

IoT Trash Bin

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Abstract- Waste management is one of the primary problems that any country faces. The main issue in the waste management is that the garbage bin gets over- flowed before the beginning of the next cleaning process. Overflowed garbage bins are creating bad smell and making an unhygienic environment. And due to this situation number of diseases taking lives of people because of bacteria and viruses spreading rapidly. . For better health and environment OUR system proposes alert system for emptying the dustbin by sending a message to the municipal web server based on garbage level. Whole system is based on IoT. The system uses ultrasonic sensor, infrared sensor, air quality sensor, NodeMcu , GPS, LED, and servo motor. Also, system uses blynk framework. This system will allow the authorized people to manage cleaning of dustbin through IoT.

Indexed Terms- NodeMCU, GPS, LED, IoT, Garbage Collection

I. INTRODUCTION

Garbage consists of the unwanted materials left over from city, urban areas, Educational Institutions, Business organizations, home etc. This project will help to understand the ecosystem and in the developments of research on IOT to eradicate or minimize the garbage disposal problem. IOT is a recent communication Technology, in which the objects of everyday life will be equipped with BLYNK Server, transceivers for digital communication and suitable protocol stacks, that will make them ready to communicate with each other and with the users.

II. LITURATURE SURVEY

[1] In, once the truck comes on the brink of the rubbish bin,RFID starts act of sending the knowledge .Ultrasonic sensors measure level of waste, buzzer to alert the truck regarding proportion of garbage

level and L.C.D displays the share level. GPS is employed for sleuthing the location of the bin. During this project the rubbish bins square measure set within the urban areas of a town and an circuit camera is mounted on the bin location.

[2] Device is formed which could relay its information, that is, level of garbage bin to the concerned person due to which route for the truck collecting garbage is optimized. Garbage bins that area unit crammed quite seventieth area unit empty 1st. Optimized route is chosen by the algorithmic rule that saves time and price and raises a step towards clean town.

[3] during a wise system is formed that alerts internet server of municipality once garbage within the bin is higher than threshold worth and needs to be cleared inside given time. One who empties the bin confirms that he has completed the task. Real time status of the bin is usually monitored with the assistance of this method that's integrated with RFID tag, Wi-Fi module, and ultrasonic sensing element.

[4] the most aim of the recycle system planned in is to change assortment of points for playacting a disposal activity into designate recycle bins. Such system encourages utilization activities by permitting the points to be re- deemable for merchandise or services. This feature is to assist makers in managing the acquisition of useful merchandise. The system permits convenient recording of data related to the disposal activities, disposed material, identification of the user and points collected by the user. Recycle Bin that caters for utilization glass (brown), paper (blue) and metal will, plastic merchandise (orange) that mechanically judge the worth of the wastes thrown consequently and supply 3R(Reduce, Recycle, Reuse) card.

III. IMPLEMENTATION

- Arduino IDE:

The Arduino integrated development environment is a cross-platform application that is written in the programming language Java. It is used to write and upload programs to Arduino compatible boards, but also, with the help of 3rd party cores, other vendor development boards.

The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. It runs on Windows, Mac OS X, and Linux.

The environment is written in Java and based on Processing and other open-source software. . Stable release: 1.8.8 / 7 December 2018. Developer(s): Arduino Software License: LGPL or GPL license. Written in: Java, C, C++.Platforms: x86-32 (32 bit Intel x86), x86-64, ARM architecture

Installation Steps:

1. First you must have your NodeMCU and a USB cable.
2. Download Arduino IDE Software
3. Power up your board: The power source is selected with a jumper, a small piece of plastic that fits onto two of the three pins between the USB and power jacks. Check that it is on the two pins closest to the USB port.
4. Launch Arduino IDE: After your Arduino IDE software is downloaded, you need to unzip the folder. Inside the folder, you can find the application icon with an infinity label (application.exe). Double-click the icon to start the IDE.
5. Open your first project: Once the software starts, you have two options create a new project. Open an existing project example. To create a new project, select File new.
6. Select your Arduino board: To avoid any error while uploading your program to the board, you must select the correct Arduino board name, which matches with the board connected to your computer. Go to Tools Board and select your board.
7. Select your serial port: Select the serial device of the Arduino board. Go to Tools Serial Port menu. This is likely to be COM3 or higher (COM1 and

COM2 are usually reserved for hardware serial ports).

