

SMART DUSTBIN USING IOT

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Abstract: SWACHH BHARAT Abhiyan is a national campaigns by the Government of India. The main aim of this mission is to clean and cover all the villeges and cities area of the country so that the present this country as an Ideal country. The previous system could not collect the garbage accurately there are some problem in that system. Due to previous system garbage spell on the roads and people are not willingly put the garbage in the dustbin Hence, we introduce the IOT based System SMART DUSTBIN. These systems present to facilitate SWACHH BHARAT with Idea of smart dustbin that identifies the fullness of rubbish dustbin. In this system, dustbin control the Overfilling of the bin by making the dustbin smart enough to notify itself for its cleaning. In this project the smart bin System is build on the Raspberry Pi having ultrasonic sensor on each of the dustbin that shows the level full in the dustbin, also used RFID card to authenticate user and after putting the garbage in dustbin it automatically add the rewards to that user account so, it gain some facilities like, mobile recharge etc. from government. By using this rewards idea people are motivating to put the garbage in the dustbin.

Keywords: IOT, Wireless Sensor Network, RFID Reader, Raspberry Pi

I. INTRODUCTION

Project Idea:

Swachh Bharat Abhiyan is a national campaign by the Government of India, covers 4,023 well populous cities and towns, to keep the areas and infrastructure of the country clean. The aim of this mission is to clean and cover all the rural and urban areas of the country so that to present this country as an ideal country before the world with the proliferation of Internet of Things (IoT) devices, such as smart phones, sensors, cameras. It is possible to collect massive amount of data for localization and purifying water. In existing systems no such proper planning regarding collection of garbage, due to some problems which makes the city or town unhygienic. Introduce the IOT based System SMARTDUSTBIN. This system present to facilitate SWACHHBHARAT with Idea of smart dustbin that Identifies the fullness of rubbish dustbin. In this system, Dustbin control the Overfilling of the Dustbin by making the dustbin Smart enough to notify itself for its cleaning. In this project the smart Dustbin System is built on the Raspberry Pi having Ultrasonic Sensor on each of the

Dustbin that shows the level full in the dustbin, also used RFID card to Authenticate user and After putting the Garbage in Dustbin it Automatically add the rewards to that User Account so, it gain some facilities like, mobile recharge etc. from government. By using this rewards idea people are motivating to put the garbage in the dustbin. The labors who are working in cleaning the dustbins are not responsible and that makes the system worse in urgent cases, proper monitoring of them is mandatory to run the city clean and green. Only traditional and manual garbage collection system is available. No automatic or technology oriented systems exist. This project is designed for the effective garbage collection using Embedded System. The main aim of the proposed method is collecting waste into the dumping vehicles. In this method whenever dustbin filled to certain levels the module placed on the dustbin will send an alert message to server node. From the server node it again sends a message to the concerned authorities. This system also sends information about harmful gases emanation. As a developing nation and as one of the most populous country in the world we in India face unique problems that require a unique solution such problem is that of waste management. As of there is no proper monitoring system on the working of labors whoever working in the corporations, if they are failed to clean the garbage bins within the stipulated time then there must be overflow and so as diseases and hazardous gases spreads easily which makes city or town worst solid management .

Motivation of the Project:

SWACHH BHARAT Abhiyan is a national campaign by the Government of India. The main aim of this mission is to clean and cover all the villeges and cities area of the country so that the present this country as an Ideal country. The previous system could not collect the garbage accurately there are some problem in that system. Due to previous system garbage spell on the roads and people are not willingly put the garbage in the dustbin. Hence, we Introduce the IOT based System SMARTDUSTBIN. This system present to facilitate SWACHHBHARAT with Idea of smart dustbin that Identifies the fullness of rubbish dustbin. In this system, Dustbin control the Overfilling of the Dustbin by making the dustbin Smart enough to notify itself for its cleaning. In this project the smart Dustbin System is build on the Raspberry Pi having Ultrasonic Sensor on each of the Dustbin that shows the level full in the dustbin, also used RFID card to Authenticate user and After putting the Garbage in Dustbin it Automatically add the rewards to that User Account so, it gain some facilities like, mobile recharge etc. from government. By using this rewards idea people are motivating to put the garbage in the dustbin.

