


Chapter 12

Machine Learning and Blockchain for 5G–Enabled IIoT

Piyush Pant

 <https://orcid.org/0000-0003-0991-9454>
Sandip University, India

Atour Taghipour

Le Havre Normandie University, France

ABSTRACT

With one of the most potent technologies ever developed in human history, the world is moving toward a new digitalized era. These technological advancements are enabling people to make things that, in the past, were merely the stuff of fairy tales. The model put out by this research incorporates one of the newest and most potent technologies of the decade. This research proposes to integrate the 5G network with the industrial internet of things, which is based on machine learning to develop an intelligent machine capable of mimicking humans. A system of this power is extremely susceptible to issues like hacking, cyberattacks, and other issues. This problem is solved with the blockchain. Since blockchain offers a decentralized approach to maintaining transparency, the research incorporates it into the model to make it more efficient and secure. IoT with blockchain has been the subject of other studies, but this study is an enhanced version that also incorporates industrial IoT with AI to create an intelligent internet of things.

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INTRODUCTION

Older technologies are being replaced by new ones as the human race transitions into a new era. They are incredibly strong and capable of designing systems that could do marvels for people. With the aid of the Internet, everyone on the earth is connected to one another. People are now able to video call from thousands of miles away, making it once-impossible to communicate with someone on the other side of the world. Everywhere, people utilize computers to help them with daily jobs like housecleaning, voice assistants, and many more. This research suggests that such products need robust and trustworthy models, together with solid security and intelligence.

The Industrial Internet of Things, or IIoT, offers Internet of Things with industrial applications, as its name implies. The industry is also undergoing a transformation, and to transition to industry 5.0, which would enable machine and human connection, it needs effective technology. The Internet of Things is widely utilized in regular life and daily tasks, but it becomes the Industrial Internet of Things (IIoT) when we add industrial applications. Machine-to-machine (M2M) communication is more advanced and quick in the IIoT since it deals with large amounts of data that need to be processed quickly.

The IIoT deals with enormous amounts of data, which puts a lot of strain on processors. If the connection or network is weak, how could the machine communicate with another machine? Or it lacks the power to support such a system; the 5G network fixes this. The next generation of networks, or 5G, is not only faster than its predecessors but also more dependable and widespread (Alessandro Massaro, 2022).

In the workplace, manual labor consumes a great deal of time. Because computational work is time-sensitive and every second counts, we need a model that can run commands and queries without constant direction. In order to improve the operation of the industry, this research suggests an AI-based IIoT that doesn't require constant support and can complete the task on its own.

As a system's power grows, more data is involved, adding to its value because "data is everything" (Srivasthav et al. 2021). The system could come into contact with malicious eyes that are searching for gaps to enter and take control of the system. Owners and employees are not usually the most trustworthy parties. How could IIoT be used and deployed in such scenarios? The Blockchain offers a solution to this (Dabboussi and Prinz, 2021). This study recommends blockchain technology to strengthen the system's security and make it more resistant to such attacks.

Machine learning is used in almost every technological domain. Its applications are growing continuously day by day as the algorithm and data improves and increases respectively. Depending on the type of the data, that is labelled or unlabelled, the

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