

SMART DUSTBIN: A SMART INITIATIVE-REVIEW

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Abstract:- With an increase in population, the scenario of cleanliness with respect to garbage management is degrading tremendously. In a city there are many public places where we see that garbage bins or dustbins are placed but are overflowing. This creates an unhygienic condition in nearby surrounding. Also creates ugliness and some serious diseases, at the same time the bad smell is also spread and it also degrades the valuation of that area. To avoid such situations we come up with a project called “SMART DUSTBIN” which is a GSM-based garbage and waste collection bins overflow indicator system for Smart Cities. The main aim of this project to develop a working prototype that has features like automatic lid mechanism and garbage level sensing.

Keywords: Garbage Management, GSM modem, smart dustbin, automatic lid mechanism , garbage level sensing.

1. INTRODUCTION

The Smart Dustbin (SDN) may be a solitary arrangement to the particular and impossible to miss issues in squander administration. As the populace develops, 62 million tons of rubbish is produced each day by the 377 million individuals living in urban India, presently the world’s third-largest trash generator. Smart dustbin may be a unused thought of execution which makes a ordinary dustbin smart utilizing Infrared Sensors for waste level location and sending message to individual civil specialists upgrading the status of the canister utilizing GSM modem.



Fig 1-Present Waste Management System

Indeed typically a touch free dustbin so, when any individual reaches near to it, the lid of it'll open automatically so there's no got to open that messy cover by your hands. This project also includes a Green LED to indicate that the dustbin is Empty and a Red LED to indicate the Full condition. As soon as the garbage inside the dustbin reaches as the approx' level of 90% a Buzzer will turn ON for few seconds to tell the user not to use this dustbin and Red LED will be turned on until it's Empty again. Till the dustbin is empty again, the lid will not open so that no one can throw garbage into it and create a mess. Over fundamental inspiration behind this extend is the progressing campaign Swachh Bharat Abhiyan (Clean India Development) propelled on October 02, 2014 at Rajghat, Unused Delhi, by the Prime Minister of India Narendra Modi which is India's biggest ever cleanliness drive to clean the roads, streets and foundation of the country's 4,041 statutory cities and towns.

2. LITERATURE REVIEW

A State of the Art review on Internet of Things by P. Suresh, Vijay. Daniel, R.H. Aswathy, Dr. V. Parthasarathy. This paper gave the idea of IoT subject and addition details about IoT. The proper smart environment and various applications.

Internet of Things: Challenges and state-of-the-art solutions in Internet-scale Sensor Information Management and Mobile analytics by Arkady Zaslavsky, Dimitrios Georgakopoulos. This paper gave us the details about mobile analysis and sensor information management that will help in data segregation of various dustbins.

Top-k Query based dynamic scheduling for IoT-enabled small city waste collection by Theodoros Anagnostopoulos, Arkady Zaslavsky, Alexey Medvedev, Sergei Khoruzhnicov. This paper it gave us the concept of dynamic scheduling required for the cleaning of dustbin and the Top-k query led us to priority based cleaning of dustbins.

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City Garbage collection indicator using RF(Zigbee) and GSM technology. This paper gave the points of interest for the module required for the transmission of the information to the collector side additionally the most channel take after of the extend. At first we utilized GSM innovation for our venture but afterward on chosen to us Wi-Fi module for the ease of information transmission.

IoT-Based Smart Garbage System for efficient food waste management by Insung Hong, Sunghoi Park, Beomseok Lee, Jaekeun Lee, Daebeom Jeong, Sehyun Park. This paper gave the overview working of the IoT based smart garbage bin and the food management. The main aim of this project is to reduce human resources and efforts alongside the upgrade of a shrewd city vision.

3. SELECTION CRITERIA OF COMPONENTS

3.1 An Infrared Sensor is an electronic device that emits light in order to sense some aspects of the surroundings. An IR sensor can degree the warm of an protest as well as recognizes the movement. Here it is utilized to discover the flood condition of the dustbin, we may too utilize Weight Sensor but it's not so great thought since it is very troublesome to anticipate by the weight of the dustbin that's it full or not ? Because there exist many different kinds of garbage having different volume and weight which miscalculate and misguide our users.

