

Chapter 6

Performance Evaluation and Metrics in Blockchain Powered AI/ML: Data Analytics for Cognitive Internet of Things (CIoT)

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ABSTRACT

This chapter delves into the performance evaluation of blockchain-integrated Artificial Intelligence (AI) and Machine Learning (ML) in Cognitive Internet of Things (CIoT) systems, focusing on data analytics. We examine metrics for assessing the precision and accuracy of CIoT systems enhanced by blockchain technology. The chapter outlines experimental designs for evaluating these systems, comparing their performance with traditional AI/ML data analytics that do not use blockchain. Benchmarking methods are discussed to measure and contrast the effectiveness of blockchain-enabled data analytics. Through these evaluations, we provide insights into the practical advantages of incorporating blockchain with AI/ML to improve data analytics in CIoT applications.

INTRODUCTION

The marriage of blockchain technology with Artificial Intelligence (AI) and Machine Learning (ML) is going to revolutionize the data analytics landscape at a very fast pace, especially in the domain of the Cognitive Internet of Things (CIoT). The integration of blockchain technology and AI and ML is going to boost the different aspects of data management and processing by complementing the strength of each of these technologies. Blockchain's decentralized and immutable ledger and AI and ML's analytical ability provide a new paradigm to overcome some of the most important issues related to CIoT systems, such as data security, integrity, and efficiency. Blockchain technology, initially developed as the underlying technology for cryptocurrencies, has turned into a multipurpose technology with extensive applications beyond money transaction. It offers a transparent and decentralized way of storing transactions on a distributed network, ensuring data security and integrity through fraud and tampering prevention (Nakamoto, 2008; Tapscott & Tapscott, 2016). In CIoT systems, blockchain improves the security and trust of data through a secure data exchange and management platform, reducing data breaches and unau-

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