

The Role of Artificial Intelligence (AI) in Developing Healthcare for Patients

Zahraa Aqeel Salih

Baghdad, Al Farabi University

Zahraa94salih@gmail.com

Abstract: AI has entered the healthcare field and has revolutionized it by focusing on accuracy and efficiency in diagnosis and providing comfort to patients, improving treatment plans, and early detection of malignant diseases. AI algorithms, including machine learning, have helped process data more accurately, leading to better and faster prediction of results and enabling them to identify health conditions at the right time. These developments support more efficient treatment plans and simplified medical procedures. In addition, artificial intelligence has helped reduce the cost and effort spent on patient care by providing remote healthcare. As AI tools continue to evolve in the medical field, it is expected to bring about a new era of improved patient care, early detection, and diagnostic accuracy. Despite that the difficulties with data privacy and the requirement for cautious use in medical environments.

Keywords: Artificial intelligence (AI), robotic surgery, patient intensive care, remote healthcare, personalized medicine.

1.1 Introduction

Artificial intelligence has revolutionized the healthcare sector, facilitating many unexplored opportunities in the field, including patient care, providing treatment, early diagnosis of serious diseases, and much more. AI algorithms that analyze medical data or information may not be clear to human doctors at present, which has helped us with early detection and accurate diagnosis. AI has also entered the field of oncology to predict responses to treatment for various tumors and prepare the appropriate treatment for each case. In addition, AI has played an important role in personalized medicine by providing treatment plans and health histories for patients[1], [2].

The capabilities of AI are not limited to treatment and diagnosis alone[3]; they also contribute to healthcare tools, including automation of daily tasks, and monitoring patients through the use of medical applications, and thus these operations helped to achieve better results[4], [5].

However, the entry of AI into such a field raises major challenges, including the privacy of patient data[4], and the need for careful focus when using artificial intelligence tools in diagnosis and treatment[6], because any error could cause serious disasters[7]. To ensure that AI can be used in patient care in the future in a way that is both safe and effective, these issues must be resolved[8], [9].

This paper focuses on the various applications of AI in healthcare, focusing on its integration into modern technologies, its impact on patient intensive care, and its role in enhancing sustainability and adaptability within healthcare systems. The methodology section discusses the strategies used to analyze these areas, followed by a results section that presents the findings

related to the effectiveness and highlights the challenges of AI in these domains. Finally, the paper concludes with a discussion on the implications of AI for future healthcare practices and the necessary steps to address the identified challenges.

1.2 Methodology

To achieve the role of artificial intelligence in the field of health care as shown in Figure 1, which explains its broad applications in terms of care, integrating technologies, patient-intensive care, sustainability, and adaptability, the methodology is as follows:

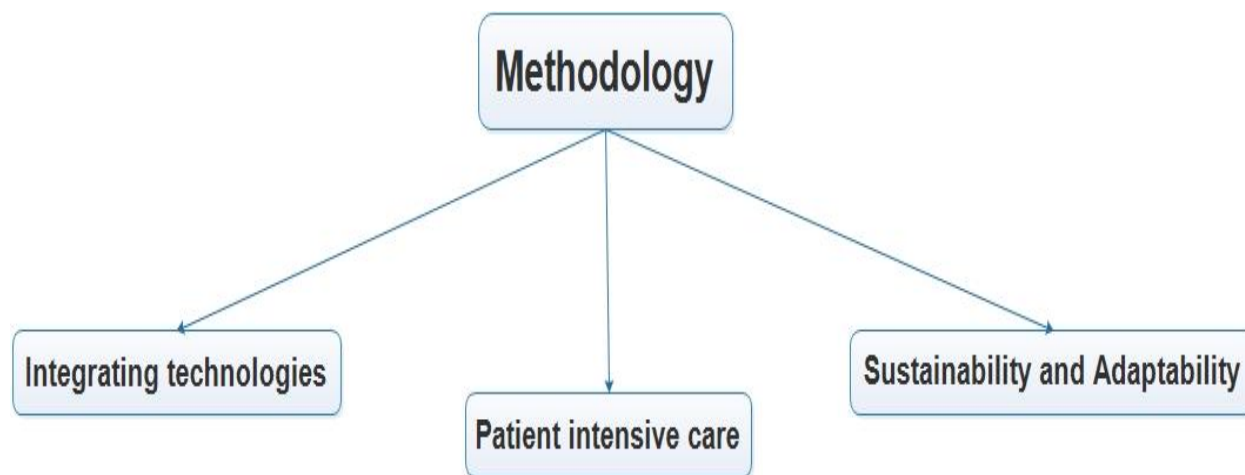


Figure 1: Show the role of AI applications in healthcare

1) Integrating technologies:

Integrating modern technologies enhances better results and increases accuracy and efficiency in these systems. The most important of these modern technological developments are:

- Electronic Health Records (EHRs): Electronic health records facilitate the exchange of patient files and contribute to their organization and coordination, reducing errors.
- Automation and robotic surgery: Robotic surgery helps us improve precision for the best results and reduce risks.
- Data Security and Blockchain: This technology has contributed to storing and sharing patient files, maintaining the integrity of information, and reducing its hacking.

2) Patient intensive care: This care includes serious medical cases, relying on advanced devices, including ventilators, kidney dialysis devices, and others. These devices require specialized personnel to operate them and also require monitoring the patient's condition until the condition stabilizes. Although they are capable of saving patients, at the same time they may cause infection or may be expensive for the patient.

