

IOT Based City Monitoring System

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Abstract- With the expansion of Internet of Things (IoT), each smart city is equipped with various kinds of electronics devices. Therefore, equipment and technologies enable us to be smarter and make various aspects of smart cities more accessible and applicable. The goal of the current paper is to provide an inclusive concept of the smart city besides their different applications, benefits, and advantages. In addition, most of the possible applications of IoT technologies are introduced, and their capabilities to merge into and apply to the different parts of smart cities are discussed. The potential application of smart cities with respect to technology development in the future provides another valuable discussion in this paper.

Keywords- Internet of Things (IOT); smart city.

I. INTRODUCTION

inside urban environments, substructures and services have been needed to supply the requirements of the citizens. Accordingly, there has been a remarkable growth of digital devices, such as sensors, actuators, smartphones and smart appliances which drive to vast commercial objectives of the Internet of Things (IoT), because it is possible to interconnect all devices and create communications between them through the Internet. In the past, it was difficult or even impossible to combine these digital devices. Likewise, gathering their information for day-to-day management of activities and long-term development planning in the city is essential. For example, some public transport information, e.g., occupancy of parking spaces, smart wastage disposal and smart water management and smart public garden. To this end, different technologies have been applied to address the specific features of each application. The required technologies cover a wide range and layer from the physical level to the data and application layers. The IOT consists of three layers, including the perception layer, the network layer, and the application layer, as shown in Figure.

Perception layer: Wireless Sensors

Network layer: Bluetooth and WiFi

Application layer : Smart city

The perception layer includes a group of Internet-enabled devices that are able to perceive, detect objects, gather information, and exchange information with other devices through the Internet communication networks. Forwarding data from the perception layer to the application layer under the constraints of devices' capabilities, network limitation and the applications' constraints is the task of the network layer. IoT systems use a combination of short range network communication technologies such as Bluetooth and internet technologies such as WiFi to carry the information over long distances based on the application. Since applications aim to create smart cities, the last layer which is the application layer, is where the information is received and processed.

II. LITERATURE REVIEW

[1] Renuka R. and S. Dhanalakshmi, Android Based Smart Parking System Using Slot Allocation & Reservation ARPN Journal of Engineering and Applied Sciences, VOL. 10, NO. 7, (April, 2015) this article provides an overview of smart parking system. Among the challenges that we face in our day to day life one of most unavoidable challenge is parking the car wherever we go. As our need increases our travelling increases but due to drastic increase in usage of vehicles and increase in population we face the tough task of parking our car particularly during busiest hours of the day. During peak hours most of the reserved parking area gets full and this leaves the user to search for their parking among other parking area which creates more traffic and leaves them with no indication on availability of parking space. To overcome this problem there is definitely a need for designed parking in commercial environment. To design such parking slot we need to take into the account of reservation of parking slot with optimal parking space which depends on cost and time. Cost function should also combine with the parking cost and

proximity to the destination. However here we have designed the time driven sequence method which solves the problem of parking using slot allocation method. This paper proposes an android application, which we have used to implement a prototype of Smart Parking System based on Reservation (SPSR) that allows drivers to effectively find and reserve the vacant parking spaces with the help of IoT (Internet of Things) with slot allocation method and to perform automatic billing process.

[2] Mr. Basavaraju S R, Automatic Smart Parking System using Internet of Things (IOT), International Journal of Scientific and Research Publications, Volume 5, Issue 12 (December, 2015) this paper is aim to provide objectives of smart parking system. Internet of Things (IOT) plays a vital role in connecting the surrounding environmental things to the network and made easy to access those un-internet things from any remote location. It's inevitable for the people to update with the growing technology. And generally people are facing problems on parking vehicles in parking slots in a city. In this study we have designed a Smart Parking System (SPS) which enables the user to find the nearest parking area and gives availability of parking slots in that respective parking area. And it mainly focus on reducing the time in finding the parking lots and also it avoids the unnecessary travelling through filled parking lots in a parking area. Thus it reduces the fuel consumption which in turn reduces carbon footprints in an atmosphere.

[3] Ahteshamul huq osmani, Ashwini Gawade, Minal Nikam, Swati Wavare Under the guidance of prof. Kalpana Kadam, Research paper on Smart City Parking System, Vol-2 Issue-3 (2016). The authors have discussed about how to manage a parking system using IoT. Parking in the city has been a major problem these days. An efficient way to manage the parking system is using Internet Of Things (IOT). Traditional parking system commonly uses security ultrasonic sensors, camera or infrared ray sensors to manage the parking areas. However, these systems are not only expensive but time consuming. So it is necessary to have a smart parking system. So in this system have used RFID tag to each of the car and also assigned a sensor to each parking slot. Using an android application user will able to see the available parking slot so that it will require less time than previous system. Also we provide information to the user about nearest places that is hospitals, hotels, school etc. So to implement this idea we have used sensors and RFID.— Smart city parking, sensors, RFID, Internet Of Things (IOT).

