

An Insight on Artificial Intelligence in Healthcare System

M Nandhini*

Assistant Professor, Department of Computer Science, Government Arts College,
Udumalpet, Tamilnadu, India

***Corresponding Author:** M Nandhini, Assistant Professor, Department of Computer Science, Government Arts College, Udumalpet, Tamilnadu, India.

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Abstract

The primary goal of the healthcare system is to address the needs of the target demographic. In terms of service delivery, over recent years, the healthcare system has undergone rapid and major change. Factors such as the growing need to reduce healthcare costs, increasing computing resources and low hardware costs, an increase in the number of partnerships and alliances among diverse domains in the healthcare field, and a growing need to improve healthcare services are driving the shift to digital and mobile-led healthcare services. Artificial intelligence (AI) is progressively being employed in healthcare as it becomes more prevalent in society, industry, and in our daily lives. The predominance of AI and healthcare innovations are directly relevant to the healthcare sector. In this study, the potential benefits and challenges of AI in the health-care system are explored.

Keywords: Artificial Intelligence; Health Systems; Sickness

Introduction

Health systems, also called healthcare systems, are collections of people, institutions, and resources delivering health care services to meet the needs of vulnerable populations [1]. The world's health systems face numerous obstacles. Due to the aging population and demographic transition, greater demands for health services, and rising health expenditures, there is a rising burden of sickness, multimorbidity, and disability [2]. In addition, the health-care system is dealing with inefficiency and low productivity. It is critical that health systems undergo a fundamental reform in order to handle these problems. Artificial intelligence (AI) is a multidisciplinary branch of study that aims to teach computers how to execute tasks that would normally need cognitive abilities. AI can help healthcare providers in a variety of ways, including clinical outcomes and day-to-day tasks. Artificial intelligence (AI), the most significant embodiment of digital technology, presents the potential of achieving more with less, and it may even be the trigger for such a shift. The nature and scope of this pledge, however, remain unknown. Healthcare can be

enhanced with AI [3]. It may enable healthcare providers to devote more time to patient care. This article briefly discusses the benefits and challenges of AI in the healthcare system.

Benefits of AI in healthcare system [4]

Enhanced availableness

Many developing and underdeveloped countries face serious healthcare issues. AI technology can reduce the cost of conventional health care infrastructure. AI technologies can be used to construct smart and efficient digital healthcare environments. Medication can be prescribed remotely depending on the symptoms of a sickness. AI technology is predicted to play a larger role in healthcare diagnostics in the future years. Through AI applications, it is possible to increase access to medical guidance for the most vulnerable populations.

Early diagnosis

Currently, AI tools use people's data to assess their prior and present health issues. Healthcare professionals are able to

diagnose more accurately by evaluating the disease details. In their databases, many healthcare applications store millions of symptoms and diagnoses. It can also foresee future health problems that an individual may suffer. Health care workers can use AI tools to accurately identify and prepare for any health problems in the future by taking the appropriate steps at present.

Improved efficiency with lower costs

Healthcare techniques are now quicker and at a fraction of the unique costs. From patient inspection through diagnosis, artificial intelligence has radically altered the game in terms of speed and cost. AI has the ability to improve administrative procedures by providing a more precise and timely diagnosis and treatment plan for each patient [5], resulting in shorter stays, fewer hospital stays, and lower expenses. AI facilitates in healthcare decision-making, ensuring accurate diagnostics and therapeutic interventions that are tailored to the individual. This instant effect will significantly reduce healthcare expenses, resulting in greater results. It eliminates the costs of post-treatment complications, which are one of the most significant cost drivers throughout many healthcare systems around the world.

Proficient and exceptional support in surgery

In robotic applications, artificial intelligence has advanced dramatically. The same may be said about the use of machine learning in surgery [6]. There are AI Surgical Systems that can execute even the tiniest movements with 100% accuracy. Sophisticated surgeries with fewer adverse effects, blood loss, and pain can be performed using AI surgical systems. Post-surgery recuperation is also quicker and smoother.

Increased support for human and mental well being

Lot of substantial evidence is available to demonstrate that AI algorithms can perform on par with or better than humans in a variety of tasks, such as examining medical images or correlating symptoms with diseases. AI applications can also perform critical tests and medical check-ups such as blood sugar, blood pressure, temperature readings, and even medication administration. Medical robots with built-in predictive analytics have been designed to assist depressed patients. They help in examining the patients' frame of mind and assist them feel more positive using these capabilities.

