The Promises of Artificial intelligence for Healthcare sector

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ABSTRACT:

Global spending on intelligence and AI systems will reach more than $ 204 billion by 2025.The AI industry will generate up to $ 119 billion a year by 2025. There will be 8 billion voice assistants by 2023. By 2030, China will become the largest AI market, accounting for 26% of the global AI market share. AI market will grow to $ 190 billion by 2025. Majority of business applications will use AI by 2025. Current business AI acquisition: -

- Recognition increased significantly during the COVID-19 epidemic, growing by 37% in finance, 27% in stores, and 20% in IT.
- 37% of organizations in 2019 used AI in the workplace.

The number of businesses using AI in business has grown by 270% between 2015 and 2019. Marketing and marketing prioritize AI and machine learning more than any other department in business today. The demand for AI talent has doubled in the last two years. Technology and financial services companies currently absorb more than 60% of AI talents. For those businesses that are already in the AI crisis, the best performing companies have said that there are twice as many opportunities for their peers to use technology in advertising. Surprisingly, data analysis is the key to AI-focused businesses, and personalization of the site is the second most frequently cited case used by AI. Many executives believe that the most important benefit of artificial intelligence is providing data that can be used to make data-driven decisions. Large companies (those with at least 100,000 employees) are the most likely to have an AI strategy, but only half have one.

Keywords: AI, Health Care, Algorithm, Challenges.

INTRODUCTION

AI in Healthcare

Healthcare business leaders rely heavily on AI capabilities: monitor the spread of COVID-19 cases, policy development assistance, policy distribution. In the healthcare industry, 38% of providers use computers as diagnostic assistants. The success rate of bot interactions in the healthcare sector (those completed without transit to human operators) will exceed further. Majority of research subjects agree that Artificial Intelligence and Machine Learning (AI / ML) already provides excellent value in specialized departments such as radiology, general pharmacy, and pathology. Research in the pharm-aceutical industry is one of the fastest growing cases. In our study we have identified about a dozen situations in practice in the healthcare industry (4

Patient Care

1- Assisted or Automatic Diagnosis & Doctor's Letter: Chatbots can help patients diagnose or assist doctors in diagnosing. Babylonian life provides relevant health information and triage based on patient-defined symptoms. However, they clearly stated that they did not provide a diagnosis. This is to reduce their legal debts but in the future we will see chatbots providing diagnostics as their accuracy rates improve.

2- Physical examination: AI testing systems can help reduce doctor errors.

3- Controlling Pregnancy: Monitor mother and foetus to reduce maternal anxiety and enable early diagnosis

4- Real-time prioritization and decisionmaking: Analysis of mean patient data to enable accurate real-time prioritization and configuration. Jvion: A Clinical Success Machine to accurately and comprehensively foresee the risks of delivering recommended actions that improve outcomes. Wellframe: Wellframe investigates text by deliv-ering patient-specific care programs to a mobile device. Its portfolio of clinical modules, developed based on evidence-based care, enables the Care Team to provide personal information to any patient. Enlitic: Patient diagnostic solutions scan incoming cases to find out the findings of most clinics, determine their value, and refer them to the most qualified physician in the network. (1)

5- Medication and personal care: Find the best treatment plans based on patient data that reduces costs and enhances the effectiveness of care. GNS Health Care: The company uses machine learning to compare patients

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with treatment that shows they work well for them. Oncora Medicals: Software development, analyzing and learning data systems available to provide personalized treatment.

6- Patient Data Analysis: Analyze patient and / or third party data for details and suggest actions. AI allows the facility (hospital, etc ...) to analyze clinical data and generate in-depth information about a patient's health. It provides an opportunity to reduce costs of care, use resources efficiently, and manage human health more easily. Zakipoint Health: The company displays all relevant health care data at the member level at the dashboard to understand the risks and costs, provide relevant plans and improve patient interaction. (1)

7 Surgical Robots: Robotic-assisted surgery combines AI with interactive robots. These robots are well suited to processes that require the same, repetitive movements as they can operate without fatigue. AI can identify patterns within surgical procedures to improve optimal processes and improve the precision control of surgical robots to a lesser millimeter accuracy.