[4] Mohit Patil , Rahul Sakore, Smart Parking System Based On Reservation, International Journal of Scientific Engineering and Research (IJSER) www.ijser.in ISSN

(Online): 2347-3878 Volume 2 Issue 6 (June 2014) this article is related to the parking system based on reservation. With the increase of economic behavior and the upgrade of living standard, the ratio of people in India who own automobiles and motorcycles have recently increased giving a boost to Metropolitan Traffic. Therefore, parking issues will be a big challenge to facilitate traffic network and ensure urban life quality. Searching for parking space in most metropolitan areas, especially during the rush hours, is difficult for 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. In this paper, we have designed and implemented a prototype of Smart Parking System based on Reservation (SPSR) that allows drivers to effectively find and reserve the vacant parking spaces. By periodically learning the parking status from the host parking database management 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. Furthermore, we have studied state-of-the-art parking policies in smart parking systems and compared their performance. The experiment results shown that the proposed reservation-based parking policy has the potential to simplify the operations of parking systems, as well as alleviated traffic congestion caused by parking searching.

[5] Narayan Sharma, Nirman Singha, Tanmoy Dutta, Smart Bin Implementation for Smart Cities, International Journal of Scientific & Engineering Research, Volume 6, Issue 9, (September-2015) the authors discussed about implementation of smart dustbin. In past few decades there is a rapid growth in the rate of urbanization and thus there is a need of sustainable urban development plans. Now using new age technology and strategic approach, the concept of smart cities is coming up all around the world. A smart city is incomplete without a smart waste management system. This paper describes the application of our model of "Smart Bin" in managing the waste collection system of an entire city. The network of sensors enabled smart bins connected through the cellular network generates a large amount of data, which is further analyzed and visualized at real time to gain insights about the status of waste around the city. This paper also aims at encouraging further research in the topic of waste management.

Many times, in our city we see that the garbage bins or dustbins placed at public places are overloaded. It creates unhygienic conditions for people as well as ugliness to that place leaving bad smell. To avoid all such situations we have implemented a project called IoT Based Smart Garbage and Waste Collection bins.

[6]1.S.S.Navghane,2.M.S.Killedar,3.Dr.V.M.Rohokale, IoT Based Smart Garbage and Waste Collection Bin, International Journal of Advanced Research in Electronics and Communication Engineering (IJARECE) Volume 5, Issue 5, (May 2015) aim of this project is to reduce human resources and efforts. These dustbins are interfaced with microcontroller based system having IR wireless systems along with central system showing current status of garbage, on mobile web browser with html page by Wi-Fi. Hence the status will be updated on to the html page. Major part of our project depends upon the working of the Wi-Fi module; essential for its implementation. The main aim of this project was to reduce human resources and efforts along with the enhancement of a smart city vision.

[7]Roshni Jose, Rebecca Wade and Chris Jefferies, “ Smart SUDS: recognising the multiple-benefit potential of sustainable surface water management systems”, IWA Publishing 2015, article is published in Water Science & Technology 71(2): pp.245-251, aim to discussed about water management system. How can we make sustainable urban drainage systems (SUDS) smart? SUDS help us to manage surface water runoff from urban environments but they are capable of delivering much more. This paper looks beyond the water quantity and quality improvement functions of SUDS and investigates the multiple benefits that can be gained by implementing smart SUDS solutions. This work provides a new perspective, using methodologies not normally associated with SUDS research, to determine multiple benefits. The outputs of the work can potentially assist decisionmakers, designerand plannersin recognising the potential for multiple benefitsthat can be delivered by SUDS. The ecosystem services (ES) associated with a large redevelopment in Dundee, Scotland, UK, are identified and a public perception study together with public participatory geographical information system (PPGIS) methods was used to confirm the goods and benefits of the SUDS. The paper presents findings on the public perception of SUDS as they provide cultural benefits such as recreation, aesthetics and biodiversity. The results show that greenspace is important when choosing a location, and willingness to pay for greenspace is high in this area. This paper concludes that SUDS provide multi-functional benefits in relation to the ES, thereby justifying the cachet of being termed Smart SUDS.