Challenges of AI in health care system

Besides these benefits, there are lots of challenges for AI in the healthcare system.

Information digitization and unification

For AI systems to produce reliable results, they need a lot of data. It is critical to feed high-quality healthcare data into AI systems; nonetheless, this step has become increasingly delicate over time. The challenge is linked to the jumbled and disorganized health data scattered across multiple information systems. Cases change insurance and healthcare providers far too frequently, making data entry difficult. It is obviously more difficult to digitize or unify these data when the data is of poor quality. Better delicacy and effectiveness in the healthcare sector are ensured with simplified and precise digitization of medical records. It's the only way to provide AI the data it needs to do precise evaluation and drive efficient methods.

Updating regulations

Around the world, there are numerous strong security and privacy protections regarding medical records [7]. Data sharing among AI systems is deemed a legal infringement under these regulations. Patients must express their consent for medical data to be collected and used for such reasons if it is legal. Flexible medical data collection guidelines with identity security are required. Medical institutions must also ensure that such rules are strictly followed and that they are held accountable for the acquisition and use of patient data. This is the most practicable method for gathering high-quality, reliable medical data for AI.

Requires human presence

Many people, including medical professionals, are distrustful of AI. Patients are concerned about not permitting technology to govern their health. It will be hard to build an AI-powered healthcare system without addressing these misconceptions. Artificial intelligence (AI) should be considered as a tool to aid healthcare practitioners in their diagnostic duties. The right mindset is required to support AI-assisted medical practices.

Requires Effective and efficient handling of large and complex healthcare data

The data from healthcare systems is collected by hospitals and healthcare institutions all across the world. Big data seems to have

an influence on the health sector because of the magnitude, diverse intricacy, and tremendous liveliness of these applications. The importance of health records is constantly increasing. The eventual aim of dealing with these kinds of massive quantities of data is to explore it properly in order to provide useful insights and perform predictive analytics on the healthcare applications with which it applies. As a consequence, AI technologies are being used to extract knowledge from big, diverse data sets. The confluence of sbig data with artificial intelligence is widely used in a number of health-care applications, leading to a variety of novel use cases.

Increased computational power in healthcare management

Health applications can collect and understand data more quickly because to cloud computing and the Internet of Things (IoT). A large amount of data is collected on a regular basis in the healthcare industry. Clinical photos, such as medical scan reports, take up a lot of storage space. Personal records like this must be kept safe for the rest of a patient's life. As a result, cloud-based solutions have far more computational power to handle healthcare data. It allows healthcare providers and patients to access data in a secure and remote manner. It makes it easier to keep track of patients. It enables healthcare workers, hospitals, and research organizations to seamlessly upload, exchange, and retrieve health data, leading in increased collaboration. Due to the growth of mobile, communications systems, IoT, and embedded devices, a remote healthcare system with a mobile phone has become feasible. The introduction of mobile-based applications has made it easier with IoT devices implanted on patients for healthcare centers to obtain and review medical data. The mobile healthcare app offers endless digital services and allows computing data more quickly.

AI applications in health care system

The capability of a computer system to achieve tasks in an intelligent human-like way is referred to as Artificial Intelligence (AI). AI is a set of technologies or perhaps a solitary one. AI and similar technologies are indeed being more widely used in financial and social turn of events, having huge applications in health care. These innovations can possibly change numerous parts of the medical services framework. It works on the patients' lives, medical specialists, and emergency clinic directors by achieving errands that normally perform in a tenth of the time. Human blunders can be horrendous when jobs are heavy and clinical reports are imprecise. As AI is unsusceptible to specific elements, it can detect

and analyze faster and all the more proficiently. The paragraphs that follow briefly analyze the main AI applications in health care management.

Machine learning

Machine learning, a sub-discipline of computer science centered with constructing algorithms that can generate exact prediction of future results. It is perhaps the most prominent AI application. It is, in fact, a realistic approach for fitting models to datasets and training models to 'learn' using data. By investigating large volumes of data, AI innovation can help medical care specialists in giving exact prescription arrangements matched to individual highlights. Generally, machine learning algorithms can be classified into two types: supervised and unsupervised.

