

# Automated Self Navigated Dustbin Dispensary System in Smart Cities



N.Pooranam, S.K.Sai Sabareshwar, K.R.Shyam Sundar, P.B.Rahav Krithik

**Abstract:** *In the modern era disposing wastes in a safe way is essential now a day; the main issues are garbage overflow. This creates unhygienic and unclean in the environment, it produces bad smell. This may leads in spreading some deadly diseases and human illness; environment should be kept clean and hygienic in society every place should be monitored in a high expense, to reduce this process the proposed approach helps in reducing entire process. The model is fully automated, where the smart dustbin automatically disposes the waste in a fixed location. Therefore this IOT connected through wired and wireless without user intervention. In the design system PIC controller will help in providing connectively in an efficient way. It reduces man work and improves maintenance of the dustbin. This process is controlled by a smart app which includes the performance measure is high which can be monitored through smart device. The design is equipped with high sensor devices which gives alert when it leads to any danger for the environment.*

**Keywords:** IOT, PIC Controller, smart device.

## I. INTRODUCTION

Today, there are various urban areas developing all around the world, with this development of urban areas, the population density of the area is increasing a lot. As the population is increasing day by day, unhygienic environment and amount of garbage is increasing heavily. The problem with current generation, mainly in India is most of the people and students have less sense of responsibility. Many people lay around the waste in our surroundings. This project is designed to overcome these kinds of situations, helps to maintain hygiene and cleanliness around the surroundings with the help of IoT. The IOT is all about extending the power of the internet beyond computers and mobile phones to a huge

range of other things, processes and environments. Those "connected" things are used to collect information, send information back or both. IOT allows businesses and people to be more connected to the world around them and to do more purposeful, higher level work. Objects and devices built in sensors are associated with the internet of things technology, which blends data from the various devices and applies analytics to share the most worthy data with applications constituted to address particular needs. Sensors, cameras and drones can connected to this base station over a Wi-Fi. This ensures high bandwidth connectivity in the farm. However, due to the lack of power on the farm, the base station is replaced by battery-backed solar power which suffers from power unreliability, it depending on weather condition. Cloudy weather can decrease solar power output significantly and drains the batteries of the base station to shut it down. To solve this problem, FarmBeats uses a weather-aware IoT base station design. Specifically, it will uses weather forecasts to appropriately duty cycle different components of the base station. To the best of our knowledge, this is the first weather-aware IoT base station is designed.

## II. LITERATURE SURVEY

### A. IOT Based Smart Garbage Alert System Using Arduino Uno

The author described about smart garbage using arduino UNO. This concept gives brief status of the dustbin. It helps to tell the user whether the garbage is filled or not. If the trash is not filled to the level in the dustbin, the lid will be open. Once it is filled it gives the message to the user through WIFI that the dustbin is filled. This model is developed with RFID computing technology that is used for verification process and enhances the smart garbage alert system by providing automatic identification of garbage filled. They use ultrasonic sensor to measure the dustbin level.

### B. Smart WIFI Dustbin System

The author described about smart WIFI dustbin system using micro controller 8051. The dustbin contains IR sensor which detects the garbage thrown inside the dustbin. The dustbin contains the LCD in it. From the database, unique ID is generated and displayed in the LCD when a person throws garbage in dustbin. Then the person can able to use the WIFI from the WIFI router in the dustbin. This makes city clean and also gives great vision for smart city.

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\* Correspondence Author

**N.Pooranam\***, Assistant Professor, Department of Computer Science and Engineering, Sri Krishna College of Engineering and Technology, Coimbatore, India (E-mail: pooranam@skcet.ac.in)

**S.K.Sai Sabareshwar**, Department of Computer Science and Engineering, Sri Krishna College of Engineering and Technology, Coimbatore, India

**K.R.Shyam Sundar**, Department of Computer Science and Engineering, Sri Krishna College of Engineering and Technology, Coimbatore, India.

**P.B.Rahav Krithik**, Department of Computer Science and Engineering, Sri Krishna College of Engineering and Technology, Coimbatore, India.