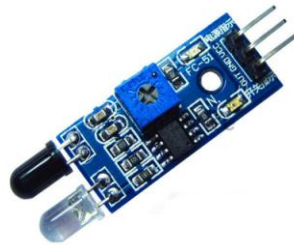


Fig 2 Infrared Sensor

3.2 we are using ATmega32 because, it is the best match to fulfill our different requirements due to its 40-pin PDIP and it is also widely accepted and we could too do numerous extra overhauls on the extend in future like As before long as the dustbin is full, it moves within the predefined way to reach the larger holder with the assistance of Line follower robot or having the individual finder before dustbin etc.



Fig 3 ATmega32

3.3 GSM Modem (Global System for Mobile communications) can accept any GSM network operator SIM card and act just like a mobile phone with its own unique phone number. The advantage of utilizing this modem will be simply can utilize its RS232 harbour to communicate and create implanted applications. Applications like SMS-control, data transfer, remote control, and logging can be developed easily using GSM.



Fig 4 GSM Modem

3.4 DC Motor is used in this project to open and close the lid of dustbin whenever any person come reaches to it which won't create any mess and anyone can throw garbage into dustbin without touching that dirty dustbin.



Fig 5 DC Motor

3.5 Green and Red LEDs are used to indicate the Empty and Full condition of dustbin respectively in this project which will help people know from a distance that whether we should go to dump our garbage in particular dustbin or not.



Fig 6 Green and Red LEDs

3.6 Buzzer is selected to be turned ON for approx. 5 Sec each time after the Overflow condition whenever any person tries to dump garbage in the bin, which tells the user not to dump here due to overflow.

4. CONNECTIONS WITH AVR MICROCONTROLLER

4.1 Connecting GSM Modem with AVR microcontroller:

GSM Modem RS232 is built with Dual-Band GSM engine- SIM900A. GSM modem (GSM Sim 900A) is used to make audio calls, SMS and DATA transfer application in M2M is a machine to machine interface that enables networked devices to exchange information. With the use of the MAX232 chip, we are able to connect GSM modem with a microcontroller. It can be used in Access Control Devices, Supply Chain Management, and Security System.

4.2 Connecting IR Sensor with AVR microcontroller:

IR sensor is an electronic device that emits in order to sense some aspects of the surrounding. It can measure the heat as well as the motion of the object; these types of the sensor will not emit an infrared radiation but it will detect an infrared radiation. Generally, all objects radiate some of the infrared radiation which is not visible to our eyes but it can be detected by the IR sensor. It can be used to detect any object or moment of the object. IR sensors with higher capabilities are used in Night Vision Devices, Infrared Astronomy, and Infrared Tracking etc.

4.3 Connecting DC Motor with AVR microcontroller:

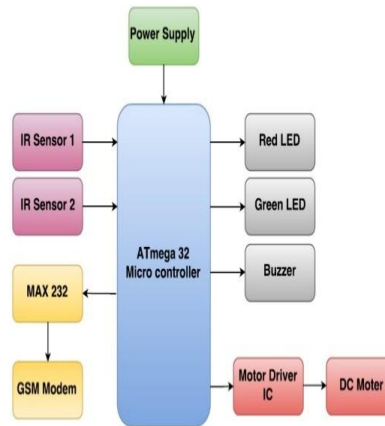
DC-motor is a rotary electrical machine that converts direct current electrical energy into mechanical energy. All types of DC-motor have a same internal mechanism, either electromagnetic or electronic. The speed of DC-motor can be controlled by a variable supply voltage by changing the current in its field. It can be used in some tools and toys, fan, blower, conveyor, lift and spinning machine etc.

4.4 Connecting Buzzer with AVR microcontroller:

The buzzer is an electronic device that converts the electronic signals into buzzing noise; which may be mechanical, electromechanical or piezoelectric. It can be used in alarm devices, timers, electronic bell and confirmation of user input such as mouse click or keystroke.