In supervised learning, algorithms are given "training data", which comprises instances that lead to desired outcomes. Unsupervised learning, on the other hand, uses training data that has not been labeled. Instead, the algorithm must discover patterns in data sets on its own, using indicators and potential abnormalities depending on the frequency or collection of certain data.

The most common application of classical machine learning in healthcare is precision medicine, which includes foreseeing with therapy procedures that are probably going to be fruitful on a patient in light of different prognostic elements and the therapeutic context. Most machine learning and precision medicine applications require supervised learning, which necessitates a training dataset with a defined outcome variable. In order to discriminate between healthy and non-healthy data recordings in the future, the computer is trained to recognize which features/images represent malignant tissue. The human expert validates the successful outcomes when the AI algorithm accurately identifies a malignant image, and the data is fed back into the model, progressively expanding the exactness of the arrangement for increasingly complex examples.

Interestingly, unsupervised learning doesn't actually have a particular conclusion. Patterns are sought by algorithms without any user intervention in unsupervised learning. Unsupervised techniques are thus exploratory, and they are used to discover undefined patterns or clusters in datasets. Most extensively used unsupervised learning algorithms are cluster analysis and association rule mining. For gaining genome-wide biological insights, unsupervised learning methods are valuable. It's a

generally expected strategy for classifying DNA sequences based on sequence similarity.

Artificial neural network (ANN)

Machine learning techniques based on the human brain are known as Artificial Neural Networks (ANNs). That is, the ANN might gain from input and answer as expectations or orders, similarly as neurons in human sensory system. The ANN is a further developed type of AI that has been used in medical care research for a really long time for classification applications like predicting regardless of whether a patient will acquire a particular disease or not. It investigates issues as far as sources of inputs, outputs, and changeable weights or 'features' that connect them.

ANNs is exceptional at detecting patterns and modeling complex or nonlinear relationships. They can easily deal with a high number of input variables as well as missing data. These are all good aspects when it comes to ANN implementation in the health care field. In the healthcare industry, artificial neural networks have a wide range of uses. This smart technology offers a wide range of benefits, from medical imaging (including breast cancer, lung, and brain imaging) to computer-aided medical diagnostics. It can also help health-care executives manage by estimating how much money will be spent on medical care and how much outpatient care would be provided.

Deep learning

Deep learning combines neural network models and machine learning in a discipline of AI. It's the most effective and complex methodology of AI. Deep learning is an essential part of data science, which covers insights and predictive analytics. Deep learning is especially useful to data scientists who then, at that point, gather, audit, and examine massive amounts of data; it smoothes out and accelerates the data analytical process. Deep learning approaches for clinical imaging have shown encouraging results in recent years. Convolution neural networks (CNNs), is a kind ANN, mostly applied to analyze medical images that can help clinical specialists in more quickly and precisely identifying medical problems. Deep learning is usually utilized in the clinical business to distinguish possibly malignant tumors in radiography images. However, these approaches are constrained by a lack of easily accessible labeled datasets for training deep learning models for effective performance. Deep learning algorithms make

complex information handling more straightforward, taking into consideration more accurate location and treatment of anomalies. Deep learning models can analyze structured and unstructured data in Health records, like clinical documentation, analytic tests, treatments, and ideas, effectively and precisely.

Conclusion

Artificial intelligence has the potential to improve international healthcare outcomes by providing new capabilities and quality. However, insufficient funding, ineffective guidelines, a defective medical services framework, and deeply ingrained cultural norms are all contributing elements to the AI-based healthcare system's deficiencies and hurdles. AI alone would not be capable of completing this task. The value of these AI systems will be determined by the accuracy with which needs are identified and linked to appropriate solutions. Right now, there's a potential that AI solutions will be driven by technology rather than a desire to solve a problem, leaving it blind to specific logical needs or restrictions. Designing real-time AI solutions for rural areas with low internet connectivity may not have been the best option. The digital divide between users and technology developers, who are often more knowledgeable about technology than users, makes it challenging to design effective digital interventions [8]. Finally, issues such as privacy, abuse, and liability are only beginning to be understood, and they will require a great deal more consideration before AI can provide safe and fair quality healthcare.

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