Development of Community Based Intelligent Modules Using IoT to Make Cities Smarter

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ABSTRACT

The purpose of the smart cities mission is to drive economic growth and improve the quality of life of people by empowering local area development and harnessing technology. All the information gathered is placed across the cloud so that any person of the city can get the information within no time. This helps the citizens to be smart by preserving their precious time and also being healthy. This article mainly discusses about the urban mobility solutions such as traffic management, smart parking, garbage monitoring system and air pollution monitoring system.

KEYWORDS

Garbage Collecting Vehicles, MQ 135 Sensor, Smart Cities Mission, Smart Parking System, Ultrasonic Sensor

1. INTRODUCTION

The Internet of Things (IoT) is a system consisting of sensors, actuators, and smart objects whose main purpose is to interconnect all things every day and industrial objects in such a way as to make them intelligent, programmable, and capable of interacting with humans and each other. IoT enables many new services and new applications such as smart grids, smart homes/buildings/offices/factories and easy way of transportation which helps to the development the smart city. It refers to the solutions for urban requirements such as sanitation, water supply and electric supply. Smart cities are the future reality for municipalities around the world. These cities will be developed with the help of communication networks, highly distributed wireless sensor technology, and intelligent management systems so that it can solve the current and future challenges and create exciting new services.

A smart city is an urban development vision to integrate various data and communication technology. Smart city can also be called as digital city or connected city. Smart city connects the citizens to government and encourage more interaction, participation and the joint effort. Smart cities gives solutions that are financially and environmentally supportable.

The rate of migration from rural to urban areas is increasing over the world day by day. Around 2050, 70% of the population will be living in cities. The cities have dominated economy, government and culture, since ancient times. In addition, they have always tried to be “smart.” So, there is an emerging need for the cities to get smarter in India so that it can tackle the issues related with the large-scale urbanization.

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The smart cities mission of the government is a bold and new initiative. It is meant to set examples that can be replicated both within and outside the smart city. It helps to drive economic growth and improve the quality of life of people by enabling local development and harnessing technology as a means to create smart outcomes for citizens (Chourabi et al., 2012).

In the existing system, there are many problems facing by the common people in the daily-life. Some of the problems are:

- The traffic jam is the main problem in almost all cities in world. The present system of traffic signals are provided with a fixed plan, where the signals are changed according to the interval provided for the particular signal (Wang, & He, 2011);
- There are many potholes on the road which makes it very difficult to travel (Rao, 2017);
- Garbage thrown even after filling the bin. Because of this overflow in bins the unwanted toxic gases are getting released. Because of this the people are suffering from many diseases (Folianto, Low, & Yeow, 2015);
- Waiting near the parking systems to find out the empty slot. Finding a parking space in most of the metropolitan areas, especially during the rush hours, is a very difficult task for the people;
- Due to the poor control on emissions, a great amount of toxic gases are produced which causes air pollution (Xiaojun, Xianpeng, & Peng, 2015).

2. RELATED WORKS

Internet of Things (IoT) provides variety of services in order to improve everyday life. Through this new technology, other recently developed technologies such as Big Data, Cloud Computing, and Monitoring could take part. Here, the survey of four aforementioned technologies are discussed to find out the common operations, and combine their functionality, in order to have beneficial scenarios of their use. In spite the idea of a smart city, the investigation is done on collecting and managing sensors data in a smart building which operates in IoT environment. As a bases technology for the proposed sensor management system, a cloud server would be used, collecting the data that produced from each sensor in the smart building. These data are easy to be managed and controlled from distance, by a remote (mobile) device operating on a network set up in IoT technology. Subsequently, the proposed answers for gathering and dealing with sensors information in a smart building could lead us to the energy efficient smart building, and thus in a Green smart Building (Zanella et al., 2014)

The Internet of Things (IoT) can incorporate distinctive types of heterogeneous end frameworks, by additionally giving open access to the selected subsets of information. Building a general architecture for the IoT is consequently a complex task, mostly due to the many number of devices, link layer technologies, and administrations that might be included in a framework. Urban IoT’s, in fact are designed to support the Smart city vision which aims at exploiting the most progressive advances to support the services for the administrations and the organization of the city and for the natives. Hence many technologies, architectures and protocols of urban IoT are utilized for the improvement of a Padova smart city.

Finding a parking space in most of the metropolitan areas, especially during the rush hours, is very difficult task for the drivers. The difficulty arises from not knowing where the available spaces may be at that time; even if known, many vehicles may pursue very limited parking spaces to cause serious traffic congestion. So to overcome from this problem, the design of Reservation-based Smart Parking System (RSPS) is implemented. This RSPS allows drivers to effectively find and reserve the vacant parking spaces, by periodically learning the parking status from the sensor networks deployed in parking lots. The reservation service is affected by the change of physical parking status. The drivers are allowed to access this cyber-physical system with their personal communication devices. By using this RSPS system, any-one can easily park the system in no-time.
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