

Innovative Healthcare Solutions: Merging IoT, Blockchain, and Generative AI

Shanu Khare¹[0000-0002-7290-9841], Payal Thakur²[0009-0004-7551-8688], and Navjot Singh Talwandi³[0009-0001-8671-3823]

¹ Chandigarh University, Shanu Khare, India shanukhare0@gmail.com

² Chandigarh University, Payal Thakur, India

thakurpayal16@gmail.com

³ Chandigarh University, Navjot Singh Talwandi, India

navjotsingh49900@gmail.com

Abstract. The healthcare sector is experiencing a revolutionary transformation fueled by the integration of Internet of Things (IoT), blockchain technology, and generative Artificial Intelligence (AI). This chapter examines the cutting-edge solutions emerging from the combination of these technologies and their significant impact on healthcare delivery, patient outcomes, and system efficiency. IoT devices, from wearable sensors to smart medical equipment, produce extensive real-time data that can be utilized for continuous patient monitoring, predictive analytics, and tailored treatment plans. Managing and securing this data, however, present substantial challenges. Blockchain technology addresses these issues by providing a decentralized, immutable ledger that ensures data integrity, transparency, and security. Through blockchain, healthcare providers can enable secure data sharing, streamline administrative processes, and boost patient trust with enhanced data ownership and privacy. Generative AI, capable of analyzing and synthesizing large datasets, adds a layer of intelligence to the healthcare system. It can expedite the development of new drugs, create personalized treatment protocols, and significantly reduce the time and cost involved in medical research and development. Additionally, AI-driven diagnostic tools and decision support systems can enhance clinical accuracy and promptness. This chapter explores case studies and practical applications where the integration of IoT, blockchain, and generative AI has led to significant advancements in healthcare. It also addresses the challenges and ethical considerations of deploying these technologies, such as data privacy, algorithmic bias, and the necessity for regulatory frameworks. By investigating the synergistic potential of these technologies, this chapter aims to provide a thorough understanding of how IoT, blockchain, and generative AI can collaboratively pave the way for a more intelligent, secure, and efficient healthcare system.

Keywords: Generative Artificial Intelligence (AI) · Internet of Things (IoT) · blockchain technology · healthcare · data integration · data security · data integrity · IoT devices · healthcare.