicle in self mode, enormous amounts of datasets and thus supplementary statistical data sharing will be essential. On the other example, a slight response of AI oriented off text where very a smaller amount of data will be necessary. In common, it forever depends on the specific AI and its tasks how a large amount of data will be compulsory. Then next is in the service of protection and tolerant self-assurance some quantity of clearness has to be analyzed. While in an idyllic world every one of the data and the algorithms would be open for the communal to inspect, there may be several genuine issues concerning to caring asset and academic assets and as well not rising cyber security risk. Legislative auditing may signify a promising outcome.

The recommendations of further testing strategy of "black-box" systems elevate exacting concerns. It resolve be a face up to decide how intelligibility can be achieved in this perspective. Still but individual person could modernize the form into a very simpler from of mathematical association connecting symptoms and analysis so as to progression might have complicated transformations away from the skills of patients to recognize. On the other hand, possibly there is no require unlocking the "black box", It may be that at smallest amount in a number of cases optimistic outcome on or after randomized trials or extra forms of testing will give out as a enough exhibition of the security and efficiency of AIs.

2.3 Algorithmic fairness and biases

Some capability are needed to get better concerns in AI-healthcare not only in high-income settings, excluding to democratize proficiency, globalize healthcare, and fetch it to yet isolated areas [15]. On the other hand, any machine learning scheme or else human-trained algorithm will simply be as truthful, efficient, and fair as the statistical data that it is educated with. AI as well bears a risk used for biases and therefore intolerance. It is consequently very important that AI makers are attentive of this danger as well as reduce possible biases at each and every phase in the procedure of manufactured goods expansion. More than a few real time examples contain established that algorithms can demonstrate biases that can consequence in unfairness with consider to racial origin in addition to skin color or sexual category [16].

Biases can as well take place concerning other features, for example, age or disabilities. The clear explanations for biases be different and may be complicated. For example, out comes from the set of information themselves, from how statistical data scientists and machine learning systems decide and investigate the data, from the circumstance in which the AI is implemented [17]. One important scenario is an AI oriented clinical decision support (CDS) computer schema that helps clinicians to locate the finest treatment for patients with skin cancer. In another side, the algorithm was mainly qualified on Caucasian patients. Thus the AI system schema will possible provide a smaller amount of accurate or else even erroneous recommendations for subpopulations for which the training statistical data was below comprehensive for example

African American. Some of these biases may be determined outstanding to enlarged data accessibility and attempts to enhance accumulate data from marginal populations and enhanced identify for which populations the algorithm is otherwise is not properly utilized.

By using the strategy of "black-box" algorithms, numerous scholars contain argued that explain ability is essential when an AI makes healthiness recommendations, particularly it took to notice biases. However, does this view really hold true? Some argue that what matters is not how the AI reaches its decision but that it is accurate, at least in terms of diagnosis [18]. The security and efficiency of health AI based applications that are black boxes possibly will be demonstrated the related to the managing of drugs that by positive results of randomized medical trials.

2.4 Data privacy

In July 2017, The UK Information Commissioner's Office (ICO) ruled that the Royal Free NHS Foundation Trust was in breach of the UK Data Protection Act 1998 when it provided personal data of circa 1.6 million patients to Google DeepMind [19]. The data sharing happened for the medical security testing of "Streams," an application that aims to assist with the analysis and recognition for finely tuned kidney wound. On the other hand, patients were not appropriately knowledgeable concerning the handing out of their individual data as piece of the investigation. Elizabeth Denham belongs to Information Commissioner Committee properly pointed out that "the worth of novelty does not require being the corrosion of essential isolation rights" [20]. Even though the Streams application does not utilize AI, this real time illustration has decorated the probable for damage to privacy rights when mounting technical solutions. If patients and clinicians never faith on AIs, their victorious integration into medical put into practice will eventually be unsuccessful. It is essentially significant to sufficiently notify patients regarding the dealing out of their individual data and promote an open dialog to encourage trust.

The Project Nightingale by Ascension and Google [21] are latest case that screening patient privacy concerns in the perspective of data sharing and the make use of AI. Other than what about the person having rights of their data? The worth of healthiness statistical data can achieve up to billions of dollars and a quantity of verification suggests that the communal is uncomfortable with related organizations or else the government advertising data about patient for their earnings. But there may be options for patients to be aware of cherished that do not engage ownership for itself. Here have to showing an important example that the Royal Free NHS Foundation Trust had complete a contract with the great Google DeepMind to make available the statistical report for patient for the testing of stream in swap over for the Trust's free of cost usage of the applications in next 5 years [23]. Reciprocity does not essentially need ownership, but those looking for to use the patient data must confirm that they are adding together worth to the health of the extremely similar patients whose data is being utilized [22].

Further than the query of what is composed, it is very important to defend patients next to uses exterior the relationship between patient and doctor that might deleteriously have an effect on patients, such as impacts on health or other insurance premiums, occupation opportunities, or still individual relationships [11]. Some of this will require strong law of antidiscrimination law that similar to regime in place for genetic privacy, this happened

in the year of 2017 [24], although several health applications in AI is too elevate novel challenges, for example that the share patient statistical data not only by means of the doctor other than too by relatives and friends [11]. In dissimilarity to the doctor who is theme to duties of privacy set out by leading statutes or else case law, relatives or else friends will almost certainly not contain lawfully enforceable obligations. Another important receptive challenge is what situation patients contain a precise to take out their data. Can patients demand the removal of data that has previously been analyzed in cumulative form?

CONCLUSION

The technology of AI in health care is going away to be increasingly and therefore wants to be ethically responsible. In this article there are four most important ethical challenges that want to be addressed to understand the complete prospective of AI in the field of healthcare. In general, it is very essential that all stakeholders, as well as AI makers, patients, healthcare workers and narrow authorities, work jointly on tackling the acknowledged challenges to make sure that AI will be effectively utilized in a technique that is ethically in form. There is in necessitating generating an overall design in form of system that is to make on communal conviction to realize an attractive common public objective that AI remuneration to each and everyone. Informed consent, data protection and privacy, cyber security, algorithmic fairness, an sufficient level of clearness and narrow oversight, high values of security and efficiency and an most favorable legal responsibility rule for AIs are the entire key factors that want to be in use into explanation and addressed to effectively generate an AIdetermined healthcare scheme based on the slogan Health AIs for All of Us. In this consider, we not simply necessitate analyzing again the recent regulatory frameworks and knowing the recent things them to the novel technical improvements. But it is also very vital to contain communal and supporting debate centered on the ethics of AI-driven healthcare such as its implications on the human workforce and the society as a whole. AI has marvelous probable for developing the overall system in healthcare, but we can merely undo its probable by now starting now to address the ethical challenges facing us.

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