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Efficient Energy Management and Communication Technique in Smart Cities using Internet of Things

Reshma.C.Saira[#1], R.Sankar[#2]

[1]*Scholar, Master of Computer Application, S.A Engineering College, Chennai , India*
reshmacharly01@gmail.com
[2]*Assistant Professor, Department of Computer Application, S.A Engineering College, Chennai, India*

Abstract — Nowadays, Internet of things becomes wider to make efficient energy. Internet is the backbone of internet of things. In this paper, we discuss how to use energy management and communication technologies in smart cities using Internet of Things (IoT). Energy management includes planning, operation and consumption of energy units. The objectives of this paper are conservation, climate protection and cost saving; while the user has permanent access to energy. Efficient communication technologies in smart cities are monitoring the liveability and infrastructure of the city to keep it suitable for the standard quality of the life. Moreover, this method describes the Internet of Things technologies for the smart cities. This paper discusses the value of smart city which will increase the energy management and communication. In this method, we present an overview of energy management and challenges in the smart cites as well as communication.

Keywords — *Energy Management; Communication; Internet of Things*

1. Introduction

In smart cities, there are many things that have been developing faster and faster. There are many technologies and devices which uses Internet of things (IoT) in smart cities. One of the device- used in this paper is the sensor device. Sensor devices are used in many things like mobile, car, microwaves and etc. Here, we are using Garbage collection with sensor devices. Energy should be managed properly because, it should reach to everyone. The communication between garbage bin and garbage truck should be connected properly. So things will be faster and easier. We can make the city neat and clean by using this. This device will be easier and more useful for the things to develop the smart city. Energy management is to save the energy and to improve the quality of the product. In this garbage collection technology, sensor device will monitor, control and conserve energy [1][2].

2. Existing System

A smart city is having an urban development vision to combine both information and communication technology with IoT. It has been spread all over the world like Schools, Colleges, Libraries, Hospitals, Transportation Systems, Power plants, water supply networks and etc. The main aim of this energy management is to build a smart city and to improve the high quality system [3][4][5]. Internet of things (IoT) is the internetworking of physical devices which connects smart devices. It also include some of the building and other items embedded with electronics, software, sensor, actuator and network connectivity that enable these object to collect and exchange data.

2.1 Disadvantages

- It need more time to process.
- Cost is more.
- The process is slow.

3. Proposed System

Nowadays, every things becoming smart based on the Internet of Things. Here one of the technologies is used based on IoT (i.e.,) using sensor device to produce good result. In our cities there are many garbage loaded fully but cleaning all the garbage are not possible. In past days we use tri-cycle to carry out the garbage. Using the new technology IoT we introduce sensor device which is connected with the garbage and the truck. When the garbage is full the sensor device will detect and indicates the truck about the current location of the garbage. To speed up the process here we use mesh topology.

3.1 Advantages

- There will be no energy management constraints.
- Energy management and communication will be efficient.
- Time management and easy to use.
- It will speed up the process.

4. Methodology

Garbage Collection using sensor device is very innovative to make our cities neat and clean. Sensor device using in this method is ultrasonic sensor device. Sensor

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device will measure the distance of an object by using sound wave. Ultrasonic device is used to detect by the sound waves (figure 1). This ultrasonic sensor placed over the bin to detect the level of the waste in the garbage bins and also compare it with the garbage bin depth and so easily detect where the garbage level is.

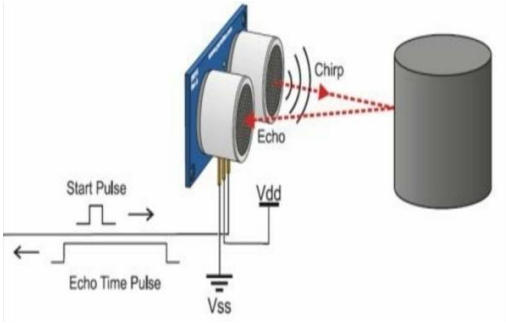

Fig.1: sound waves detection

This will monitor the garbage bin and inform about the level of the garbage collected in the bins. It is an efficient system to automate the cleanliness drive for the city because, automatic garbage reporting and cleaning is done. This method also saves fuel of garbage collection vehicle because, they don't have to go and see which one is filled and which one is not filled. Device used in this system are AVR microcontroller (figure 2), WIFI modem, LCD display, ultrasonic sensor (figure 3), Resistors, capacitor, diodes and transformer. Here the LCD screen is used to display the status level of garbage collection in the bins which shows the garbage level. Microcontroller internally connected to LCD display and also WIFI modem for internet connection. Microcontroller used to process comment send by the sensor.