III. PROPOSED SYSTEM ARCHITECTURE

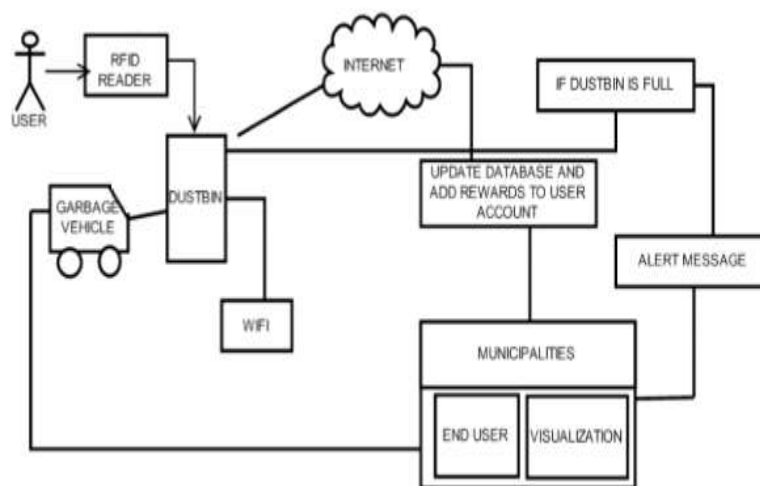


Figure : Architecture of the system

Sensing: Ultrasonic sensors provide information on an absolute position of an object. This helps in early detection of events and enables to take the necessary steps.

Monitoring: Along with continuous monitoring of the sensors, the information should be reported in real time to the appropriate central server.

Control: The monitored data is analyzed in real time and the optimum control information is determined and transmitted over networks.

Storage Backup: Rapid, flexible and accurate responses is desired since the analysis and control information is done on real time. In accordance with the requirements, the intelligence of our system is provided by the IoT devices. Ultrasonic sensors are used in

smart bins. The IoT devices send these data over the wireless networks to the processing server, and this data is used to generate optimum schedules for waste collection.

Smart bins: The waste bins are attached with sensors that will sense the filling level of the bin. These bins are attached with sensors which make them smart. Ultrasonic sensors act like a radar system and track the amount of garbage in the bin. These sensors send information and alert the processing system when a threshold limit is reached, which enables the processing system to generate an optimized schedule according to which the smart trucks will collect waste from these bins.

Collection Vehicles: Trucks are used for collection of waste from the smart bins and transporting them to the local collection points for further processing of the waste. The driver of the truck is provided with a smart device which will provide the driver with real time routes and optimized schedules according to which the waste collection can be done. The processing system provides the schedules based on the data generated by the smart bins. The data generated by the IoT is sent from the device to the central processing system via a high speed wireless transmission medium. We are using Wi-Fi in this case.

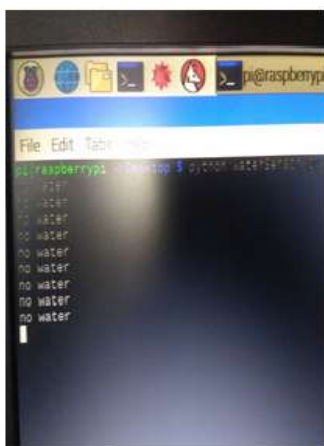
III. HARDWARE IMPLEMENTATION

1. Working Of RFID Reader:- A radio frequency identification reader (RFID reader) is a device used to gather information from an RFID tag, which is used to track individual objects. Radio waves are used to transfer data from the tag to a reader. Radio-frequency identification (RFID) uses electromagnetic fields to automatically identify and track tags attached to objects. The tags contain electronically stored information. Passive tags collect energy from a nearby RFID reader's interrogating radio waves. Active tags have a local power source (such as a battery) and may operate hundreds of meters from the RFID reader. Unlike a barcode, the tag need not be within the line of sight of the reader, so it may be embedded in the tracked object. RFID is one method of automatic identification and data capture (AIDC).