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## C. Smart Dustbin for Smart City Using Solar

The author described smart dustbin for smart city using solar using arduino, GSM module, ultrasonic sensor, IR sensor, DC motor and solar panels. In this dustbin IR sensor is used to detect human's hand and the door of the dustbin opens with the help of DC motor. All this functions are done with arduino.

The level of the dustbin trash is measured with the help of ultrasonic sensor. Once the dustbin is filled it sends the message to municipal corporation maintenance system through GSM model. Solar panel is responsible for the power supply for this model.

## D. Smart Dustbin 'An Intelligent Approach To Fulfill Swatchh Bharat Machine'

The author describes about this smart dustbin using arduino UNO and with the help of RFID, ultrasonic sensors, serial LCD, SIM900GSM module and servomotor. The outer of the dustbin is connected with ultrasonic sensors and LCD those two devices are connected to arduino UNO. When the ultrasonic sensors fixed outside the dustbin detects human, the door of the dustbin opens with the help of servomotor. Ultrasonic sensors placed inside the dustbin measures the trash level in the dustbin. Once it is filled it sends the control room of Municipal Corporation with the help of SIM900GSM module. LCD displays "THANK YOU" message. RFID in the form of Serial peripheral interface communication. It also accepts digital pulses from Ultrasonic sensors.

## E. Development of Smart Dustbin Using Applications

The author describes about this project with the help of arduino, blynk apps, GSM module using concepts of IoT. The dustbin uses two ultrasonic sensor for detecting the level of the garbage and one more ultrasonic sensor for detecting the human and helps in open and closing the door. The door uses DC motor. The ultrasonic sensor inside the dustbin is used to measure the level and in the blynk app we can able to see the garbage level status. Once the garbage level reaches the limit, a LED light blinks and send message to the controller room using the GSM module.

## III. PROPOSED METHODOLOGY

In the proposed system each design is made separately and finally collaborated. This proposed approach will help in finding the improper disposal of waste where the environment gets polluted. Though the method is mainly focused on environmental hygiene each processing phase is developed in an efficient method. This method has mainly three different levels to demonstrate the experimental process. Each phase the new component is added to make it more effective in utilization. In the first phase of development ultrasonic sensor is placed to find the waste collection level in the garbage collector and if it reaches the bottle neck then it will close the door of the garbage collector and moves automatically. It will dispose the waste in the desired place and again comes back to the same position. In the second phase of development a rain sensor placed in the dustbin to find the decade materials are exposed in air to avoid the air pollution this step is obtained. Once the rain occurs the garbage door closes automatically to avoid over flow of garbage and other hygiene issues. In the

last phase of the development phase there is a toxic sensor placed at the dustbin system. To identify explosive wastes like batteries and warns against other toxic gases. In which the pollution level will increase in the surrounding area. This proposed method will help the waste management system to reduce the human power and helps in disposing the waste in a proper channel. The system which is developed will be enhanced in an efficient method to help the society to reduce the pollutions occurred during this phases. These are the three stages and working of this IoT based proposed system.

## IV. BLOCK DIAGRAM

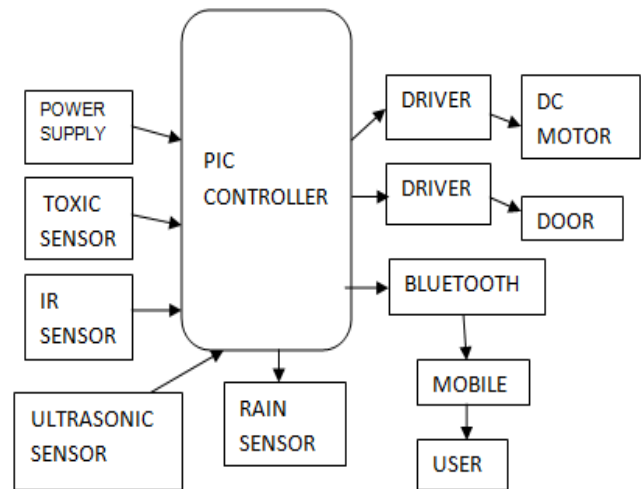


Figure 1 Block diagram of the proposed system

The block diagram consists of PIC controller; it also has many sensors like IR sensor, toxic sensor, ultrasonic sensor, rain sensor. It is connected with three drivers to perform specific function in this project. The status of the project will be seen through Bluetooth in users mobile. It is developed in MPLAB IDE Tool. Ultrasonic sensor is connected in dustbin it is used to detect the level of dustbin where dustbin is full or empty. Here we use the ultrasonic sensor in two different ways.

