

# Smart Garbage Monitoring System Using IOT

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**Abstract:** *Nowadays certain actions are taken to improve the level of cleanliness in the country. People are getting more active in doing all the things possible to clean their surroundings. Various movements are also started by the government to increase cleanliness. We will try to build a system which will notify the corporations to empty the bin on time. In this system, we will put a sensor on top of the garbage bin which will detect the total level of garbage inside it according to the total size of the bin. When the garbage will reach the maximum level, a notification will be sent to the corporation's office, then the employees can take further actions to empty the bin. This system will help in cleaning the city in a better way. By using this system people do not have to check all the systems manually but they will get a notification when the bin will get filled.*

**KEYWORDS:** ATMEGA 328, Ultrasonic sensor, IR sensor, Arduino, IOT, LCD(16\*2), Login.

## INTRODUCTION

IOT or Internet Things refers to the network of connected physical objects that can communicate and exchange data among themselves without the desideratum of intervention. It has been formally defined as an "Infrastructure of Information Society" because IOT sanctions us to a mass information from all kind of mediums such as humans, animals, conveyances, kitchen appliances. Thus, any object in the physical world which can be provided with an IP address to enable data transmission over a network can be made part of IOT. In

this system we used electronic hardware such as sensors, software and wi-fi module GSM module networking gear. IOT is different than Internet as in a way it transcends Internet connectivity by enabling everyday objects that utilizes embedded circuits to interact and communicate with each other utilizing the current Internet infrastructure. Since then the scope of IOT has grown tremendously as currently it consists of more than 12 billion connected devices and according to the experts it will increase to 50 billion by the end of 2020.. Manufacturers have gained insight into how their products are used and how they perform out the real world and increase their revenues by providing value added services .which enhances and elongates the life cycle of their products or services. In this paper, we are going to propose a system for the immediate cleaning of the dustbins. As dustbin is

considered as a basic need to maintain the level of cleanliness in the city, so it is very important to clean all the dustbins as soon as they get filled. We will use ultrasonic sensors for this system. The sensor will be placed on top of bin which will help in sending the notifications to the officials. The users also checks the levels of the garbage through an IOT based mobile application in and around the world.

2.

## OVERVIEW OF THE TITLE

To develop smart intelligent garbage alert system for proper garbage management. To design a technique in which garbage level could be checked at regular intervals. To develop e-monitoring system that put forth mobile based Application assimilated with IOT technology.

3.

## MOTIVATION

Nagpur city's current waste collection logistics is carried out by emptying containers according to predefined schedules and routes which are repeated at a set frequency. Such a System has major disadvantages:

A. Time consuming:

- B. High costs
  - C. Greater traffic and congestion.
  - D. Unnecessary fuel consumption.
  - E. Increased noise and air pollution as a result of more trucks on the road .
- All the above disadvantages are a result of lack of real time information resulting in unsuccessful collection of

waste. The Nagpur Municipal itself finds this as a big problem and a big hurdle in between Nagpur Smart City initiative. There is an urgent need to optimize the management of this service to reduce infrastructure, operating and maintenance costs, as well as reduce contamination directly associated with waste collection.



**Fig:1 Conditions in the city.**

## LITERATURE REVIEW

4.

A Smart Dustbin proposed by , based on IOT in which the smart bin was built on a platform which was based on Aurdino Uno board which was interfaced with a GSM modem and an ultrasonic sensor. The sensor was placed on the top of the bin. A threshold level was set as 10cm. As the garbage reaches the level of threshold, the sensor triggers the GSM modem which alerts the associated authority till the garbage in the bin is emptied. At the end a conclusion was made that various issues like affordability, maintenance were addressed when these smart bins were designed. It also contributed towards a hygienic and a durability clean environment in the process of building a smart city. The researchers suggests the method for garbage management which is as follows. The bin was interfaced with a system based on microcontroller which had IR wireless systems with a central system that showed the current status of the garbage in the bin. The status was seen on a mobile Application . To reduce the cost, they only used weight based sensors and on the sender's side they only used a Wi-Fi module to send and receive the data. In this system, the level of garbage in the bin was detected by the ultrasonic sensor which will send the data to the officials using the GSM module. The sensor will