4.5 Connecting LED with AVR microcontroller:

A Light-Emitting Diode is a two-lead semiconductor light source. It could be a P-N intersection diode, which radiates light when actuated. It has numerous preferences lower vitality utilization, littler estimate, longer lifetime etc. It can be used in the remote control device, home application, and an automobile application. It can be also used as an indicator, flashlight etc.



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Fig-7 Block Diagram of Smart Dustbin

5. ADVANTAGES

In the environment is the need of an hour. Our project is a step toward such green technology. When everything around the world is shifting itself to technology, then why not the dustbin? The dustbin is an essential part of the cleanliness mission and thus need to be looked after well. The present methodology being followed for waste collection has many flaws in it so an immediate step has to be taken before it breaks down the whole system. Including a bit of smart to our dustbins will fathom most of our issues and the smart-bin features a lot of preferences. The item which is planned to form each dustbin shrewd is exceptionally convenient because it can put to work fair by setting the sensor and GSM coordinates demonstrate within the foot of the closing cover of the dustbin. The first major advantage of it is that it will stop overflowing of dustbins along roadsides and localities as smart bins are managed at the real time. The filling and cleaning time of smart dustbin will too be decreased hence making purge and clean dustbins accessible to common individuals. Utilizing the expectation and course calculation it'll keenly discover the most brief course in this way decreasing the workforce, the number of trucks required to clean, the sum of fuel devoured by trucks and in this way can spare a expansive sum of assess payer's cash as well. It also aims at creating a clean as well as the green environment, as it will reduce the fuel consumption and in turn reducing the pollution in the air. As it is being said that the technology which goes parallel wit

6. SCOPE OF WORK

Sensor Based Waste Collection Bins is utilized to distinguish the status of squander canisters on the off chance that it is purge or filled so as to customize the waste collection plan in like manner conjointly spare the fetched. Real-time waste administration framework by utilizing keen dustbins to check the fill level of dustbins whether the dustbins are full or not, through this framework the data of all smart dustbins can be gotten to from anyplace and anytime by the concerned individual. It'll illuminate the status of each and each dustbin in genuine time so that concerned specialist can send the waste collection vehicle as it were when the dustbin is full. By actualizing this framework asset optimization, fetched diminishment, compelling utilization of smart dustbins can be done.

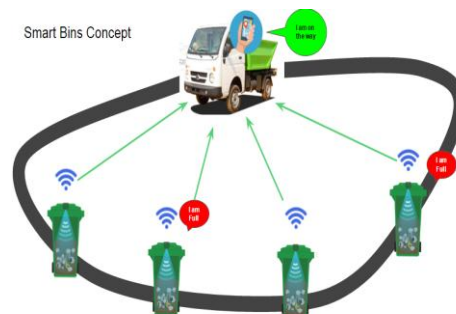


Fig8 proposed design of smart dust bin

7. CONCLUSION

Urbanization is at its rapid growth stage around the world, as a number of people desire to live in the city lights with more opportunities for growth and success. Cities are growing like never some time recently to suit this development and in this

handle, the concept of keen cities came into activity. The parameters like cleanliness and hygiene are the topic of concern in these smart cities and concrete measures should be taken for that. Also, the growth should go hand in hand with the green environment and research should be further done on such technology. Our work is a small but efficient step towards cleanliness and we believe that this paper would encourage people to do good work on the similar topics. We have successfully made and tested the model of our smart bin so we believe with encouragement from the side of government we can successfully transform this model into the product.

8. FUTURE SCOPE

The creators are ceaselessly working to overhaul the Smart dustbin so as to address a wide number of current inadequacies. The problems of foul odor and manual controlled mobility call for the future scope which includes the odor control mechanism to get rid of the foul smell of organic garbage. Also, realizing the requirement of an autonomous dustbin, GPS module can be implemented for path planning combined with an ultrasonic sensor for obstacle avoidance.

To enhance it further, an automated system can be developed which is able to pick up waste in and around the bin, segregate them and put them in bins.



Fig 9 Final assembly design of proposed model

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