1. Dustbin Filing below threshold valve.

2. Dustbin heavy when threshold level of dustbin is crossed (US sensor gives Output).done by forward and reverse direction rotation of motor. For smooth running, good speed regulation and operating of motor Drive IC L293D is used. All the functions of the model is seen through mobile by users via Bluetooth.

Gas Sensor is used in this model; it is placed inside the dustbin. When there are any explosive items in the dustbin it gives a buzzer sound.

Once the dustbin is filled or empty the notification will be sent to the user through mobile via Bluetooth.

Rain Sensors are used to detect rain, once it detects. The top door closes automatically. IR sensors are used to detect the object on the path of model during motion. Once the object found the model stop its motion and comes to rest.

When the trash in dustbin filled. The model automatically disposes the waste in fixed location. The proposed system consists of the above components which defines all the working model of the system. The buzzer sound will be a alert system for the environment.

This model is fully automated and all the functions of the model is viewed by the user through mobile phones via Bluetooth.

- The waste is disposed in the fixed location
- It can detect object during its motion through IR sensor.
- Reduced Man labour
- Accuracy and continually monitored.

### V. EXPERIMENTAL SETUP

Before you begin to format your paper, first write and save the content as a separate text file. Complete all content and organizational editing before formatting. Please note sections A-D below for more information on proofreading, spelling and grammar.

Keep your text and graphic files separate until after the text has been formatted and styled. Do not use hard tabs, and limit use of hard returns to only one return at the end of a paragraph. Do not add any kind of pagination anywhere in the paper. Do not number text heads-the template will do that for you.

#### A. Ultrasonic Sensor

An ultrasonic sensor is used to detect distant to an object. Ultrasonic sound waves are used by this sensor. In this project we use this sensor to measure the level of the dustbin.



Figure 2 Ultrasonic sensor

#### B. Rain Sensor

It is a instrument used to detect rainfall. In this project this sensor is used to detect rainfall and helps to close the garbage door.

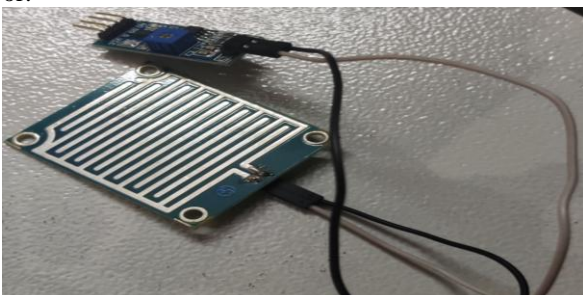


Figure 3 Rain sensor

#### C. Toxic Sensor



Figure 4 Toxic sensor

This sensor is used to detect different kind of gases. They are mostly used to detect toxic gases or explosive kind of gases and help to measure gas concentration. In this project we use this sensor to detect toxic type of gases, explosive items and alert users.

#### D. IR Sensor

Infrared sensor is a sensor which is used to sense something around the surroundings. It can detect the heat of the objects and also it can detect the motion. In this model we use this sensor to detect obstacle and avoid collision.