check the level of garbage and send it to the slave unit which will further send the data to master unit which at last will inform the authorities to clean the garbage bin. This paper proposed Decision Support System which would be used for garbage collection in the cities. This system handled the ineffective waste collection in the inaccessible areas of the city. The system worked in two parts, the first part was to find the companies that were involved in collecting the waste and owned trucks and who could also organize some drivers for collecting the garbage from various parts of the city in the truck and pass on the city dumps or the recycling organizations. The second part was to make a system which could handle all the communications of all the people involved and could also maintain the data which will be collected while working around in the city.

## 5. COMPONENTS AND COMPATIBILITY

- 1.Arduino Mega 2560 R3 board.
- “Arduino is an open-source electronics prototyping platform based on flexible, easy-to-use hardware and software. It’s intended for artists, designers, hobbyists,

and anyone interested in creating interactive objects or environments”

2. Four SR04 Ultrasonic Sensors.

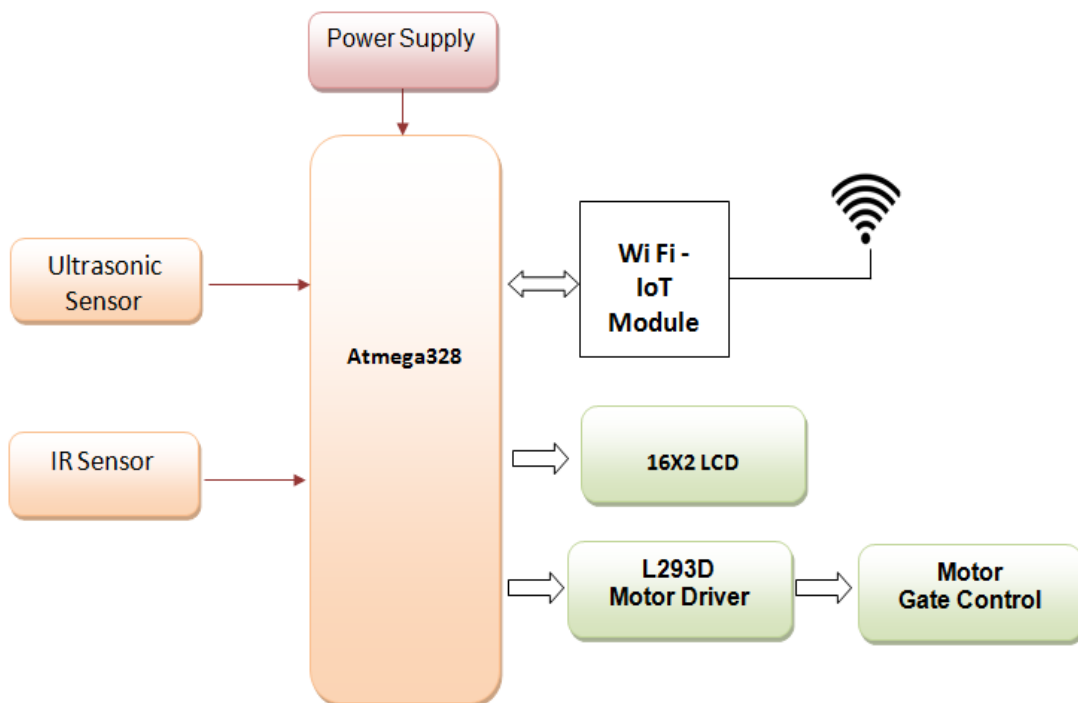
One of the advantages of ultrasonic sensing is its outstanding capability to probe inside objectives non-destructively as ultrasound can propagate through any kinds of media including solids, liquids

and gases except vacuum. In typical ultrasonic sensing the ultrasonic waves are travelling in a medium and often focused on evaluating objects.

