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A study on artificial intelligence for monitoring smart environments

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Abstract

Wireless networking has made enormous improvements. These developments have brought about new paradigms of wireless networking and communications. Environmental protection has been in recent years a more intelligent and linked system for all facets of a global city. With the rise in data gathering, machine learning (ML) approaches can be used to boost the knowledge and the skill of an application. As the numbers increase and technology develops, the number of available data increases. Smart collection and interpretation of these Big Data is the underground to the rising of smart Internet of Things IoT apps. This study discovers the diverse methods of machine learning that resolve data difficulties in smart cities. The discussion takes place on applications such as air quality, water pollution, radiation pollution, smart buildings, smart transport, etc., which pose genuine environmental challenges. Adequate monitoring is needed to ensure sustainable

growth in the world by safeguarding a healthy society. The potential and challenges in particular the role of machine learning technology for the Internet of Things and Big Data Analytics.

Introduction

Wireless devices can be used for observation structures such as hospitals, roads, transport networks, and power grids as core components. To relay sensor findings of the area, the city officials must be notified by an internet connection [1]. The Internet-connected computing technologies continues to extend the current Internet by offering physically and cyber-growth networking and connectivity. IoT instruments can generate the long data series and with the time inter-relations and other characteristics. Where intelligent knowledge regarding the intelligent city and the internet of things is addressed in Fig. 1.

Analytics, while quite shaded by the high-profile social networking movement and maybe also by the mobile revolution driven by Apple Inc., now featuring smartphones, apps, and tablets, is one of the hot topics in today's technology world (also called big data). The intelligent city utilizes knowledge and communication systems to control communities in an interconnected way. A holistic view of the smart city, where smart grids, smart convergence, smart networking, smart construction, and smart technology are connected.

To better govern the city and increase the quality of living in urban cities, core innovations are sensed and information collected is processed by the application of information technology in the next millennium. To this end, the use of sensors is envisaged in a range of vital urban environments, such as power supplies, sewage and underground networks, oil and gas pipelines, roads, bridges, schools, hospitals, stations and even airports, Social networking, smartphone, and tablet revolutions have changed the existence of a person as never before, but analytics is transforming organizations' lives like never [3].

The abundance of newer types of data generated by all sorts of platforms and devices makes it possible for organizations to leverage information for practical insights. A Business intelligence (BI) with a data warehouse as a critical central component is a trend that has gradually taken hold. Activities such as data integration, data quality, and purification, job scheduling and data planning, multiple types of reporting and analytical objects, professionals, delivery and management teams, and consumers involved in receiving value from a data warehouse were all included in the BI [4].

BI as an enterprise has evolved and been well-structured with associated procedures, methodologies, preparation, and certification, and is now an integral part of IT in both large

public and private organizations. Differentiating between BI in which reporting and data warehousing are combined and analytics in which database mining, statistics, and visualization are used to obtain insights into potential possibilities is essential. There would be a detrimental tendency to substitute BI with analytics as an umbrella word to apply to something relevant to data [5]. A comprehensive step-by-step guide to constructing analytics solutions will be generated by the information discussed in this book and it will use BI as a base. Therefore, holding the two definitions distinct and the two terms complementary is essential.

The study is divided by the applications for which SEM methods are used and the sensor used and the classification methods used to further test each function. Each feature. Due to the results of the discussion and study developments, in systemic analysis, the comprehensive report offers extensive suggestions and consequences in SEE science [6].

In these situations, a critical review of important contributions and SEM scientific studies related to air quality, water quality, irradiation contamination, and the monitoring of agricultural systems is intended in the present manuscript. New possibilities for comfort, protection, and productivity for the residents can be provided to potential buildings. Changes in the way deal with people's lives and information transmission are thoroughly embedded into their day-to-day practices and objects [7].

The new wave of buildings would promise a safe and enjoyable atmosphere. The knowledge generated and gathered by the smart building sensors provide useful information that can assist potential choices. In the end, deep education and robust data analysis would play an important role in ensuring that intelligent resources are provided. The survey also discusses in this article emerging patterns and issues influencing the development of smart building services [8].

For example, 5G is being researched to provide the academic community with mobile internet communications through mobile networks. The principle of IoT, one of the key elements of 5G wireless networks, has been suggested recently to connect every machine to the Internet, for example, wireless sensor nodes, household computers, etc. As these technologies are growing, they are posing numerous real-world challenges [9].