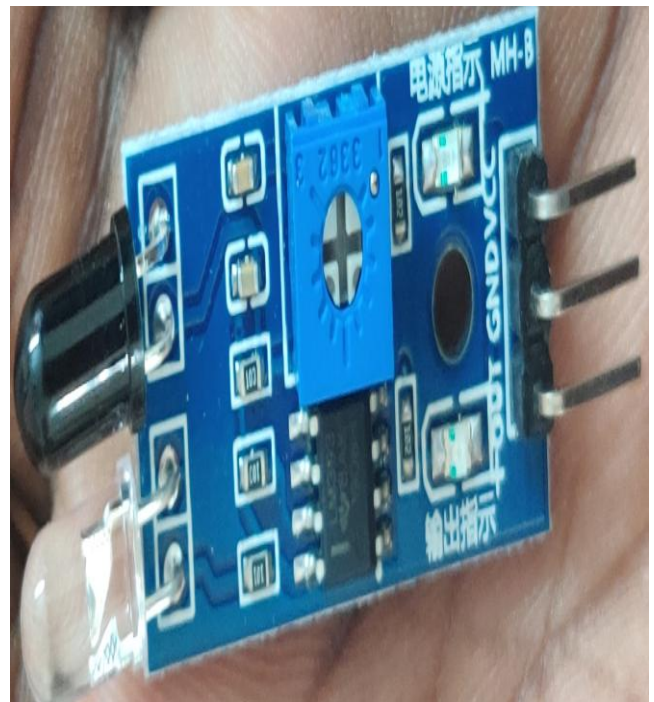
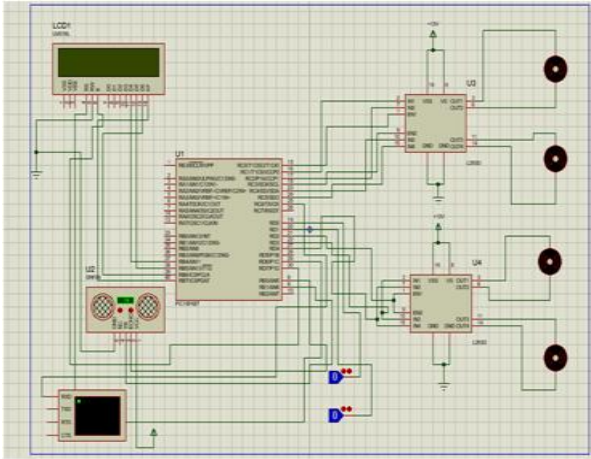


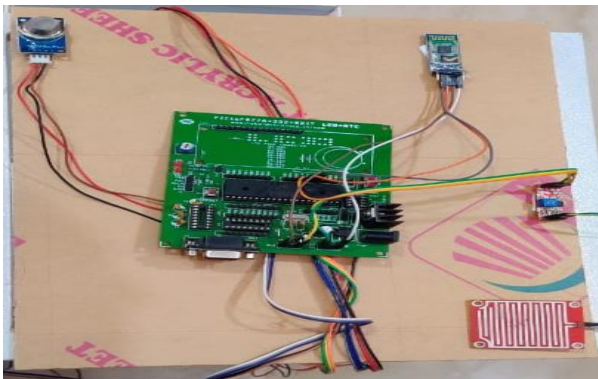
Figure 5 IR sensor

## VI. CIRCUIT DIAGRAM



**Figure 6 Circuit Diagram**

The circuit diagram explains the connectivity between the components and each component has its own effectiveness. This circuit diagram clearly explains how the circuits are connected and how it works in this project.



**Figure 7 connectivity of the components**



**Figure 8 TOP VIEW**



**Figure 9 TOP VIEW**

## VII. RESULT AND DISCUSSION

The circuit diagram explains the connectivity between the components and each component has its own effectiveness. This circuit diagram clearly explains how the circuits are connected and how it works in this project. The project contains two doors, one is to collect the garbage and another door is to dispose the collected garbage. Two doors are controlled by the DC motor. IC will be placed in top of the model. Four wheels will be fixed below the dustbin system and it helps the garbage system to move accordingly. Many sensors are added to this model to perform several operations.

## VIII. CONCLUSION

This project work is the implementation of smart garbage management system using sensors, Microcontroller and BLUETOOTH module. This system assures the cleaning of dustbins soon when the garbage level reaches its maximum.

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**AUTHORS PROFILE**



**N.Pooranam**, Assistant Professor, Department of Computer Science and Engineering at Sri Krishna College of Engineering and Technology joined in the year 2016. Her main research interest is on Artificial Intelligence, machine learning and IOT. She punished many patents, Scopus articles.



**S.K.Sai Sabareshwar**, UG student, Department of Computer Science and Engineering, Sri Krishna College of Engineering and Technology, Coimbatore, India.



**K.R.Shyam Sundar**, UG Student, Department of Computer Science and Engineering, Sri Krishna College of Engineering and Technology, Coimbatore, India.



**P.B.Rahav Krithik**, UG Student , Department of Computer Science and Engineering, Sri Krishna College of Engineering and Technology, Coimbatore, India