3) Sustainability and Adaptability

Both sustainability and adaptability which emphasize the capability to fulfill present requirements without compromising future resources and the ability to adapt to changing conditions are essential ideas in many different professions. These ideas are related because adaptive techniques can maintain long-term sustainability while also frequently adapting to changing surroundings. Combining the two ideas promotes success and resilience in business, environmental management, and urban planning industries. While balancing adaptation and sustainability is not easy, doing so can lead to prospects for fair development and long-term progress.

1.3 Results and challenges

Summarizes Table 1 the results, challenges, and statistics related to patient intensive care, sustainability, adaptability, and integrating technologies in healthcare:

Category	Result	Challenges	Statistic
1) Integrating technologies	<ul style="list-style-type: none"> ➤ Robotic systems in surgical operations help us improve work and accuracy, which leads to reducing the recovery period. ➤ Reduces errors in patient record management with faster access to data 	<ul style="list-style-type: none"> ➤ One of the problems facing the system is the incompatibility of old devices with newer devices. ➤ Healthcare organizations have budgetary difficulties due to equipment maintenance cost 	<ul style="list-style-type: none"> ➤ By 64% in 2022, a statistic conducted by Deloitte was conducted by integrating artificial intelligence technologies with other technologies[10].
2) Patient intensive care	<ul style="list-style-type: none"> ➤ AI-powered monitoring systems provide patient data for timely intervention ➤ By following advanced patient analyses, we help improve the accuracy of predicting the disease condition. 	<ul style="list-style-type: none"> ➤ Restricting and prohibiting total reliance on technology as it may cause major disasters that threaten the lives of patients. ➤ AI-enhanced devices can be expensive to maintain 	<ul style="list-style-type: none"> ➤ According to statistics conducted by research published in the journal Critical Care Medicine, the mortality rate of patients decreased by 25% through the adoption of artificial intelligence in the intensive care unit [11].
3) Sustainability and Adaptability	<ul style="list-style-type: none"> ➤ Systems AI contributes to more sustainable healthcare practices by optimizing resource allocation. ➤ Use predictive analytics to assist with long-term healthcare planning ➤ AI systems help adapt to suit patient needs 	<ul style="list-style-type: none"> ➤ Due to rapid updates, AI-based systems need continuous development because their solutions may be outdated. ➤ Scaling AI solutions in diverse healthcare settings with differing resources might be challenging. 	<ul style="list-style-type: none"> ➤ By 70% in 2023, of healthcare executives stress the urgent need for AI in the sustainability and adaptability of care systems [12].

1.4 Conclusion

AI always plays an important role in healthcare, as it improves resources, patient care, accurate diagnosis, and others. However, the focus is on managing the challenges of AI in healthcare, including continuous updates, financial management, technological incompatibility, and others. We must do our best in the future to address these challenges and become a powerful revolution for AI in patient care management.

Reference

1. A. Al Kuwaiti *et al.*, "A Review of the Role of Artificial Intelligence in Healthcare," *J. Pers. Med.*, vol. 13, no. 6, 2023, doi: 10.3390/jpm13060951.
2. M. Yousef Shaheen, *Applications of Artificial Intelligence (AI) in healthcare: A review*. 2021. doi: 10.14293/S2199-1006.1.SOR-PPVRY8K.v1.
3. T. Davenport and R. Kalakota, "The potential for artificial intelligence in healthcare," *Futur. Healthc. J.*, vol. 6, no. 2, pp. 94–98, 2019, doi: <https://doi.org/10.7861/futurehosp.6-2-94>.
4. M. V. U. Ramirez, "Advancements in Connected Medical Devices: Assessing Innovations in Remote Monitoring and Diagnosis," *Public Health*, vol. 5, pp. 2–11, 2024.
5. P. Sibanda, I. Fashoro, and B. Scholtz, "Benefits and Challenges of Robotic Process Automation Adoption in Healthcare," in *The 45th Annual Conference of the South African Institute of Computer Scientists and Information Technologists*, p. 36.
6. J. Oyeniya and P. Oluwaseyi, "Emerging Trends in AI-Powered Medical Imaging: Enhancing Diagnostic Accuracy and Treatment Decisions".

7. C. Elendu *et al.*, “Ethical implications of AI and robotics in healthcare: A review,” *Medicine (Baltimore)*, vol. 102, no. 50, p. e36671, 2023.
8. S. Lockey, N. Gillespie, D. Holm, and I. A. Someh, “A review of trust in artificial intelligence: Challenges, vulnerabilities and future directions,” 2021.
9. P. K. Garg, “The future healthcare technologies: a roadmap to society 5.0,” in *Geospatial Data Science in Healthcare for Society 5.0*, Springer, 2022, pp. 305–318.
10. D. Global, “Global Health Care Outlook. Are we finally seeing the long-promised transformation.” Deloitte. <https://www2.deloitte.com/content/dam/Deloitte/global/Documents~...>, 2022.
11. S. M. Pastores, D. Annane, and B. Rochweg, “Guidelines for the diagnosis and management of critical illness-related corticosteroid insufficiency (CIRCI) in critically ill patients (Part II): Society of Critical Care Medicine (SCCM) and European Society of Intensive Care Medicine (ESICM) 2017,” *Intensive Care Med.*, vol. 44, no. 4, pp. 474–477, 2018, doi: 10.1007/s00134-017-4951-5.
12. R. Boudershem, “Shaping the future of AI in healthcare through ethics and governance,” *Humanit. Soc. Sci. Commun.*, vol. 11, no. 1, p. 416, 2024, doi: 10.1057/s41599-024-02894-w.