Artificial Intelligence (AI) impact on healthcare

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Abstract

Artificial Intelligence (AI) in healthcare is revolutionizing the healthcare industry by providing improved health outcomes and quality of life by reducing costs. This research paper highlights, the impact of Artificial Intelligence in the health sector from multiple dimensions including Patient care, Diagnostics, Finance, Marketing and clinical trials. Ability of a machine work similar to human intellect is known as Artificial Intelligence (Merriam-Webster, 2017). Role of Artificial Intelligence is very important in pandemic situations & in countries which are still developing where access to clinical expertise is limited & travel for medical treatment is not a feasible solution always.

This research aimed to identify the benefits of AI and how those benefits can be optimized to improve health outcomes by reducing cost and human efforts. The study also gives an insight into the challenges faced by organisations while implementing AI in healthcare such as - the shortage of healthcare professionals and increased spending as major challenges. The research methodology used for this study was objective to understand the areas of AI implementation. The researcher carried out an exploratory study with a detailed literature study.Use of AI in the healthcare can significantly improve decision-making quality and automation will reduce the effort and manpower which will eventually result in better health services at a minimized cost. Better data-driven decision-making with the help of AI in both clinical as well as other fields of healthcare can give excellent results.

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Keywords: Artificial Intelligence (AI), Healthcare, Decision Making, AI Applications
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1. Introduction

Every sector of the industry today is moving into digital transformation with advent of many technologies such as Artificial Intelligence, Machine Learning, and Robotics Automation etc. As per the Oxford Dictionary (Oxford Dictionary, 2015), the definition of Artificial Intelligence (AI) is the theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages.

Artificial intelligence help to predict accurately which help in decision-making & performs complex calculations those are very difficult to solve for humans. In the field of healthcare AI has tremendous potential because of two main reasons: (a) High availability of medical data and (b) it has a shortage of professional manpower. A projected shortfall of 15 million health workers by 2030, mostly in developing countries (World Health Organization, 2019).

AI has already played a very important role not only in accurate early disease diagnostics but AI has also in improved clinical decision-making, Robot-assisted surgeries, and the possibility of pre-diagnosis of Diseases like Cancer and diabetes which can majorly impact society as a whole. Apart from the clinical part, AI is actually benefiting healthcare

Organization administration in many ways like Service acceleration, Call deflection of inbound calls, Churn reduction by natural language & AI chatbots which result in Revenue generation & cost reduction.

Like all new technology, artificial intelligence holds enormous potential for improving the health of millions of people around the world, but like all technology, it can also be misused and cause harm(World Health Organization, 2021).

Summary - AI usage in health care can be manifested in the figure below.
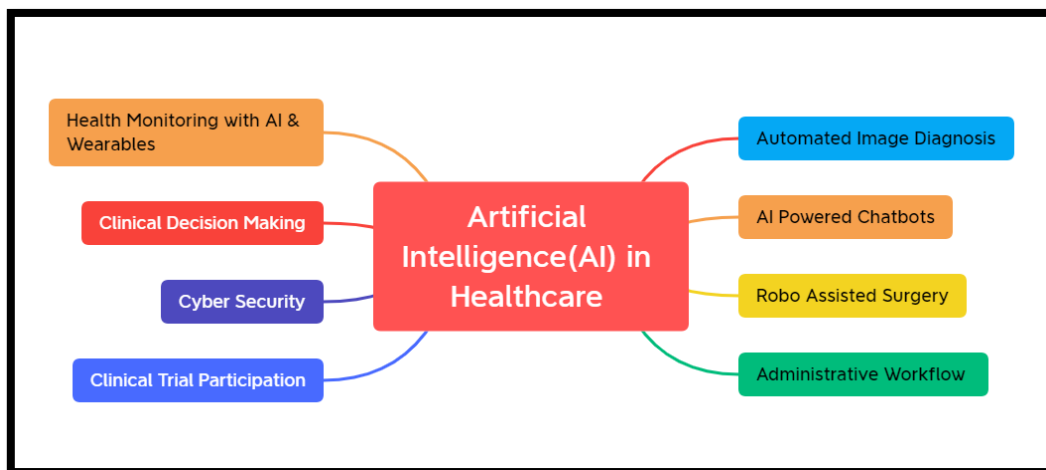
Source: Author   Figure: Applications of AI in Healthcare

2. Research Methodology

There are multiple viewpoints about what are real applications and benefits of AI in healthcare; this report studies the impact of AI on healthcare through exploratory study. This review mentioned a few applications already in use and also looked at those that can be improved and utilized in the future. Two major research questions came up as follows:

[RQ-1] What is Artificial Intelligence and how it is impacting Healthcare?

[RQ-2] What are the benefits and use of AI in Healthcare?

