

# The Role of Artificial Intelligence in Healthcare: Innovations and Disruption

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## ABSTRACT

Artificial intelligence (AI) has emerged in the healthcare field using advanced algorithms, machine learning and other artificial intelligence technologies to improve various aspects of medical services based on healthcare systems and primary healthcare. This is done through several things, the most important of which are: from diagnosing regular and chronic diseases to managing patient files and improving administrative tasks related to the patient and health costs as well as the medical and nursing staff, artificial intelligence has a wide range of applications in this sector. As we know in advance, the potential of AI in biomedical research and healthcare innovation has not yet been realized. It is essential to train medical and informatics professionals on how to apply, improve, and develop programs and extract results.

**Keywords:** Healthcare; Digital Transformation; Artificial Intelligence

**Abbreviations:** AI: Artificial Intelligence; GDPR: General Data Protection Regulation; HIPAA: Health Insurance Portability and Accountability Act

## Introduction

What is Artificial Intelligence? It is often asked, and This question is asked in the context of all different sectors, but in the field of healthcare, AI has a different meaning and impact. Its impact can be particularly revolutionary, because it not only improves the quality of healthcare, but also improves access to it and reduces the overuse of medical equipment, which improves In turn, the percentage of waste in Health bill. The traditional healthcare system is a thing of the past, and digital transformation is the foundation for the transformation structure in healthcare systems and primary healthcare. As a result of this transformation, artificial intelligence has emerged in the healthcare field using advanced algorithms, machine learning and other artificial intelligence technologies to improve various aspects of medical services based on healthcare systems and primary healthcare. This is done through several things, the most important of which are: from diagnosing regular and chronic diseases to managing patient files and

improving administrative tasks related to the patient and health costs as well as the medical and nursing staff, artificial intelligence has a wide range of applications in this sector.

What makes artificial intelligence particularly useful in the field of medicine is its ability to analyze huge amounts of data related to the patient and the medical file quickly and accurately, enabling doctors to make better, more efficient and less costly decisions for the healthcare sector. Common areas of use of AI in primary health care include laboratory analysis, such as X-ray imaging, which allows for more accurate diagnosis and prediction of treatment outcomes, as well as the development of personalized medical plans. The use of AI in medical research also allows for the discovery of new treatments and drugs faster, bypassing long waiting periods for trials, and obtaining more accurate results with reduced chemical quantities used, resulting in better and faster results.

## Methods and Material

### How Does Artificial Intelligence Work in Healthcare?

Artificial intelligence works in the field of primary health care by analyzing the large data sets that we provide it with from patient cases and the health system. Artificial intelligence works to analyze the information and link it with other data that it was previously provided with, and it performs the process of weaving and linking between the data and previous cases. This is what is known as did not New is machine learning. Using machine learning, artificial intelligence algorithms analyze medical data such as laboratory results and the data we have obtained, link them and give a conclusion about the case and similar cases to distinguish between them. The same applies to radiological images and reports (regular x-rays, CT scans, MRI and other technologies) to help doctors make accurate diagnoses with impressive results free of errors. This is more evident in tumors and the help in discovering and identifying them. In many cases, artificial intelligence can outperform humans in diagnosis. This is because machine learning allows computers to infer and manage processes outside of their programming. The same can be applied to the analysis of psychological and neurological data. If we go further, we will see that the development of artificial intelligence branches has reached deep learning, which means that Computational operations in multilayer neural networks make it possible.

Which will help in finding medical solutions faster and in a short time and linking data. All of this will affect the diagnosis of congenital malformations at an early stage, as well as genetic studies and prediction of diseases that may occur in the future. It will also affect treatment and the manufacture of effective and low-cost medicines. As for the administrative aspect, this future system will help organize administrative work and determine the priority of operations according to data and schedule patient appointments. In addition, promoting fair, inclusive and trustworthy development of AI in health-related research and innovation can facilitate building partnerships. (Medical supplies and medicines) And meaningful engagement. By improving the geographic representation of AI, emerging economies are facilitating the spread and acceptance of AI in health-related R&D internationally. Through collaboration and inclusiveness, we are closer to realizing the potential of AI to solve global scientific and health challenges. The most important thing we should stop is the use of artificial intelligence in the field of primary health care, which means disease prevention. Artificial intelligence can analyze data related to the patient's genetics and biography, as well as predict the risk of developing certain diseases. For example, artificial intelligence algorithms can predict the risk of developing diabetes, heart disease, or cancer based on data from medical records and health symptoms. These predictions enable patients and doctors to take preventive measures before the disease becomes serious [1-5].

