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Review on IOT Based Smart Garbage and Waste Collection System

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Abstract - *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. It creates bad health condition for the people by spreading some deadly diseases, to avoid all such situations we are going to implement a project called IOT Based Smart Garbage and Waste Collection bins. These dustbins are interfaced with microcontroller based system using Ultrasonic Module, WIFI Module, and GSM Module along with central system showing current status of garbage, on mobile web browser with html page or in android app 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 is to reduce human resources and efforts along with the enhancement of a smart city vision. Each bin is given a particular ID it will in display in the screen of the respected officer and they can take immediate action. We are designing a smart bins means it contains some sensors, Ultrasonic Module, WIFI Module. Thus this scheme helps to maintain the city sparkling by informing about the trash levels of the bins via a web page.*

Key Words: **Microcontroller, Ultrasonic Sensor, WIFI Module.**

1. INTRODUCTION

Recent days, many people are living in cities only for their convenience in all the ways and many people are coming from the rural areas for the opportunities. Due to this there is huge growth of population in metro politician Cities the waste percent is increased to the enormous level, the waste is overflowing from the bins and finally it leads a situation of general bin into mini dump yard in each and every street. So, it's became a major problem for the municipal authorities to clean that waste. They are unable to clean that waste in time. So, to reduce this, based on latest technology moving to smart bin. Up to now this method is not widely implemented in India, presently we are using only old bins and compressor bins in our premises.

This project IOT Garbage Monitoring system is a very innovative system which will help to keep the cities clean. This system monitors the garbage bins and informs about the level of garbage collected in the garbage bins via a web page. For this the system uses ultrasonic sensors placed over the bins to detect the garbage level and compare it with the garbage bins depth. The system makes use of AVR family microcontroller, LCD screen, Wi-Fi modem for sending data and a buzzer. The system is powered by a 12V transformer. The LCD screen is used to display the status of the level of garbage collected in the bins. Whereas a web page is built to show the status to the user monitoring it. The web page gives a graphical view of the garbage bins and highlights the garbage collected in colour in order to show the level of garbage collected. The LCD screen shows the status of the garbage level. Thus this system helps to keep the city clean by informing about the garbage levels of the bins by providing graphical image.

2. OBJECTIVES

The objective of the system is to design and develop IOT based garbage monitoring system. In this system ultrasonic sensor is attached inside the dustbins to measure the real time garbage level of dustbins. The notification alert will be send to the webpage when the level of dustbins reaches to 80%. The web page will also give a graphical view of the garbage bins and highlights the garbage collected in color in order to show the level of garbage collected.

3. PROBLEM STATEMENT

One of the main concerns with our environment has been solid waste management which impacts the health and environment of our society. The detection, monitoring and management of waste is one of the primary problems of the present era. The Traditional way of manually monitoring the waste in waste bin is a cumbersome process and utilizes more human efforts, time and cost which can easily be avoided with our present technologies.

4. LITERATURE SURVEY

The aim is to develop an IOT base garbage monitoring system. So in this we survey about the Garbage level that will tell the waste level which is detection inside the dustbin and a web page is built to show the status to the user monitoring it. The web page gives a Graphical view and highlights the garbage collected in color in order to show the level of garbage collected to the user. So we take a basic knowledge about the types of waste present in the dustbin i, e., Solid,

Liquid, Sludge and Hazardous (Waste item, domestic bin, trash bags). [1]

Microcontroller is best described and has deliberately been designed to be used by people who are not experts in electronics. And there are different tools which are best described as a single-board computer that is Arduino. To build this project Microcontroller, WI-FI module, Ultrasonic sensor are the main parts that are used in this project and we studied about other parts which is important for this project. [2]

Ultrasonic sensor are very use full in today's generation. So we have used this sensor to detect the level of the garbage. The sensors are place at the top of the dustbin in the common garbage bins placed at the public place when the garbage reaches the level of the sensors it will send SMS using WI-FI module to the web page and will show graphical view of the bin how much it is fill.[3]

For this there should be a flow of system. So we have taken an overview about the system architecture and we have referred the flow chart which tells the flow of the system and the architecture tells which parts are connected to whom. Smart Dustbins can prevent the accumulation of the garbage along the roadside to a great extent thereby controlling the widespread of many diseases. It can prevent pollution and also prevent the consumption of the spread out garbage by the street animals. [4]

5. PROPOSED WORK

A. Flow of the system

There is a login sections for user and admin. Each section verifies the user and checks whether the user is authenticate user or not. The every new user need to register first, and fill the details. After login user will jump to their home page which will have dashboard, profile, garbage monitoring and how to use the webpage.

The Figure depicts the flow chart. At the start the garbage bin is unfilled and the sensors placed over the bins senses the level of the garbage composed in the bins. If the sensor senses no garbage in the bin then it does not refer information to the person. Else if the sensor senses any garbage in the bin and the level of the garbage is in between 0%-80% and it specifies the level in graphical view. If level is in between 80-100% then it will send information (text message) to the contractor and NMC and then the contractor will text to the garbage collector then directly the person collect the garbage.