Fig.2: AVR Microcontroller

Fig.3: Ultrasonic sensors

5. Implementation

Here the Ultrasonic sensor device and LCD screen is placed over the garbage bin to detect the waste level (figure 4). LCD screen is to display the amount of waste in the garbage.

Fig.4: Ultrasonic sensor device placed over the bin

Fig.5: Measuring the Waste in Garbage

Ultrasonic sensor device will detect and measure the waste in the garbage (figure 5). Direct current (DC) voltage such as from a battery or DC power supply will not work in a transformer. Only Alternating Current (AC) makes a transformer works. The magnetic field flows through the iron core. A rectifier is an electrical device that converts the Alternating current (AC), periodically reverses direction, to Direct current (DC), which flows in only one direction. The process is known as rectification. Regulator is a device for controlling the level or amount of something such as speed or temperature. It sends the message to the cleaner authority via Global System for mobile (GSM) modem. Then display status of dustbin on Personal Computer (PC) with Graphical User Interface (GUI) and it will repeat this process. So the application of IoT is needed here. When the garbage is filled then the sensor device will indicate a signal (figure 6) and the garbage collector will collect the garbage. This process will be continued again and again.

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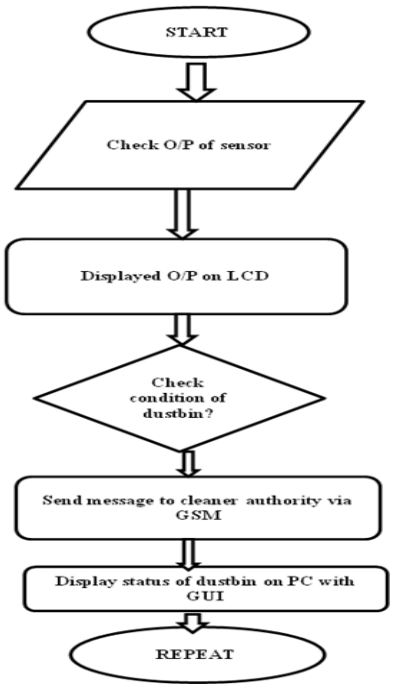
Fig.6: Signal Indication

5. Flow Chart

The entire process flow of this mothod is shown in the following flow chart.



6. Conclusion

This garbage collection will help us to making the country neat and clean. So we can reduce the disease that are mostly spread by this garbage waste. Cleanliness will improve the country to developed and make the country proud. Garbage collection truck needn't go and search where the garbage is filled or not filled because of this we can reduce the use of fuel and also we can save the fuel. By using this sensor device, we can easily identify where the garbage is filled. At the same time energy management and the communication will increase this will improve the quality of service.

Reference

[1] Ruba A. Amarin, IssaBatarseh, Steve Rhoades Petra System., "Efficient Energy Solutions, Enabling Smart City Deployment.", Proceedings of Future Technologies Conference, 6-7 December 2016, San Francisco, CA, USA

[2] H. Arasteh, V. Hosseinnezhad, V. Loia, A. Tommasetti, O. Troisi, M. Shafie-Khah, P. Siano., "Iot – Based Smart Cities: a Survey. 2016 IEEE 16th International Conference on Environment and Electrical Engineering, 7-10 June 2016, Florence, Italy

[3] WaleedEjaz, MuhammedNaeem, Adnan Shahid, AlaganAnpalagan, and Minho Jo., "Efficient Energy Management for the Internet of Things in Smart Cities," IEEE Communication Magazine, January 2017.

[4] SamanehIgder, Samya Bhattacharya,Jaafar M. H. Elmirghani., "Energy Efficient Fog Servers for Internet of Things Information Piece Delivery (IoTIPD) in a Smart City Vehicular Environment., 2016 10th International Conference on Next Generation Mobile Application, Security and Technologies, http://eprints.whiterose.ac.uk/106927.

[5] IbrarYaqoob, Ibrahim AbakerTargioHashem, YasirMehmood, Abdullah Gani, SalimahMokhtar, and SghaierGuizani., "Enabling communication Technologies for Smart Cities"., IEEE Communication Magazine, January 2017.