The powerful and insightful control of cities is one of the most relevant applications. The intelligent town is a vision that removes data from the town's framework to monitor it. This vision can be achieved by incorporating information and networking capabilities into the frameworks for observation and control. This fact improves the usage of the IoT (Internet of Things) as more resources are linked to the Internet through the city [10].

Finally, a standard for machine learning techniques, denotation processes, and the development of acceptable specifications for wireless sensor networks has been proposed (WSNs). The smart building environment. In this post, smart transport is the integrated system for road optimization, parking, street lighting, prevention/detection of incidents, traffic irregularities, and service delivery. Many specialists in the intelligent transport field have been fascinated by ML and IoT approaches. The purpose of this paper is to undertake an independent analysis of ML and IoT techniques to have a clearer understanding of field dynamics and to consider future coverage needs. Crowdsourcing and wireless sensor networks tend to be the most popular solutions for researchers. Innovative technologies enable atmospheric administration to have a smart monitoring system.

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Section snippets

Literature review

Mohammad Saeid et al [1] introduced several methods of computer education that tackled considering IoT technologies in potential smart cities. This analysis of data is the most substantial contribution and this analysis of data describes how various methods are used to retrieve higher-level data. It would consider machine learning knowledge and Internet of Things (IoT) data mining problems. Further research will be performed on a case-by-case basis with Aarhus Smart City data from the Support

Smart cities with IoT sensors

Communities need reliable plans and infrastructure. The concept of intelligent cities is very relevant both in education and business. When it comes to overpopulated towns, people are looking for innovative strategies to overcome overcrowding. Internet of Things serves the task of collecting the info. With modern smart grids, cities may plan for proven or likely unknown issues.

Fig. 2. In this condition, human activity is more streamlined and technologically improved, allowing for an eventual

Inference from the review work

In recent years, a broad variety of industrial IoT technologies have been developed and implemented. The Internet of Things (IoT) is an interesting modern trend in technology, maybe the most exciting phenomenon occurring in the world right now. These individual sensors form a network called wireless sensor networks (WSNs) that analyses physical environments and transmits captured data back to base station. WSN may be used to compile facts and disclosure data regarding a specific application the

Conclusion and future work

IoT consists of a collection of processors linked to a set of data transfer networks. Smart City is one of the most prominent IoT developments in fields such as energy, networking, and economic development, and provides a broad variety of services. These programmers can be improved and streamlined by evaluating the intelligent data obtained from these websites. This research provides a comprehensive and relevant overview of reports on a broad variety of environmental management mechanisms

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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References (20)

I. Yaqoob

[Internet of things forensics: Recent advances, taxonomy, requirements, and open challenges](#)

Future Generation Computer Systems (2019)

A. Pathak *et al.*

[IoT based smart system to support agricultural parameters: A case study](#)

Procedia Comput. Sci. (2019)

Mahdavinejad, Mohammad & Rezvan, Mohammadreza & Barekatain, Mohammadamin & Adibi, Peyman & Barnaghi, Payam & Sheth,...

S.L. Ullo *et al.*

advances in smart environment monitoring systems using IoT and sensors

Sensors (2020)

B. Qolomany

Leveraging machine learning and big data for smart buildings: A comprehensive survey

IEEE Access (2019)

Desarkar, Anindita, and Ajanta Das. "Big-Data Analytics, Machine Learning Algorithms and Scalable/Parallel/Distributed...

W.C. Tam *et al.*

Generating Synthetic Sensor Data to Facilitate Machine Learning Paradigm for Prediction of Building Fire Hazard

Suppression, Detection and Signaling Research and Applications Symposium (2019 (2019) SUPDET)

E. Adi

Machine learning and data analytics for the IoT

Neural Computing and Applications (2020)

T. Yigitcanlar

Contributions and risks of artificial intelligence (AI) in building smarter cities: Insights from a systematic review of the literature

Energies (2020)

A. Sheth

Transforming big data into smart data: Deriving value via harnessing volume, variety, and velocity using semantic techniques and technologies

in: Data Engineering (ICDE), 2014 IEEE 30th International Conference on(2014)

There are more references available in the full text version of this article.

Cited by (3)

Optimisation of the adaptive neuro-fuzzy inference system for adjusting low-cost sensors PM concentrations

2024, Ecological Informatics

[Show abstract](#) 

Smart City Optimization through Machine Learning for Enhancing Urban Efficiency and Sustainability

2024, Nanotechnology Perceptions

Artificial Intelligence in Smart City Applications: An overview

2022, Proceedings - 2022 6th International Conference on Intelligent Computing and Control Systems, ICICCS 2022

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