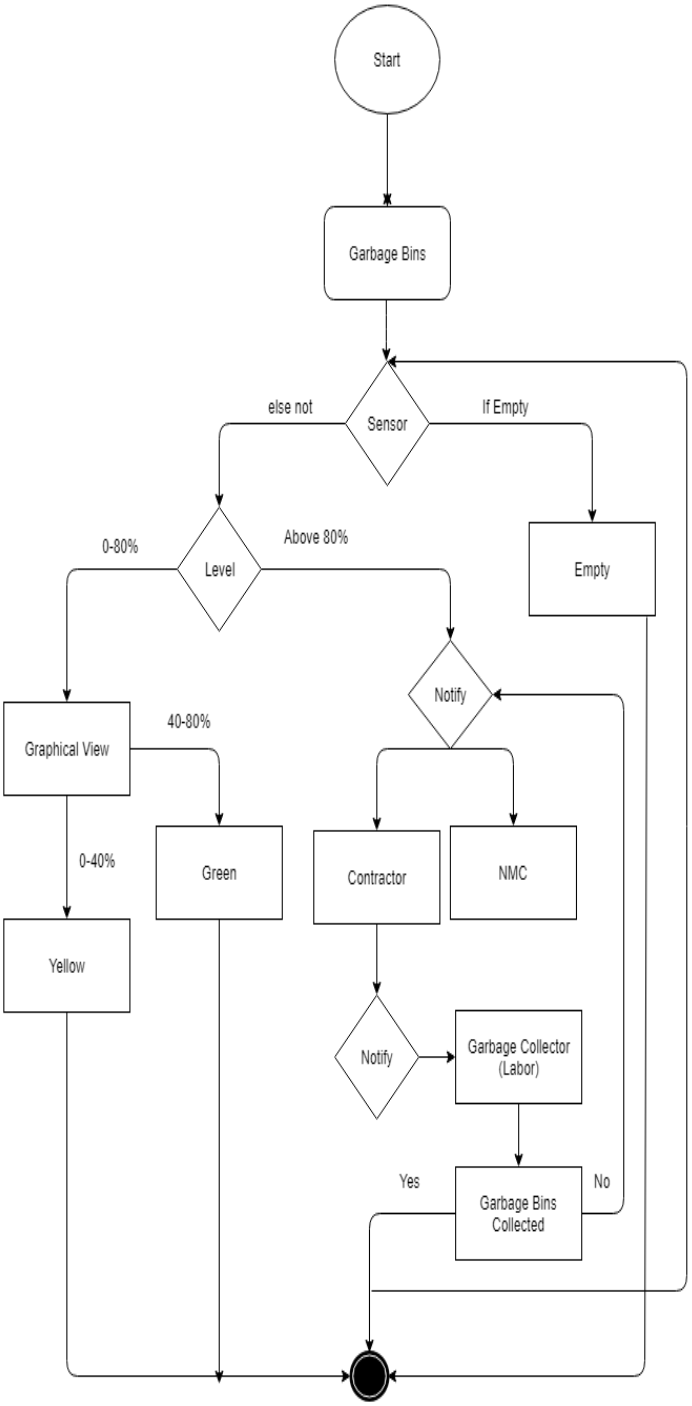

Fig. Flow of Garbage Monitoring

B. Functional Modules

The whole system is divided into the five modules. They are:- Identification of Bin and Parts, Microcontroller Module, Ultrasonic Sensor Module, Wi-Fi Module, Notification Module.

1) Identification of Bin and Parts:

In this, we have identified the parts and tools that are used for building this projects. The main parts that are used for

building this project are Microcontroller, Wi-Fi module, Ultrasonic sensor.

2) Microcontroller module:
It get information from sensor and process on it. It compares the received data with the threshold level set and accordingly output is generated. The LPC2131/32/34//38 microcontrollers are based on a 16/32-bit ARM7TDMI-S CPU with real-time emulation and embedded trace support, that combine the microcontroller with 32 kB, 64 kB, 128 kB, 256 kB and 512 kB of embedded high-speed flash memory.A128-bit wide memory interface and unique accelerator architecture enable 32-bit code execution at maximum clock rate.

3) Ultrasonic Sensor module:
The Ultrasonic Sensor sends out a high-frequency sound pulse and then times how long it takes for the echo of the sound to reflect back. The sensor has 2 openings on its front. One opening transmits ultrasonic waves, (like a tiny speaker), the other receives them, (like a tiny microphone). The speed of sound is approximately 341 meters (1100 feet) per second in air. The ultrasonic sensor uses this information along with the time difference between sending and receiving the sound pulse to determine the distance to an object.

4) Wi-Fi module:
This module has a powerful enough onboard processing and storage capability that allows it to be integrated with the sensors and other application specific devices through its GPIOs with minimal development upfront and minimal loading during runtime. . The ESP8266 supports APSD for VoIP applications and Bluetooth co-existence interfaces, it contains a self-calibrated RF allowing it to work under all operating conditions, and requires no external RF parts. The ESP8266 Module is not capable of 5-3V logic shifting and will require an external Logic Level Converter.

5) Notification module:
This module will send notification to the contractor and NMC when the garbage level is 80% above. Then the contractor will send the text message to the garbage collector (labor) if he is in the same route to collect the garbage.

6. APPLICATION AND ADVANTAGES

Advantages:-
•It is the good method to manage waste.
•It is safe and easy to implement.
•Support Digital India.
•Real time based cleaning our cities.

Applications:-
•This project can also be used in the" SMART CITY".
•This project is also helpful in the government project of "SWACHH BHARAT ABHIYAN".

7. CONCLUSION

Pick-To-Clean are providing us with many unique smart solution compared to the traditional working process in corporation of societies. It will increase the efficiency on garbage collection and reduce time and cost of labor work. Also makes citizens look clean and keep surrounding healthy. It will also tracking short and easiest way of garbage collection root for garbage collectors (Drivers).

8. REFERENCES

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