3. A Wi-Fi module - Rees52 Arduino Compatible Esp8266 Serial Esp-01 Wi-Fi wireless Transceiver Module.

4. Other necessary wires and PCBs

**6. BLOCK DIAGRAM**

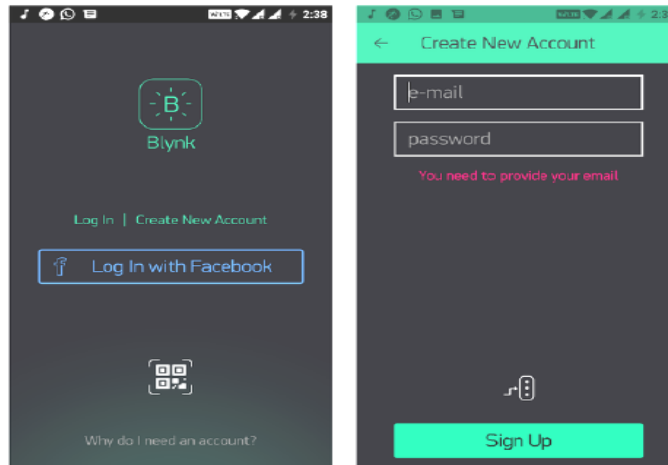


**Fig.2Basic block diagram.**

**7. CONFIGURING BLYNK APPLICATION**

To connect to the internet we make use of a prebuilt platform called Blynk app. After the user installs the Blynk app on the smartphone, an account to be created in the app to access its services. The services are enabled for the signed users. Let us create

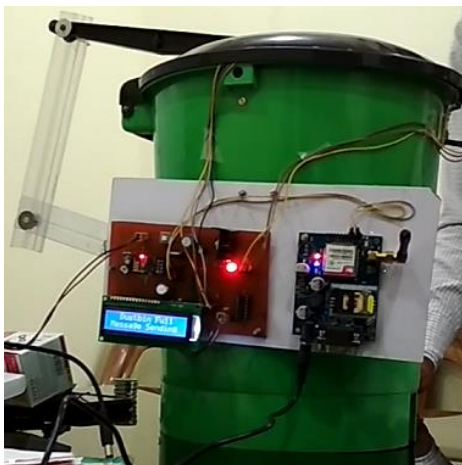
an account and add a new project to get started. A unique authentication code is used by the code to communicate with the project. The Blynk needs to be running in the background for the user to get real time notifications. The working process of the proposed model can be clearly seen in the following figure.



**Fig.3**Blynk Application

## RESULT

The system was checked repeatedly by increasing and decreasing the level of garbage in the bin. Notification was sent each time the level got changed. The user checked the notification was checked by the user on the (Blynk) app, so it can be said that the system has worked in the way we planned. Proper security was also given to the hardware components so that the output which comes is accurate because further actions have to be taken based on the output



**Shows the model of Garbage Bins.**

**Fig.2**

## CONCLUSION AND FUTURE ENHANCEMENT

In this implementation of Smart Garbage Alert System using IOT, assures the cleaning of dustbins soon when the garbage level reaches its maximum. If the dustbin is not cleaned in specific time, then the record is sent to the higher authority who can take appropriate action against the concerned official. This system also helps to monitor the fake reports and hence can reduce the corruption in the overall management system. This reduces the total number of trips of garbage collection vehicle and hence reduces the overall expenditure associated with the garbage collection. The users also check the level of garbage from anywhere around the world through IOT based mobile application. It is ultimately helps to keep cleanliness in the society. This is quite a significant project in its originality and concept. We are using Internet of Things theory which gives this project its charisma and uniqueness about the concept. The project aims at cleanliness of the areas where trash bins are located and the very basic management that it contains with it. It aims at advanced management of the whole garbage collection system. We use ultrasonic sensors (details mentioned above) and its other hardware ATMEGA 328 and such as Arduino for analysing the garbage levels and sending information about it to administrators and then garbage trucks are being deployed by them. Another very important aspect of our project is that it sends the message to the concerned official and authorities that the garbage bin is full at that place.

## ACKNOWLEDGEMENT

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**GARBAGE ALERT SYSTEM** as a combined effort of all involved in our project.

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