Chapter 16
Optimization-Based Data Science for an IoT Service Applicable in Smart Cities

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ABSTRACT

There are several research works that are focused on IoT services. IoT services are frequently applicable in smart cities. But there is need to optimize datasets to improve the performance of prediction mechanism during decision making. There have been several studies in area of IoT that have considered role of optimizer for IoT services that are applicable in smart cities. Research work considers PSO technique to get the optimized data set before training operation. The dataset is filtered considering optimization approach. Simulation work is supposed to provide solution in less time with better accuracy.

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1. INTRODUCTION

Smart City projects throughout the globe are being made possible by emerging IoT applications. You can monitor and control your devices from afar and get fresh insights & useful information from large amounts of real-time data thanks to this technology. Sensors, lights, and meters linked to IoT are used to gather and analyze data in smart cities. After this, communities utilize the data to enhance infrastructure, public utilities& other services. All across the globe, towns are being transformed into "smart cities" because to the huge potential of IoT. As a consequence, the city's traffic is more efficiently managed, its pollution is decreased, its energy consumption is lowered, and its residents enjoy higher standards of living (Albrecher et al., 2019).

1.1 IoT

At Procter & Gamble, Kevin Ashton initially used the phrase "IoT in a presentation on the integration of RFID for SCM (Aggarwal et al., 2021). It is imperative that new IoT technologies be used in order to interconnect all connected devices in a network without the involvement of humans. Alternatively, anything may be linked to the internet and used in a new and different manner. Data collection and transmission are both possible tasks for an IoT-connected gadget. As a novel area of research, IoT has gained popularity in recent years, especially in the medical industry. As part of its revolutionary impact on everyday life, IoT is transforming the healthcare industry by fusing both technical and interpersonal elements. As a result of changing economic and social conditions, healthcare systems are being redesigned from the bottom up. In today's healthcare systems, patients are more involved in their own treatment, and their conditions are more easily managed. IoT is gaining prominence in healthcare systems because it improves patient treatment at lower cost and enhances the patient's overall experience. There is a wide range of applications for this technology (Babu et al., 2022).

Internet of things refers to a business model that allows intelligent objects to connect with one another through the Internet of Things. It is possible to integrate digital and physical interactions using a variety of technologies from various applications. All of the components of a smart home come together to make IoT application; which includes sensors, hardware, software and computer platforms. More than simply home appliances are increasingly considered "smart," and not only those with some type of AI. With the help of IoT, we can streamline processes, conduct in-depth analyses, and combine different technologies. This allowed author to think about the whole breadth of these industries. Sensors, networks, and even robots are all necessary components of the IoT. Emergence of IoT may be attributed to a variety of factors, including new developments in software, lower hardware costs, and a willingness to try new things. When it comes to providing goods and services, they have a huge impact. It is crucial to conserve energy, water, and other key natural resources, which are all being depleted at an alarming pace.

IoT: Things, Internet and Human

IoT is outcome of three different factors interacting with each other: things, the internet, and people.

However, IoT has a gradual adoption rate. It was a lengthy procedure in actuality. In the future, it's possible that IoT devices and applications may be enhanced by artificial intelligence (Bansal et al., 2022).