8. Upload the program to your board. Simply click the "Upload" button in the environment.

- Blynk framework:

1. A graphic interface -simply dragging and dropping widgets.
2. Supports hardware of any choice. Arduino or Raspberry Pi is linked to the Internet over Wi-Fi, Ethernet or new ESP8266 chip.
3. Blynk will get you online and ready for the Internet of Your Things.

- Installation Steps:

1. Create a Blynk Account. After you download the Blynk App, you'll need to create a New Blynk account.
2. Create a New Project. After you've successfully logged into your account, start by creating a new project.
3. Choose Your Hardware
4. Authentication Token
5. Add a Widget.
6. Run The Project.

IV. MODELING

Microcontroller used for this module is NODEMCU Arduino which has in built Wi-Fi. Since it's less expensive than Raspberry Pi we are using Arduino UNO. Also it's USB port which may be used for connecting device. Infrared LM393 sensor is connected to NODE MCU using jumper wires. During this module infrared is connected with servo motor TowerPro MG996R to NODE MCU for opening lid of bin when required. Ultrasonic Adraxx HC SR04 sensor is employed for checking the extent of garbage present inside bin where it'll show level is full, half or empty on Blynk framework. For understanding of hazardous waste air quality sensor MQ 135 is implemented during this project. Overall communication

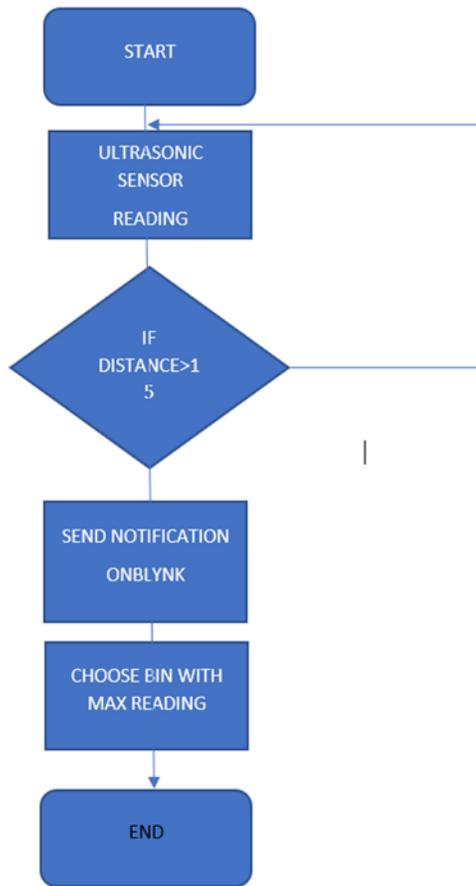


Figure 1 Dataflow diagram

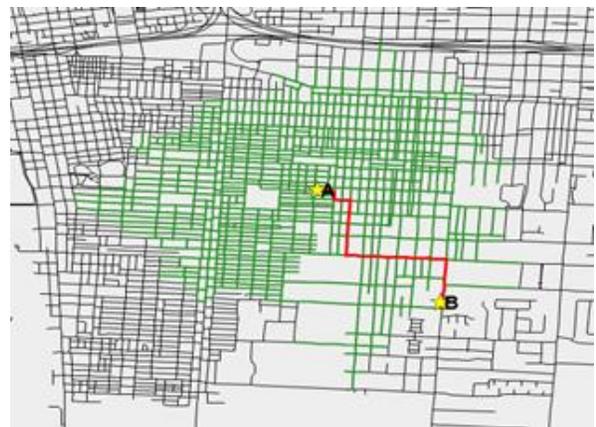
interface of module is internet. Basic waterfall model is applied. All sensors are connected to NODE MCU using wires but with the help of USB cable hardware is connected to laptop. A Google map is employed for fastest route calculation. This protects time and fuel as optimized path provided by google map is employed for collection of garbage. Location co-ordinates for bin and phone location of driver are often used for implementing this feature. Dustbin is mounted at a selected place which won't be changed by anyone, so fixed co-ordinates are often added on google map. No live status of bin location is required, just the drivers position is modified.