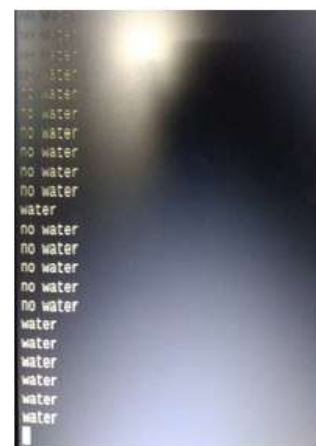


```
KeyboardInterrupt
pi@raspberrypi:~/Desktop $ cd RFID/SPI-Py/MFRC522-python/
pi@raspberrypi:~/Desktop/RFID/SPI-Py/MFRC522-python $ python
Welcome to the MFRC522 data read example
Press Ctrl-C to stop.
Card detected
Card read UID: 32,1,147,25
Size: 8
Sector 8 [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0]
Card detected
Card read UID: 32,1,147,25
Size: 8
Sector 8 [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0]
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2. Working Of Moisture Sensor:-The soil moisture sensor consists of two probes which are used to measure the volumetric content of water. The two probes allow the current to pass through the soil and then it gets the resistance value to measure the moisture value.



(Before)



(After)

ADVANTAGES

- It saves time and money by using smart waste collection bins and systems equipped with fill level sensors. As smart transport vehicles go only to the filled containers or bins. It reduces infrastructure, operating and maintenance costs by upto 30
- It decreases traffic flow and consecutively noise due to less air pollution as result of less waste collection vehicles on the roads. This has become possible due to two way communication between smart dustbins and service operators.
- It keeps our surroundings clean and green and free from bad odour of wastes, emphasizes on healthy environment and keep cities more beautiful.
- It further reduces manpower requirements to handle the garbage collection process.
- Applying smart waste management process to the city optimizes management, resources and costs which makes it a "smart city".
- It helps administration to generate extra revenue by advertisements on smart devices.

LIMITATIONS

- System requires more number of waste bins for separate waste collection as per population in the city. This results into high initial cost due to expensive smart dustbins compare to other methods.
- Sensor nodes used in the dustbins have limited memory size.
- Wireless technologies used in the system such as zigbee and wifi have shorter range and lower data speed. In RFID based systems, RFID tags are affected by surrounding metal objects (if any).
- It reduces man power requirements which results into increase in unemployment's for unskilled people.
- The training has to be provided to the people involved in the smart waste management system.

CONCLUSION

We can conclude that proposed System is useful for implementing the concept under Smart city that overcomes major problem like time Consumption and manpower required. This project Helps to complete Aim of "SWACCH BHARAT Abhiyan". By using this method the collection of waste in the city becomes easier. It helps in reducing air pollution, traffic flow, man power, time and money. With the help of proper technology we can guide the trucks in selecting the shortest path for garbage collection. This project can add an edge to the cities aiming to get smart and people-friendly.

References

1. Sayali Suryakant Chalke, Mohini Bhalerao "A Survey on IOT Based Smart Garbage Monitoring System", 2018.
2. K. Harika, Muneerunnisa, V. Rajasekhar, P. Venkateswara Rao, "IOT Based Smart Garbage Monitoring and Alert System Using Arduino UNO", 2018.
3. P. Siva Nagendra Reddy, R. Naresh Naik, S. Nanda Kishor "Wireless Dust Bin Monitoring And Alert System Using ARDUINO", 2017.
4. Krishna Nirde 1, Prashant S. Mulay 2, Uttam M. Chaskar "IoT based solid waste management system for smart city", 2017.
5. Dr. Jittendranath Mungara¹, Shobha², Keerthana M³, Kanakambika R³, Kokila S³ "Survey on Smart Garbage Monitoring System Using Internet of Things (IOT)", 2018.