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Artificial Intelligence in Healthcare Domain

Regy Varghese

Associate Professor, Department of Medical Surgical Nursing, Lisie College of Nursing, Ernakulam, India

Abstract: ***Artificial intelligence (AI) is the development of computer systems that are capable of performing tasks that normally require human intelligence, such as decision making, object detection and solving complex problems. The applications of Artificial intelligence are making our lives easy day by day. Weak AI, strong AI and super intelligence are the three major types of artificial intelligence. Artificial intelligence has transformed industries around the world, and has the potential to radically alter the field of healthcare. The application of AI in healthcare mainly reflected in areas such as medical imaging, preliminary diagnosis, discovery of new medicines and treatment, AI assisted surgery and Virtual Nursing Assistants. AI has an important role to play in the healthcare offerings of the future. It is generally believed that AI tools will facilitate and enhance human work and not replace the work of physicians and other healthcare staff. It is been proposed that AI training should be incorporated as a standard component of medical education.***

Keywords: Artificial intelligence; super intelligence; medical imaging; virtual nursing assistants

1. Introduction

Artificial intelligence (AI) is called machine intelligence in the language of computer science. It contrasts natural intelligence. In the 21st century there are wide evidences of transitions from human domination to AI. The applications of Artificial intelligence are making our lives easy day by day. Apple's Siri, Amazon's Alexa are the apt uses of artificial intelligence. Despite the fact that artificial intelligence evokes fear in most of us, but it is benefiting us in numerous ways. AI has amazing potential to enrich everyone's life. According to the latest reports AI is estimated to contribute additional 15.7 trillion to the world economy by the year 2030 and the greatest impact will be in the field of healthcare.

What is Artificial intelligence

The term AI was coined by John McCarthy in 1956. Artificial intelligence is the development of computer systems that are capable of performing tasks that normally require human intelligence, such as decision making, object detection, solving complex problems and so on.

AI is not one technology but rather a collection of technologies that perform various functions depending on the task.

Types of Artificial intelligence

1) Weak AI (Narrow AI):non- sentient machine intelligence, typically focused on a narrow task
2) Strong AI /Artificial General Intelligence (AGI): machine with the ability to apply intelligence to any problem, rather than just one specific problem-"at least as smart as typical human".
3) Super intelligence: artificial intelligence for surpassing that of the brightest and most gifted human minds. Due to recursive self improvement, super intelligence is expected to be rapid outcome of creating artificial general intelligence.

Benefits of AI

- Increased level of accuracy
- Helps in decision making
- Solve complex problems
- High level computations

Artificial intelligence in health care

Since the introduction of AI in 1950's, it has been impacting various domains including marketing, finance, gaming industry and even musical arts. However the largest impact of AI was in the field of health cares.

What lead to the current importance of AI in health care industry?

The reasons are high availability of medical data..AI is based on technologies such as deep learning and machine learning which require tons and tons of data. So with the availability of data it become easier to implement or it became easier to use artificial intelligence in health care industry.

Another important reason that leads to the development of AI in healthcare industry is the introduction of complex algorithms. The development of deep learning and neural network also played a major role in the impact of AI in health care.

Uses of artificial intelligence in health care

- **Medical imaging and diagnosis:** AI algorithms can feed images labeled by radiologist and the AI can easily excel the radiologist in identifying the finding of cancer. Neuro network was 99%accurate for diagnosing cancer than 38% accuracy achieved by doctors. So AI increases the possibility of early detection of cancers and thus helps in saving life.
- **Preliminary diagnosis:** Currently doctors in emergency departments are overworking and get fatigued. This leads to more errors in patient's diagnosis**.** One of the techniques to reduce this error is use of AI assistant. When patient book the appointment, they will submit a list of symptoms patient have. The AI engine will analyze these symptoms and come to a complex prediagnosis and can submit to doctor. So the doctor will get a preliminary idea and the diagnosis will be much easier. Thus AI assistance can successfully reduce the risk of misdiagnosis.

- **Discovering new medicine and new treatment:** AI algorithms help to invent new medicine and also help in reducing drug interactions. The use of AI can drastically cut down the time to discover and develop new medicine by 5 folds, reducing it from 5 years to 12 months.
- **AI assisted surgery:** Artificial intelligence is being applied to surgical robotics. Surgeons are using robotic surgery platforms that use micro-instrumentation, flexible robotics, and other technologies for bronchoscopic procedures. This is extremely useful in hair transplant surgeries. The robot harvests hair follicles and then implants the follicular units into targeted areas on the scalp. Abdominal surgical robots can move by means of an eye-tracking camera control. Surgeons are able to move the camera simply by moving their eyes.
- **Virtual Nursing Assistants:** this is specially used for patients that are recently been discharged or patients that require homecare. Virtual assistant will be accessible through an app in the phone. It will conduct the reassessment of patients and answer any of their questions. Then it can feed all the informations in the hospital account. The hospital can provide ongoing care without the need for hospital visit.

AI can assist doctors, nurses, and other healthcare workers in their daily work. AI in healthcare can enhance preventive care and quality of life, produce more accurate diagnoses and treatment plans, and lead to better patient outcomes overall. AI can also predict and track the spread of infectious diseases by analyzing data from a government, healthcare, and other sources. As a result, AI can play a crucial role in global public health as a tool for combating epidemics and pandemics.

In some of the developed countries the physicians are already using the AI in their practices and many believe there is ample reason to think this advanced technology can help in addressing diagnostic errors, the largest cause of malpractice claims. A recent Physician survey by the Doctors Company, the nation's largest physician owned insurer, found that 53% of the physicians are optimistic about the prospects of AI in medicine. Thirty five percentage are using AI in their practices and 66% believe that AI will lead to faster and more accurate diagnosis.

Potential benefits from AI in health care

- Advancements in health care treatments
- Ability to quickly and more accurately identify signs of disease
- Patient can ask medical questions and receive answers in absence of doctor
- Reduces the treatment cost
- Make the treatment decision faster
- helps to reduce the human errors
- Assistance with care triage
- Enhanced image scanning and segmentation
- Integration and improvement of workflow
- Disease risk prediction
- Patient appointment and treatment tracking

Potential risks from AI in health care

- False positives/negatives
- System error
- Overreliance
- Unexplainable results
- Unclear lines of accountability
- New skill requirements
- Network systems vulnerable to malicious attacks

To lessen these risks, healthcare members must seek training in the use of AI and adhere to the standards provided by the device companies. Training will also enable the health care team to fully and clearly articulate potential harms to patients. It is been proposed that AI training should be incorporated as a standard component of medical education. Hospitals and other practices are also key to ensuring proper development, implementation and monitoring of protocols and best practices for use of AI systems in health care. Bias in the data and algorithm transparency are the major ethical dilemmas of AI in Medicine.

2. Conclusion

AI has an important role to play in the healthcare offerings of the future. It is generally believed that AI tools will facilitate and enhance human work and not replace the work of physicians and other healthcare staff.AI is ready to support healthcare personnel with a variety of tasks from administrative workflow to clinical documentation and patient outreach as well as specialized support such as image analysis, medical device automation and patient monitoring. The greatest challenges to AI in the healthcare domains are not whether the technologies will be capable enough to be useful, but rather ensuring their adoption in daily clinical practices. The healthcare ecosystem is realizing the importance of AI powered tools in the next generation healthcare technology.

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