Chapter 23
Recent Trends for Smart Environments With AI and IoT–Based Technologies:
A Comprehensive Review

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ABSTRACT

One of the most fascinating technological components of an ambient intelligence system is its potential to behave independently for the benefit of humans. We used to be able to pinpoint exactly where computers were and how they affected our lives. This has steadily blurred, and now various types of computing devices are all around us, implanted in numerous objects we interact with and thereby influencing our lives. There are signs that this tendency is unstoppable, and that computers and society will now interact in considerably deeper ways than before, to the point where computing will become invisible to people while remaining deeply linked in our daily lives. Looking back on 20 years of educational research, the authors retrieved more than 400 research articles based on the application of artificial intelligence (AI) and internet of things (IoT) techniques in teaching and learning.

INTRODUCTION TO ARTIFICIAL INTELLIGENCE - INTERNET OF THINGS (A-IOT) FOR SMART ENVIRONMENTS

The "Internet of Things" (IoT) is set to revolutionize service delivery in the near future by enabling the creation of smart environments such as smart outdoor monitoring (SOM), smart households, smart transportation and smart cities.(Ahmed et al., 2016) Smart environments will involve a massive deployment of Internet-connected devices, such as wearable computing devices, sensors and actuators, among other things. The usage of public resources would be restricted tremendously as the population of metropolitan areas grows. Smart cities are a possible answer because they enable an intelligent approach and are more efficient to challenges like security, waste management and transportation. As a consequence, smart cities would have a large number of devices in place to help with data, transmission, gathering and analysis. In a nutshell, communication is regarded as the most important aspect of a smart city topology. In this study, we explore how the Internet of Things (IoT) is a capable communication method, and how 5G is a key enabler by providing high integrity, feasible network capacity, high spectrum efficiency, low latency, and competitive bandwidth. The growth of the Internet of Things (IoT) devices that are connected to the Internet is constantly increasing. The complexity and diversity of the Internet of Things (IoT) in terms of ambivalence and dynamism greatly complicates this scenario and adds vulnerabilities. Intelligent IoT management needs to increase Service Quality, minimize energy usage in real time in dynamic environments, and sustain connectivity. Machine learning (ML) is essential for smart application provisioning, quality of service (QoS) and increasing connectivity.

This survey focuses on how machine learning may be used to enhance IoT solutions. We would also go over some of the IoT applications which can leverage machine learning, including smart healthcare, smart cities and smart homes. For every application, one goes through the perks of using machine learning. Further, we will discuss machine learning issues and the potential for future IoT development, and also a report of the current literature which is related to works published earlier. Linked cars, smartphones, unmanned sensors, Unmanned Aerial Vehicles (UAVs, sometimes known as drones), robotics, smart wearable gadgets, and other devices are all part of the IoT infrastructure. There could be a lot of communication traffic with so many distinct IoT devices. As a corollary, IoT requires low latency, ultra reliable, large data rates in high-dynamic and real-time contexts and high Quality of Service (QoS)

For smart city applications, like traffic surveillance, public safety, receiving data from the Internet of Things, disaster management, and giving wireless power supply to IoT-based devices, UAVs, for example, are crucial in maintaining connectivity and delivering services. The Internet of Robotic Things (IoRT) is a novel taken on the Internet of Things. The Internet of Robotic Things (IoRT) is a version update of the Internet of Things (IoT), in which sensor networks are dispersed among robots for teaching robots to conduct various jobs efficiently while receiving data from their surroundings. Also, smart wearables (IoT devices) are diffused in human beings for healthcare tracking and monitoring in smart homes and smart healthcare applications. Within the upcoming revolution of IoT, collection of big data should be done, distributed in real-time to a huge number of IoT devices in dynamic situations, and intelligently assessed for appropriate results and proper decision-making. For conceptualizing and leading IoT devices in a variety of real-time applications and services, an accurate and relevant decision-making criterion is needed. Real-time data necessitates the use of descriptive, adaptive, and predictive analytics techniques. In dynamic environments, the intended action is created by classifying the information and making an informed decision. Intelligent strategies make IoT a worthy paradigm for improving living quality in

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