

Chapter 3

AI–Driven IoT (AlloT) in Healthcare Monitoring

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ABSTRACT

This research provides a thorough yet concise review of the opportunities and challenges for utilizing AI and IoT in the healthcare sector. Also included are an outline of AI and IoT, their applicability, certain observations on recent developments, a look at what the future holds, and difficulties facing healthcare systems. The web of things has several uses in healthcare organizations, from remote monitoring to sophisticated sensors and medical device fusion. In any event, it can help professionals communicate ideas more effectively while keeping patients safe and sound. The internet of things (IoT) for human organisations can also assist in attaining responsibility and satisfaction by promising patients to collaborate further closely with medical professionals.

INTRODUCTION

Due to the current popularity of both Artificial Intelligence(AI) and the Internet of Things(IoT), it is currently normal practice to incorporate these two technologies. Everyone has a stake in the healthcare system, so everyone needs to know how to navigate it. But remembering every little thing is a difficult chore. Humans can only perform at a certain level mentally and physically. As a result, exceeding one's maximum can only be done by technologies like IoT and AI. No matter what industry the technologies are used in, using innovative solutions in healthcare is always a smart idea(Mazin,2022). IoT and AI are also powerful drivers behind the digital revolution. The full digital ecosystem, an IoT ecosystem(Javaid,2021) of connected gadgets, has been built and is getting stronger every day. It includes smart homes, municipal infrastructure, supply chain, retailing, manufacturing, healthcare, education, and life sciences. IoT is utilized to give individuals intelligent help because it is equipped with AI and machine learning, among other things. It is gradually replacing both minor and significant processes in a variety of sectors. There is no exception in healthcare as discussed by Raza(2017).

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IoT and AI reciprocally depend on one another. IoT calls for processing extremely huge quantities of data which must be analysed and set to use.

Therefore, AI procedures may and ought to be employed to improve IoT-related functions in order to give users and/or consumers really meaningful experiences. What type of meaning does AI give the IoT?(Dziak,2017)

IoT, which connects zillions of smarter gadgets, is a nascent technology and as such does have flaws. For instance, there is still room for improvement in terms of IoT data transfer accuracy and speed. Additionally, the AI system learns from what it models itself after in addition to mimicking how humans accomplish jobs. The core of AI is this system of self-improvement. IoT can benefit greatly from AI, to put it generally. To provide intelligence to IoT, it is implemented as AI software that is integrated within IoT gadgets and enhanced by fog or edge computing solutions. Because of the enormous volume of quickly analysed sensor data that smart devices produce, machine learning(ML) explained by Kazi(2023) & Kazi(2022) must be used to increase the intelligence of physical objects.

The emphasis of AI in healthcare could be on disease diagnosis and therapy for the last 50 years as discussed by Pradeepa(2022), Pardeshi (2022) & Waghmare(2022). Primarily rule-based systems are capable of diagnosing and treating disease, but clinical practises could not fully adopt them. They did not pointedly outperform individuals in diagnosis, and there was deprived interoperability with workflows for doctors and medical record systems by Nagare(2014), Nagare(2015) & Kazi(2022). However, integrating medical procedures and EHR systems alongside the application of AI in healthcare by Tadlagi(2022), Kazi(2022) & Vinay(2022) for diagnostic and treatment plans can frequently be difficult, whether it is rules-based or algorithmic. The majority of AI and healthcare features offered by medical software suppliers for clinical trials, diagnosis, and treatment are stand-alone and focus on just one aspect of care. Certain EHR software providers have launched to incorporate fundamental powered by AI (Babitha,2022, & Devi,2022) healthcare analytics features into their range of services. To be able to benefit from the deployment of AI inside healthcare effectively, healthcare providers who utilise solitary EHR systems would likely need to undertake considerable integration efforts themselves or make use of other suppliers who possess AI capabilities that are able to interact with their EHR by Dixit(2014) & Kazi(2022).

It is likely that when AI and IoT are combined in the healthcare industry, operational efficiency will increase. The fundamental processes that enable the intelligent and effective deployment of AI algorithms in IoT devices are tracking (gathering)(Nikita(2020), monitoring (analysing)(Halli, 2022), controlling, optimising (training)(Kazi,2017,2018), and automation (modelling, predicting)(Kazi,2022 & Kazi,2022).

When they operate together, they help lighten the administrative load on clinical staff. Medical staff will be enabled to devote more time to interacting with clients thanks to enhanced clinical workflows, which will inevitably result in a more patient-centric approach to the administration of healthcare services discussed by Pardeshi(2022). Consequently, the following are the primary application cases for AI-enabled IoT shown in Figure 1.

AI has meaningfully altered the way doctors recognise, track and treat, patients in healthcare sector. Medical staff might otherwise miss disease indications and trends, but AI in healthcare's ability to quickly assess enormous quantities of clinical records helps identify them discussed by Wale(2019). AI applications in healthcare extend widely, from projecting outcomes using electronic health records to radiological image analysis for earlier detection. By employing AI in hospital/clinic settings, healthcare systems may grow smarter, quicker, and further effective in treating billions of patients worldwide. AI, which will alter how patients receive high-quality care while lowering expenses for carers and improving health outcomes, seems to be the probable future for healthcare as discussed by Ayala(2014).

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