Medical Imaging and Diagnostic

8- Early diagnosis: Analyze incurable conditions using laboratory data and other medical data to enable early diagnosis. Ezra: Ezra uses AI while analyzing full-length MRI scans to support doctors in early detection of cancer.

9- Medical Photography Ideas: Advanced medical imaging to analyze and transform images and model of possible conditions. SkinVision: SkinVision allows you to get skin cancer early by taking pictures of your skin with your phone and going to the doctor on time. Powerful AI therapeutic thinking is also widely used in diagnosing COVID-19 cases and identifying patients in need of respiratory support. For example, a Chinese company, Huiying Medical, has developed a powerful AI image capture solution with 96% accuracy.

Research and Development

10- Drug availability: Discover new drugs based on previous data and medical expertise. NuMedii: A Biopharma company, NuMedii has developed technology, AIDD (Artificial Intelligence for Drug Discovery) which combines Big Data with AI to quickly detect interactions between drugs and diseases at system level.

11- Genetic analysis and planning: Understand genes and their com-ponents. Guess the effect of genetics.

12- Device comparison function with drugs. Quant: The company uses the latest Big Data and Deep Learning technologies to extract logical, tangible information from photos and videos to design experiments to help select and select which components make up the greatest sense of needs.

13- Brand management and marketing: Create a good product marketing strategy based on market perception and target segment. Healnt: The product of the company Migraine Buddy records terabytes of data helping patients, physicians and researchers better understand the causes of the real world and the effects of emotional disorders. (1)

14- Price and risk: Get the full amount of treatment and other services by competing with other market conditions.

15- Market research

MD Statistics: MD Statistics is a global provider of pharmaceutical marketing research solutions. Functions: Considers automation technologies such as intelligent automation and RPA helps hospitals simplify the operation of the front and back office as reported.

17- Customer service chatbots: Customer service chatbots allow patients to ask questions about payment of bills, appointments, or refills.

18- Fraud detection: Patients may make false claims. Using AI-sponsored fraud detection tools can help hospital administrators identify fraudsters.

Challenges

According to Dutta, the challenges facing the AI healthcare industry are (2)

1. Great pressure on health care systems and equipment
2. Strong growth of health care data
3. Generate complete understanding during decision-making
4. Additional wisdom for nurses
5. Integration and legal challenges

Moral challenges

As the previous section shows, the use of AI in health care clinics has great potential to transform it for the better, but it also raises the ethical challenges we face now. Informed permission to use: AI Health applications, such as photography, diagnostics, and surgery, will change patient-clinic relationships. But how will the use of AI to assist in patient care be related to informed consent criteria? This is a stressful question that has not received enough attention in ethical discussion, although informed consent will be one of the immediate challenges in integrating AI into clinical practice. How often do physicians have a responsibility to educate the patient about the comp-lexities of AI, including ML forms used by the system, the type of data entry, and the occurrence of bias or other defic-iencies in the data used? Under what circumstances should the physician inform the patient that -AI is not used at all? These questions are especially chal-lenging to answer in situations where AI works using "black-box" algorithms, which may be the

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result of inexplicable machine learning techniques r doctors to fully understand. for example, Corti's algorithms are "black box" because even Corti's developer does not know how the software reaches its decisions in order to notify emergency responders that someone has a heart attack. This lack of information may be of concern to medical professionals. On average, for example, a doctor needs to disclose that he or she cannot fully explain the diagnostic / treatment recommendations for AI? How much transparency is needed? How does this relate to the so-called "right of interpretation"? What about cases where the patient may be reluctant to allow the use of certain categories of data. How can we better measure patient privacy and AI safety and performance? (3)