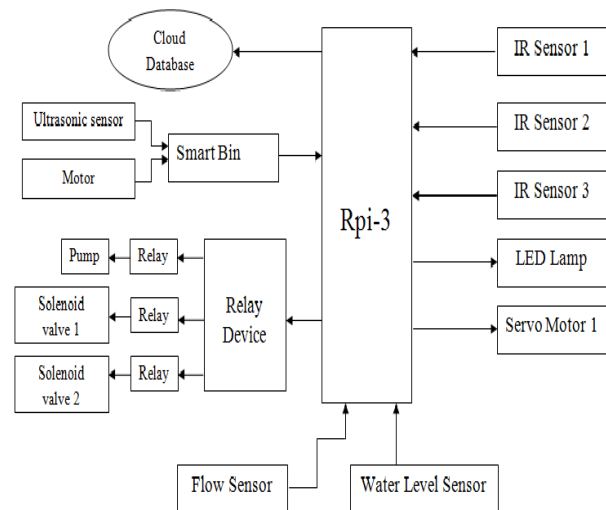
[8]R. Priya, G.P. Rameshkumar, A Novel Method to Smart City’s Water Management System With Sensor Devices and Arduino, International Journal of Computational Intelligence Research ISSN 0973-1873 Volume 13, Number 10 (2017), pp. 2391-2406 is aim to study water management based on IoT. Smart city is an upcoming era, there are many houses in which high and middle class people can have facilities

according to their comfort. Based on the people population, season, etc, the usage of water is varying. So, water supply management is very much needed and it should be maintained properly. In existing method, corporation may not know how much water is used and the wastage. To avoid the wastage of the water, the proposed system has been developed for water supply management with sensor devices.

III. PROBLEM DEFINITION

To bring the efficiency in management of day to day life in urban areas various issues like time required, occurrence of error, man power, degraded quality of work, economical losses, etc should be reduce. In order to overcome this problems concept of smart city has been introduce.

BLOCK DIAGRAM:



COMPONENT:

Raspberry-pi:

Raspberry Pi is an ARM based credit card sized SBC (Single Board Computer)

Flow Sensor:

A flow sensor is a device for sensing the rate of fluid flow. Typically a flow sensor is the sensing element used in a flow meter, or flow logger, to record the flow of fluids. As is true for all sensors, absolute accuracy of a measurement requires functionality for calibration. There are various kinds of flow sensors and flow meters, including some that have a vane that is pushed by the fluid, and can drive a rotary potentiometer, or similar devices.

IR Sensor:

An infrared sensor circuit is one of the basic and popular sensor module in an electronic device. This sensor is analogous to human's visionary senses, which can be used to detect obstacles and it is one of the common applications in real time.

Solenoid valve:

A solenoid is a simple electromagnetic device that converts electrical energy directly into linear mechanical motion, but it has a very short stroke (length of movement), which limits its applications.

- Solenoid converts electrical energy to mechanical energy and this energy is used to operate a mechanical valve that is to open, close or to adjust in a position.
- Ultrasonic sensor: Ultrasonic sensors or ultrasonic transducers are a type of acoustic sensors divided into three broad categories: transmitters, receivers and transceivers. Transmitter converts electrical signals into ultrasounds, receivers convert ultrasound into electrical signals and transceivers can both transmit and receive ultrasound.
- Relay: A relay is an electrically operated switch. Relays are used where it is necessary to control a circuit by a separate low power signals, or where several circuits must be controlled by one signal. Relays were used extensively in telephone exchanges and early computers to perform logical operations.
- Servo motor: A servo motor is a rotatory actuator or linear actuator that allows for precise control of angular or linear position, velocity and acceleration. It consists of suitable motor coupled to a sensor for position feedback. It also requires a relatively sophisticated controller, often a dedicated module designed specifically for use with servo motor.

IV. METHODOLOGY

First of all we made the model of individual aspects of the whole smart city. Initially we started with the smart parking system. Model was prepared with three slots and IR sensors were placed at the centre of each slot. IR sensor was interfaced with raspberry pi. LEDs were placed at the top of each slot to indicate whether the slot is full or available. We also prepared a webpage to indicate the availability of slots.

In case of smart water management, we have used a central tank for distribution of water over the water bodies. In order to distribute the water in different locality, we have used

a solenoid valve as a switch. Along with the solenoid valve a flow sensor is also used to measure the supply of water in the tank. In this case solenoid valve is accessed by user whenever he is in need of water through webpage. After that water flow sensor measure the flow of water from solenoid valve to respective tank. Once the amount of water measured by flow sensor is equal to specified amount of water it will send signal to raspberry pi and through this solenoid valve will be off.

In smart waste management bin we have used a readymade dustbin. Along with that we have used an ultrasonic sensor, IR sensor and a servo motor. Ultrasonic sensor is used to measure the level of waste in the dustbin. While IR sensor used to sense the presence of human body who wish to use the dustbin. Once the dustbin is full, location and dustbin number will be sent to the municipal office.

V. CONCLUSION

We have implemented this project and we have been able to reduce various issues which interfere in day to day life of urban areas. Smart water management system efficiently manages the water supply, smart parking system helps to reduce chaos due to improper parking of vehicles, due to the smart irrigation man efforts and time has reduced to greater extent which results in less efforts and good maintenance of public garden,.

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