

Machine Learning-Enhanced IoT Applications for Smart Healthcare Monitoring System

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Abstract: In recent years, the healthcare industry has encountered a series of formidable technical challenges. These include the need for real-time monitoring of patient health and an efficient management of Electronic Health Records (EHR) to ensure the security and privacy of healthcare data and the utilization of vast amounts of medical data for informed decision-making. The integration of Internet of Things (IoT) and Machine Learning (ML) in healthcare marks a transformative shift in healthcare management. This chapter discusses the practical implementations of ML-enhanced IoT applications within the context of smart healthcare EHR data management. This chapter also provides a comprehensive exploration of the architectural underpinnings of smart healthcare monitoring systems. It delves into the key components, data flow, and integration aspects on the structural foundations of smart healthcare that enable seamless healthcare data management and analysis. It also discussed how IoT and ML synergize for remote healthcare monitoring, telemedicine, HER data management, and data security. By elucidating the architecture, this chapter equips readers with a fundamental understanding of the infrastructural backbone that supports subsequent ML-enhanced IoT applications. Considering recent healthcare challenges, the significance of this work cannot be overstated, as it equips the healthcare industry with the tools and strategies needed to navigate the evolving landscape of modern healthcare effectively.

Keywords: Machine Learning, Healthcare Management, Medical Big Data, IoT Integration, Anomaly Detection, Real-time Analysis.

1.1 Introduction

The healthcare landscape has encountered formidable challenges that demand innovative and advanced solutions today [1]. As the demand for efficient and effective healthcare services continues to grow, there is a critical need to harness cutting-edge technologies. This chapter delves into the transformative potential of merging Machine Learning (ML) [2] and the Internet of Things (IoT) [3] within the realm of healthcare management. By closely examining the intersection of these two powerful technologies, this exploration aims to unravel the profound impact they can have on reshaping the healthcare landscape. The evolution of healthcare is intricately tied to the ability to address ongoing challenges, and the integration of ML and IoT