AI health applications and chatbots are also increasingly being used, from dietary guidance to health screening to helping to improve adherence to medications and data analysis for wearable sensory data. Such applications raise questions for bioethicists about user agreements and their relationship with informed consent. In contrast to the conventional informed consent process, a user agreement is a contract that a person agrees to without face-to-face negotiation. Many people do not take the time to understand user agreements, and do not always pay attention to them. In addition, regular software updates make it even harder for individuals to adhere to the terms of their agreement. What information should be provided to people using these apps and chatbots? Do consumers understand enough that future use of AI healthcare software or chatbot may be conditional on accepting changes in usage terms? How much should user agreements be similar to informed consent documents? How can we look at the user agreement that is responsible for ethics in this context? Dealing with these questions is tricky, and even more difficult to answer when information from patient-centered AI applications or chatbots is returned to clinical decisions.

Security and openness

Security is one of the biggest challenges for AI in health care. To use one well-published example, IBM Watson of Oncology uses AI algorithms to evaluate information from patients' medical records and to help clinicians evaluate cancer treatment options for their patients. But how do we ensure that AI keeps its promises? In order to realize the potential of AI, stakeholders, especially AI developers, need to ensure two key factors: (1) the reliability and validity of data sets and (2) transparency.

First, the data sets used need to be reliable and valid. The slogan "trash inside, take out the trash" applies to AI in this area. Improve training data (labeled data), AI will work better. In addition, algorithms often require additional refining in order to produce accurate results. Another major problem is data sharing: In cases where AI requires excessive confidence (e.g., self-driving vehicles), more data values and thus more data sharing will be required.

Second, in the service of patient safety and self-confidence something publicly should be ensured. Although in a good world all data and algorithms may be open to the public for inspection, there may be some legal issues related to investment / intellectual property protection as well as increased cybersecurity risks. Third-party or governmental audits may indicate a possible solution.

In addition, AI developers should be clear enough, for example, about the type of data used and any software shortcomings (e.g., data bias). Recommendations for many "black box" programs raise some concerns. It will be a challenge to determine how to achieve transparency in this context. Even if one can model a simple mathematical relationship that includes symptoms and diagnoses, that process may have more complex changes than the skills of doctors (especially patients) to understand. However, there is probably no need to open the "black box": It is possible that at least in some cases positive results from random tests or other forms of testing will serve as an adequate indicator of AI safety and effectiveness. (1)

Algorithmic justice and bias

AI has the potential to improve health care not only in high-income areas, but also to make technology a technology, "global" health care, and to bring it even to remote areas. However, any ML system or personalized algorithm will only be reliable, efficient, and fair as a trained data. AI is also at risk of bias. It is therefore important that AI developers are aware of this risk and minimize potential bias at all stages of the product development process. In particular, they should consider the risks of bias when deciding (1) what ML technologies / processes they want to use to train algorithms and (2) what data sets (including consideration of quality and variability) they want to use the system.

A few real-life examples have shown that algorithms can show bias that can lead to injustice in relation to racial origin and skin colour or gender. Bias may occur in relation to other factors such as age or disability. Definitions of these biases are varied and can take many forms. For example, it can result in data sets itself (not representative), ranging from the

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way data scientists and ML systems select and analyze data, in the context in which AI is used, etc. In the health sector., where phenotype-related and sometimes genotype-related information is involved, biased AI, for example, may lead to false diagnoses and make treatment less effective for a few other people and thus put their safety at risk.

In the case of "black box" algorithms, many experts have argued that clarity is necessary when AI makes health recommendations, especially in finding bias However, is this theory true? Some argue that what matters is not how AI comes to its conclusion but that it is accurate, at least in terms of diagnosis. The safety and effectiveness of "black box" health AI applications can be demonstrated, for example, — like drug management — with good results from randomized clinical trials. (4)

A related problem has to do with where AI will be used. AI designed for high-level specialists in rich settings will not really recommend accurate, safe, and fair treatment in low-cost settings. One solution would be to avoid using technology in such settings. But such a "solution" exacerbates existing inequalities. Consideration should be given to the responsibilities of regulatory and resource support to ensure that these technologies improve not only the lives of people living in high-income countries but also those living in low- and middle-income countries.

