

Chapter 11

Integrating Machine Learning, Artificial Intelligence, Deep Learning, and IoT in Remote Patient Monitoring

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ABSTRACT

The internet of things (IoT) can effectively manage remote patient healthcare monitoring systems, particularly in predicting chronic kidney disease levels. When IoT devices collect patient data, they transmit this information to a software platform that can be accessed by healthcare professionals or patients themselves. The healthcare industry, one of the largest globally, is experiencing significant changes due to the introduction of IoT. Many healthcare organizations are making substantial

DOI: 10.4018/979-8-3693-7703-1.ch011

investments to transform their services and leverage the advantages of IoT, which has led to the development of the internet of medical things (IoMT), a network of medical sensors and supporting infrastructure. IoMT offers numerous benefits, such as enabling remote healthcare by monitoring patients' health from a distance, providing medical care to elderly individuals, and tracking the health status of large populations to detect and prevent epidemics.

INTRODUCTION

The Internet of Things (IoT) and artificial intelligence (AI) are among the most rapidly advancing technologies globally. Among the most cutting-edge technologies in the world, the IoT and AI are making tremendous strides. The idea of “smart cities” is gaining traction as a response to the exponential growth in urbanization. Through increased efficiency, decreased costs, and an emphasis on better patient care, a smart city hopes to transform healthcare. A solid understanding of the several smart city frameworks is crucial for integrating IoT and AI into RHM systems. Smart city functionality is made possible by these frameworks, which include technology, devices, systems, models, designs, use cases, and applications. Artificial intelligence and machine learning the backbone of monitoring systems built on the Internet of Things for gathering and analysing various records and data sets. Clinical decision support systems rely on ML approaches to help in a variety of healthcare services, and ML methods are essential in building analytical models. Medical practitioners are able to provide patients with more tailored care plans, lifestyle suggestions, and treatment options after evaluating these systems. This technology supports healthcare applications by monitoring key metrics such as body temperature, heart rate, and blood glucose levels. The present paper surveys the most relevant health-related IoT (H-IoT) applications, which are supported by the infrastructure of smart cities. The current work evaluates the technologies and systems involved in RHM services, focusing on the most applicable monitoring tools that utilize different IoT-based sensors. The study contributes to the scientific field by addressing key limitations and suggesting future research directions in this area (Gayathri et al. 2024; Sujith et al. 2022; Palanisamy et al. 2023).

Remote patient monitoring is an increasing field that allows medical professionals to keep track of their patient’s health status outside of traditional clinical settings. To give patients a complete picture of their health, RPM integrates several technologies ranging from artificial intelligence, machine learning, deep learning and several other algorithms of Internet of Things. The purpose of this chapter is to examine how these technologies are included in patient monitoring and how they could affect healthcare. The goal of modern medicine’s development of remote

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