

IOT BASED GARBAGE MANAGEMENT (MONITOR AND ACKNOWLEDGEMENT) SYSTEM

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Abstract: Solid waste management is one of the primary problems that India faces irrespective of the case of developed or under development states. It is seen that most of the garbage across the roadside is overloaded because the waste is not collected periodically. It creates an unhygienic condition for the people and creates bad odor around the surroundings. This leads in spreading some deadly diseases and human illness. This paper reviews systems for garbage management and proposes a system which will take care of proper processing of garbage. The reviewed systems use ultrasonic sensors for detecting the level of waste, Servo Motor, NodeMCU, LM35 for temperature sensor.

Keywords: Disease, Garbage management, Ultrasonic sensor, Node MCU

INTRODUCTION

The environment should be clean and hygienic for better life leads in India. In the present scenario, many times it is seen that the garbage bins or dust bins are placed at public places in the cities are overflowing due to increasing the waste every day. These overflowed garbage bins can create an obnoxious smell and make an unhygienic environment. This leads to the rapid growth of bacteria and viruses which can cause different types of diseases. The proposed system shall overcome such problems by alerting the status of garbage bins as well as helps to monitor the temperature of the garbage to avoid the high fame generation. By intimating the notification of garbage filled, the number of trips of the garbage collecting vehicle shall be also reduced. The IOT based garbage monitoring system is an idea where we can control lots of problems which distribute the society in pollution and diseases. The system has to be done instantly else it leads to irregular management which will have adverse effects on nature. The garbage monitoring system is compatible mainly with the concept of smart cities. The main objectives of our proposed system are as follows: Monitoring the waste management, providing a smart technology for waste system, avoiding human intervention, Reducing human time and effort, resulting in a healthy and waste ridden environment.

LITERATURE SURVEY

In this section, some of the latest existing works in the area of garbage management systems have been reviewed. In paper [1], a waste collection management solution based on providing intelligence to waste bins, using an IoT prototype with sensors. It can read, collect, and transmit a huge volume of data over the Internet. Such data, when put into a spatio-temporal context and processed by intelligent and optimized algorithms, can be used to dynamically manage waste collection mechanisms. Simulations for several cases are carried out to investigate the benefits of such systems over a traditional system. They tried to replicate the scenario using Open Data from the city of Pune, India stressing on the opportunities created by this type of initiatives for several parties to innovate and contribute to the development of Smart waste management solutions. The increase in population, has led to tremendous degradation in the state of affairs of hygiene with respect to the waste management system. The spillover of waste in civic areas generates the polluted condition in the neighboring areas. It may aggravate numerous severe diseases for the nearby people. This will humiliate the appraisal of the affected area. For eliminating or mitigating the garbage and maintaining cleanliness, it requires smartness based waste management system. In paper [2], an IOT based smart waste clean

management system is proposed which checks the waste level over the dustbins by using Sensor systems. Once it detected immediately this system altered to concern authorized through GSM/GPRS. For this system used a Microcontroller as an interface between the sensor system and GSM/GPRS system. For IoT/Smart-city applications to make use of these data efficiently there needs to be a proper framework through which the required sensor could be easily searched and made use of. There has not been enough contribution to efficiently retrieve the sensor data and to make it available in the required format for the registries to search for. In paper [3], a distributed cross-layer commit protocol (CLCP) is analyzed for data aggregations and its support for query based search for IoT application. A Geographic information system is one of the emerging technologies that have a huge contribution in planning and management of waste. The model proposed in paper [4], provides an innovative approach for identifying the number of waste bins and their respective locations. The disadvantages of the existing systems are: The process is not always cost effective, the resultant product has a short life, and the practices are not done uniformly.

PROPOSED SYSTEM

The proposed system “IoT based Garbage Management (monitor and acknowledgement) System” shall provide a smart solution regarding overflowing of garbage bins. This system shall be beneficial to detect the temperature of the garbage and helps to avoid high fame intention. Then, the proposed system uses ultrasonic sensors (as they are precise and have large range) to sense the level of garbage in the bin. Thing Speak is an IOT platform that allows connecting and saving sensor data in the cloud and developing IoT applications. Also, the platform provides apps that analyze and visualize data. Webpage that shows the level of the garbage bins and helps to monitor the admin and user. Admin and user can monitor the places, level of garbage bins and temperature level. By intimating the notification of garbage fled, the number of trips of the garbage collecting vehicle shall be also reduced. The advantages of the proposed system are: Saves continuous labor costs and human efforts, mainly reduces the environment pollution. The proposed system is mainly divided into 4 modules. These modules need to collaborate mutually in order to realize the proposed system secure to cities clean and safe.