Data Privacy'

Although the Streams app does not use AI, this real-life example highlights the potential for harm to privacy rights when developing technological solutions. If patients and doctors do not trust AI, their successful integration into clinical practice will eventually fail. The value of health data can reach billions of dollars, and some evidence suggests that the public is not comfortable with companies or governments that sell patient data for profit. Apart from the question of what is collected, it is important to protect patients from use other than doctor-patient relationships that may adversely affect patients, such as health effects or other insurance premiums, job opportunities, or even personal relationships Some of these will require strict non-discrimination — similar to existing regimes of genetic secrecy ; but other AI health applications also raise new issues, such as those that share patient data not only with physicians but also with family and friends.

Safety and effectiveness

It is very important that AIs are safe and effective. Participants can contribute to the successful use of AI in clinical activities by ensuring reliable and valid data sets, performing software updates periodically, and highlighting their product, including shortcomings such as data bias. Additionally, an adequate level of surveillance is required to ensure the safety and effectiveness of AI. The first step in evaluating whether AI products need to be reviewed is whether those products are medical devices. For example, medical devices include simple language enhancements, microchip cardiologists, and in vitro diagnostic products such as reagents and test kits.

Legal issues from AI

Health care workers should be strictly evaluated before they are hired, and must follow a series of daily ethical rules. There are no unanimous international laws or regulations regarding the use of medical AI currently in place to stop staff behaviour. If AI is used by criminals, (2) AI crime (new and damaging crime) can occur. Thus, the formation of broader AI rules detailed information is urgently needed. However, a number of issues need to be considered.

Hardware security

All AI products currently require a series of electronic products to perform their functions, such as computers, cell phones, and bracelets. Three important issues regarding the safety of such hardware should be noted. First, even the best physical functions can be affected by factors such as cost, temperature variability, and electromagnetic disturbances. Second, the complexity and expertise of medical knowledge and technology make it difficult for physicians or engineers to use multi-functional AI. technology. On the other hand, engineers need to be re-trained to access and process medical system data, which may interfere with the flow of medical work and cause data leaks. On the other hand, physicians may have a misunderstanding of the principles and methods of actual AI products. adaptation, which causes problems such as decreased efficiency and increased errors. Third, the issue of AI network security should be addressed. Global cascading reaction may occur when key nodes are attacked or fail in a complex network transfer process.

Software Security

Even powerful algorithm systems are highly vulnerable under design attacks. The performance of the AI system is often unsatisfactory in dealing with the intended design despite its excellent performance in the original design test. (3) In fact, all stages of the AI algorithm formation process will be attacked, assuming the attacker knows everything related to a trained neural network model (training data, model archit-ecture, hyperparameters, number of layers, opening function, and model weights).

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False attacks can be used to produce a bad sample or false positives can be used to produce a good sample, causing confusion in dividing the system. Attacks can be carried out even without structural awareness and the limits of the target model or set of training data. Errors will occur again in the system without external interference. The original algorithm will gradually deviate from the right path due to changes in disease patterns, missing data, and automatic update errors

Conclusion

AI will not replace doctors. Just as biochemical analysts do not replace laboratory scientists, the use of AI is not a threat to physicians. On the contrary, it will encourage the reorganization of the physician's role. AI research should not be limited to the accuracy and sensitivity of a report but should focus on the nature of diseases, such as their etiology and pathogenesis, and should enrich our understanding and biological knowledge Translated algorithms will be widely seen and will bring AI-based treatment to human lives. We must develop a study of appropriate ethics, rules, and AI surveillance as soon as possible. Additionally, we need to build a large public database that contains information similar to human genetic data in line with strong security measures, general development, and care. The time for AI has arrived, and all sectors of life are coming up to meet it.

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