3. Use And Impact Of Artificial Intelligence (AI) In Healthcare

AI has played very important role in the clinical field of health care as well as improved businesses by reducing manpower efforts and costs. Machine learning is important field in artificial intelligence which helps to learn automatically and improve from previous events, interpret processes, analyse data and automate things in order to give beneficial actionable insights to an organization**.**

Based on this review we can enlist the benefits that AI utilization can give:

1) Accurate in diagnosis

2) Reduce day-to-day monotonous work to save time

3) Accurate findings from medical images & reports

4) Quality health care at minimum cost

5) Optimized use of manpower

6) Minimize complications in surgical operations

7) Monitoring patient health conditions and prediction of diseases

8) Processing complex medical data

4. Use of AI in healthcare

Robotic-Assisted Surgical Systems (RASS):

The use of the robotic system in surgical procedures enhances accuracy, flexibility, and better control during the operation than traditional techniques. Robotic surgeries can be used by surgeons to perform complicated surgeries those can very difficult to execute with other methods**.** This will result infewer complications and fast recovery.

Clinical Decision-Making:

A clinical Decision or diagnosis has been done by using patient's medical history. With the advancement in AI, we can diagnose with accuracy which is beneficial for the patient. AI has becoming better in fast and accurate medical diagnosis in fields like Diabetes & Cancer prediction, Tuberculosis diagnosis and Psychiatric diagnosis (Väänänen et al., 2021).

Patient Health Monitoring:

Patient health monitoring systems & wearable devices can reduce cost saves time and gives well in advance alert which can avoid mishap by emergency detection or complications in the future. It also reduces patient hospital stay and recovery can be faster with the help of these systems. Wearable devices like AI enables watches can be helpful in remote service through

telemedicine, continuous healthcare monitoring, symptom checking tools & automation alert systems(Shah & Chircu, 2018).

Medical Imaging And Diagnostics:

Medical scans & images are complex to read and conclude but at the same time, this is one of the key information needed for patient's disease diagnosis. Interpretation of medical images, scans & reports needs skilled, experienced and specially trained resources. AI technologies provide faster & accurate interpretation in lesser cost. This is very useful in Image diagnosis for oncology i.e. cancer screening, detecting cardiovascular abnormalities, and identifying neurological diseases. Technology like augmented reality will help in superimposing a computer-generated image which gives a holistic view of the complex surgeries

Clinical Trial Participation (CTP):

The clinical is time & money consuming process. Therefore use of clinical trial automation will reduce time and cost and also improves the success rate. AI-assisted clinical trials are able to process huge amounts of data and give very accurate outcomes.

Applying predictive AI techniques and analytics can help researchers to understand important investigations and accurate patient studies. In industries like pharmaceuticals, AI-powered programs can improve efficacy by forecasting efficacy and possible drug reactions. AI in healthcare majorly benefited pharmaceutical firms by accelerating process of finding drug(Shaheen, 2021b).

Administrative Workflow Applications:

The increased operational efficiency due to AI can improve patient experience, and convert medical data into actionable which results in increased revenue. (Garg). Due to the multi-dimension data and technical jargon administration of healthcare data is also a great challenge. The use of AI improves efficiency and reduces manual possible errors. It helps organizations to reduce costs and save the time of both staff as well as patients which is crucial in the field of the hospital as it involves life risk and the importance of every second. Also electronic medical records (EMRs) reduce the cost of individual organizations as it reduces cost of buying and maintaining costly hardware and software required for healthcare(Panch et al., 2019).

Post-Treatment Patient Care:

The lack of healthcare professionals and huge demand for medical field expertise can impact post-hospital patient care & patient engagement. AI-powered systems in healthcare will be able to analyze result patterns in medical parameters after treatment and alert the consultants

which help in faster and better action. Artificial Intelligence can help healthcare professionals by giving alerts post-treatment and actionable insights by reducing burnout(Spatharou et al., 2020).

Natural Language Processing:

Just diagnosis and prediction are not important, conveying the same in an understandable format is key to the decision-makers in healthcare. Natural language Processing is a subset of AI which is the ability of computers to understand the latest human speech terms and text.

Cyber Security:

Data like medical history is very sensitive and private in nature so data access, governance, risk management, security, and sharing are very important. AI systems can work on the same to keep data in such formats that it can protect from possible risks.

Case Studies Of Ai In Health:

IBM's Watson for Health is useful to store healthcare data, power diagnosis and precision medicine(IBM, 2019). Also Google's DeepMind Health is useful for solving real-world health issues (PricewaterhouseCoopers, 2019).

5. Conclusion

We found that AI has tremendous potential as it provides more accurate & faster diagnosis & preventive healthcare as it will directly impact human lives. More data, better data, and more connected data are important parts of AI in healthcare**.** Secondary benefits include high capability to reduce healthcare costs, automate processes & save time as well as manpower. In Addition to the current situation of the pandemic, and chronic diseases with an aging population AI can play important role in diagnosis and treatment irrespective of location and socio-economic situations. While AI methods still need a few manual interventions which have limitations in terms of manual errors while entering data. It also misses the psychological part of the consultation with the patient which plays important role in patient recovery and treatment. However we believe that we can achieve remarkable results in the development of diagnosis & precision medicine with the help of AI in Healthcare.

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