V. ALGORITHM

Dijkstra's Algorithm in maps.

Dijkstra's algorithm is an algorithm we can use to find shortest distances or minimum costs depending on what is represented in a graph. You're basically working backwards from the end to the beginning, finding the shortest leg each time.

In case with Map Suite Routing's built-in Dijkstra routing algorithm. However, there may be instances where you may want to find the shortest path from a single source node to several destination nodes. With a few small modifications, you can use Dijkstra's algorithm in order to efficiently get multiple route results from a single location to multiple destinations.



Usually with Dijkstra's algorithm you would pass in a single source node (point A) and a single destination node (point B). The algorithm would find the shortest path between point A and each intermediate node, until it eventually finds the shortest path between point A and point B.

VI. RESULTS



Figure 2 Smart dustbin

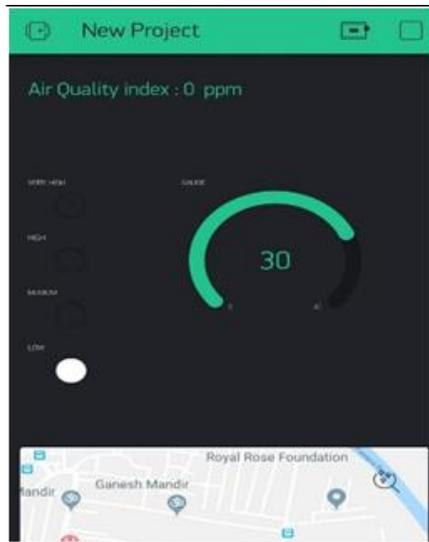


Figure 3 empty bin

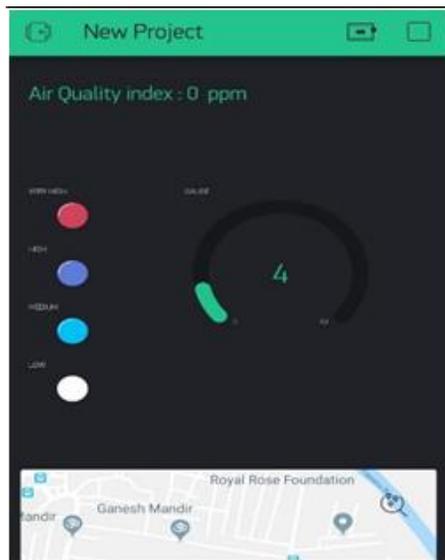


Figure 4 filled bin

VII. CONCLUSION

This module will focus on cleanliness of city. Investment is little high but it will be more useful for long time than traditional garbage system. It will reduce human efforts. Main advantage of this module is level detection feature will prevent overflowing of garbage. It's always a healthy choice for using such prototypes in our locality which will benefit tremendously. It can be used in both private, public sectors as well as in Government sectors. For improving the existing waste management system,

reducing costs, increasing efficiency and increasing profits it will be beneficial.

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ACKNOWLEDGMENT

We would wish to take this chance to precise my profound gratitude and deep reference to our guide Prof. A.S.DEOKAR for her exemplary guidance, valuable feedback and constant encouragement. Her valuable suggestions were of giant help for our project. Her perceptive criticism kept us working to form this project during a far better way. Working under her was a particularly knowledgeable experience for us