## AI with Healthcare Innovation and Disruptive

- **Data Quality and Type:** Biomedical datasets often come from different sources and can vary widely in quality, completeness, and representativeness. This diversity can hinder the development of powerful AI models, especially machines and deep learning. This requires training human medical staff in the type of information they need to capture and how to enter it. Thus, when the parameters are standardized, AI and its branches can be creative in their analysis. This requires Changes in Operations, and training Staff, and overcome on resistance Technologies New.
- **Privacy and Security:** Handling sensitive patient data raises privacy and security concerns. Compliance with regulations such as the Health Insurance Portability and Accountability Act (HIPAA) and the General Data Protection Regulation (GDPR) is a major concern. Legitimacy, fairness, and transparency. Purpose limitation. Data minimization. Accuracy in data collection. Storage limitation. Integrity and confidentiality. Accountability. All of these are essential to protecting patient information.
- **Ability to Interpret and Explain:** Many AI models, especially deep learning algorithms, are viewed as "black boxes" that make it difficult for researchers and clinicians to understand the rationale behind their predictions or decisions. This is because the input of standardized information and the given conclusions we are dealing with are different and based on the richness of the data and algorithms that can be obtained.
- **Regulatory and Ethical Issues:** The rapid development of technology is creating an irregularity in the work of healthcare because the rapid development of AI technologies is outpacing the current regulatory frameworks in place in the healthcare sector, leading to uncertainty about how AI applications in healthcare will be evaluated and approved. In addition, ethical considerations around bias, fairness, and accountability must be addressed.
- **Reproducibility and Verification:** Since artificial, automated and deep intelligence produces consistent and reproducible results across different studies and clinical settings, this is of paramount importance for gaining acceptance in the biomedical community that deals with humans.
- **Resource Constraints:** This depends on the country and its budget, as it is certain that implementing artificial intelligence systems is resource-intensive, requiring access to large computing power, data storage, and expertise in both the fields of artificial intelligence and biomedicine.
- **Bias and Fairness:** This is an important task that must be stopped at, as artificial intelligence algorithms can unintention-

ally perpetuate or amplify biases present in training data and data, leading to variation in treatment recommendations and patient outcomes across different population groups, which hinders the work of health care at the local and regional levels.

- **Scalability:** Developing AI solutions that can be scaled and applied globally across different populations and healthcare systems is a complex task because it requires approval and cooperation between countries regarding medical information and patient privacy, which in turn affects the reduction of the emergence of regional or global diseases.

## Conclusion

Advances in AI, deep learning, algorithmic and high-throughput experimentation have enabled scientists to accelerate the discovery of new chemicals and materials with unprecedented efficiency, flexibility and precision. In recent years, this has manifested itself in new types of treatments, drugs and medical supplies. Autonomous experimentation systems have emerged as a key innovation in AI to enhance and accelerate research and development. Autonomous experimentation systems, also known as self-driving laboratories or materials acceleration platforms, are digital platforms capable of conducting large numbers of experiments independently. These systems are rapidly impacting biomedical research and clinical innovation, in areas such as drug discovery, nanomedicine, precision oncology, and more. As AI is expected to impact healthcare innovations from local to global levels, Addressing these challenges is essential to harnessing

the full potential of AI to transform biomedical research and improve healthcare outcomes. It is essential to train medical and informatics professionals on how to apply, improve, and develop programs and extract results. It is also preferable to create new institutes that focus on coordinating medical information and artificial intelligence to recalibrate programs with what suits the human being at the center of development. As we know in advance, the potential of AI in biomedical research and healthcare innovation has not yet been realized. As these technologies continue to advance, we can expect further breakthroughs in research, development, and clinical innovation, ultimately leading to improved health outcomes.

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