The modules are: assembling module, working module, admin module, and user module. Figure 1 describes the block diagram of the monitoring system. It consists of several Ultrasonic sensors, LM35, and Node MCU [1]. The ultrasonic sensor is used to detect the level of garbage in the bin, and it will send this information to the Node MCU, which acts as the system controller [2]. Then given a power supply to the Node MCU, it displays the garbage level in percentage in the webpage [3]. And also the LM35 will act as a temperature sensor [4]. It will detect any fame in the bin. It will send this information to the Node MCU and power supply applied to the Node MCU [5]. It displays the temperature level in Celsius on the webpage

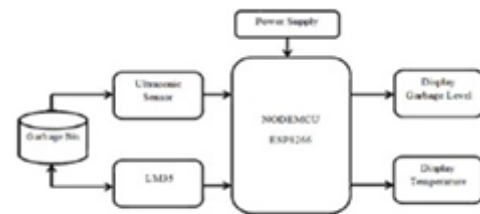


Fig. 1 Block diagram of monitoring system

Assembling Module

A garbage bin is an advanced bin which is attached with an ultrasonic sensor for detecting the level of wastage and LM35 sensor for detecting any fame in the garbage bin. Servo motor is attached to it. It is used for opening and closing the lid, when the garbage is thrown. These components are connected to the NodeMCU pins. NodeMCU is doing all the functions of other components. These are assembled in a PCB board connecting with wires.



Fig. 2 Assembling all components

Figure

e 2 shows components assembling.

Working Module

After assembling the components, the working output of these sensors is taken by serial monitor in Arduino IDE. Firstly, writing the code of two sensors into the Arduino IDE. Then applied code into NodeMCU. In ultrasonic sensors, it measures the distance of garbage level in the bin. Sensor head emits an ultrasonic wave and receives the wave reflected back from garbage. Measuring the time between the emission and reception and that measurement show in percentage in the serial monitor. In LM35, it detects the temperature in the garbage and is shown in a serial monitor in Celsius parameter.

Admin Module

Admin module in the webpage contains Login and Monitoring. When login the admin, it contains the places name where the bins can be located. Admin have possible to add more places into the webpage. In the monitoring section, it shows two garbage bins. Each garbage bin displays the level of the garbage and temperature of the garbage.

User Module

User module in the webpage contains only login. When login the user, it shows the two garbage bins. Each bin shows their status of garbage level and temperature. Garbage level shown in percentage and temperature shown in Celsius. By monitoring this, the user can easily throw the garbage without overflowing.

EXPERIMENTS AND RESULTS

System implementation is the process of defining how the information system should be built. For the implementation first we want to set up NodeMCU by inserting the program code. Program code written in C language. After inserting the code, then assembling other components such as LM35, Servo motor and Ultrasonic sensor into the NodeMCU pins. The next process is to create the webpage for showing the status of the bin. Web Page is created with the help of the Net Beans IDE. It creates the home page and login page. Homepage contains Admin and User. Admin have login option and monitoring. Login page contains the places where the bin located and additional bin location will be added by admin. Next monitoring contains the status of bin level and temperature. In the user, it contains only the login page. When logged on the login page, it shows the bin level and temperature. After that, assembling hardware will connect to the bin. Then put some garbage into the bin. Then switch on the Wi-Fi, it detects the

bin level and temperature and that will show in the webpage. The results obtained are shown in figure 3.

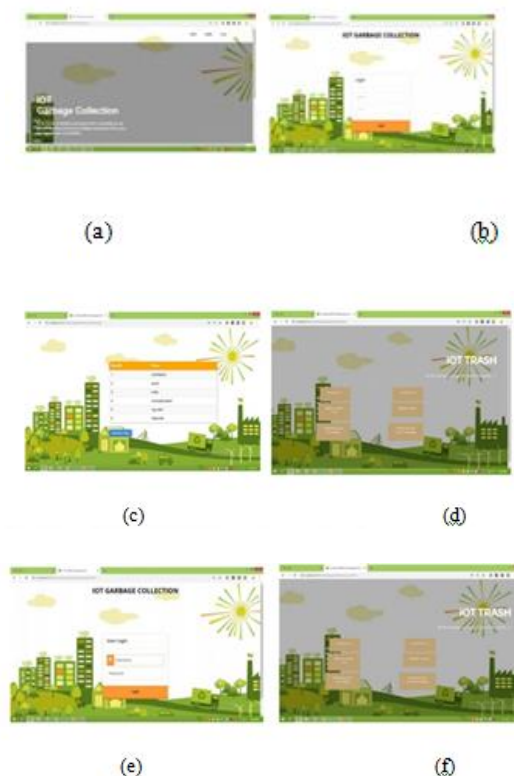


Fig.3.(a) home page (b) admin page (c) bin located places (d) monitoring the two bins in admin login (e) user login (f) monitoring the two bins in user login

CONCLUSION

The proposed system “IoT based Garbage Management (monitor and acknowledgement) System” shall provide the smart solution regarding overflowing of garbage bins. This system shall be beneficial to detect the temperature of the garbage and helps to avoid high fame intention. Then, the proposed system uses ultrasonic sensors to sense the level of garbage in the bin. Thing Speak is an IOT platform that allows connecting and saving sensor data in the cloud and developing IoT applications. Also, the platform provides apps that analyze and visualize data. Webpage that shows the level of the garbage bins and helps to monitor the admin and user. Admin and user can monitor the places, level of garbage bins and temperature level. By intimating the notification of garbage fled, the number of trips of the garbage collecting vehicle shall be also reduced. By keeping the environment clean, contribution shall be given to the society for “Clean India Concept”.

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