# Smart Garbage Meter for Garbage Quantity Detection Using IoT

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**Abstract – Automation is the technology which is mainly included with the application of mechanical and electrical engineering. Due to the immense rise in the development of technology we have seen many things in the technology which are getting auto-mated. In this regard we are chasing the issue of garbage management. Irrespective of any countries garbage management is major issue in nation or worldwide. Due to this issue the environmental surroundings get unhygienic and which results in the serious spread of many infectious diseases and the sickness. The first and the fore most step which should be taken is proper collection of garbage. As this issue is getting increased day by day we are in need to develop more improvised and efficient management system. And Thus In this project we are proposing an automated garbage system using Ultrasonic sensor, Arduino, wi-fi module and a Load sensor. Using previously mentioned hardware, A device can be built. The main concept is the ultrasonic sonic sensor is fixed to the device. The garbage is more in urban areas.This garbage issue data regarding the levels of the garbage in the dustbin can be updated using this ultrasonic sensor. And the sensor updates the quantity of the garbage to the Arduino. Arduino plays a major role in this device as it carries the information of garbage to the wi-fi module through which the user can be updated with the quantity of garbage in the container without reaching up to the garbage container.This entire process helps in the control of garbage management**.

**Index Terms – Ultrasonic sensor, Load sensor, Batteries, Wi-fi module, Arduino, Jumper wires.**

## 1. INTRODUCTION

In today's era garbage plays a major role as the population of the country is getting increased day by day, the growth in garbage gets increased.

The country spends a lot of revenue on garbage for getting cleaned and cleared. Garbage is major issue in highly urbanize areas as the generation is mainly due to the overflow of the garbage container. The country's population plays a major role as there is more population the garbage will be more. In this regard a clean surroundings should be maintained to prevent the dreadful and infectious diseases. This can only be done by maintaining a proper garbage disposal management and to keep the surroundings clean and green. Currently there are many ways to collect the garbage, In some countries door to door collection is there which requires a lot of human intervention with a great effort and as well as more money. In some countries they clean the garbage containers in the regular intervals but sometimes it may overflow and results in the bad odor and the environmental pollution.

Our IOT based smart garbage management helps to control this issue and makes the work ease and efficient. In our project we mainly used two sensor the ultrasonic as well as load sensor to detect the levels of garbage in the garbage container .In the device the ultrasonic sensor is connected to Arduino board through jumper wires and the sensor helps in updating the levels of the garbage to Arduino and the Arduino in further connected to the wi-fi module. Using wi-fi module Arduino updates the data to the Blynk application where the user can see the quantity of the garbage as well day's old through the change in their color.

Programming the source code into the Arduino in such a way that when quantity of the garbage increased to certain level it sends the notification to the user stating to clean the bins. By this we can prevent the overflowing of the garbage which helps in keeping the surroundings clean and prevent environmental pollution. The proper collection of garbage helps in the recycling process which in turn increases various other resources and we can also implement reward points to the citizens who put their garbage in the right bin and make them involved in the recycling process.

## 2. PORPOSED MODELLING

The main hardware used in smart garbage meter are listed below

Batteries

The batteries are the used supply the power. The batteries would supply the power to the sensors, wi-fi module and Arduino using jumper wires.

Container

The container contains the whole working module in it. The container is used to protect the module from water, rats, insects.

The metal used for making container is galvanized steel. For budget friendly we can use plastic container but it is not protective in all conditions.

Jumper wires

We use jumper wire for connecting two point. These wires contains pins at both the ends and are used for avoiding soldering.

Figure 1 JUMPER WIRES

Sensors

Ultrasonic sensor

We would use ultrasonic sensor to detect garbage level. It would measure the level of garbage in the bin. It also measure how long the garbage is by measuring the liquidity in the garbage.


Figure 3 Ultrasonic Sensor

Load sensor

The load sensor is used to detect the weight of the garbage. It would detect the weight of the garbage and sends the information to the to the application using wi-fi module. It is placed below the garbage bin. It would weigh the weight in voltage form the amplifier converts into digital form.

Figure 4 Load Sensor

3. IMPLEMENTATION

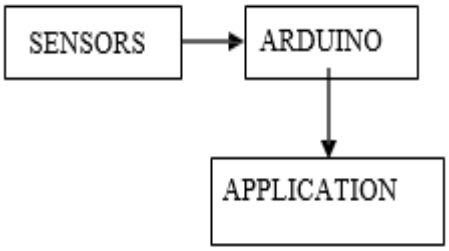


Figure 5 BASIC STRUCTURE

It's implementation is easy but it must be done in careful manner. Each garbage is given a unique id and stores the location of it in the data base. The ultrasonic sensors would sense the garbage level by its liquidity and send the information to the Arduino the Arduino would check the threshold level which is set in the server if the garbage exceed the threshold level it would send a information to the blynk application by using wi-fi module. There is another sensor which would detect the weight of the garbage. The load sensor detects weight and send the information to the Arduino and Arduino check the threshold level weight in the server if the weight exceeds than threshold level it sends the information to the application by using wi-fi module.

The application interface would consist of three signals they are red, yellow and green. The blynk application shows red signal when the garbage is more in quantity or more than 10 days. The application shows yellow signal when the garbage level is medium or it is less than 10 days. The application shows green signal when the garbage is less in quantity or it is less than 5 days. We can set the threshold value of each signal as our wish we can change it as our convenience. Alarm turns on when the signal turns to red. The database can be accessed by the application. Database can be modified only by the admin. System architecture is given below.

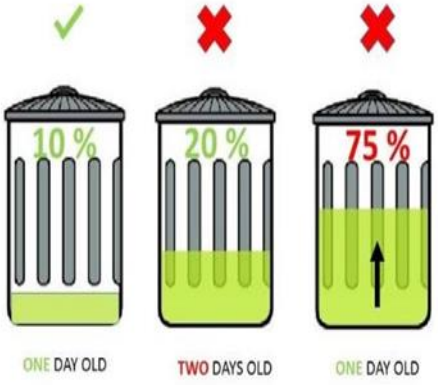


Fig.6.meter indication

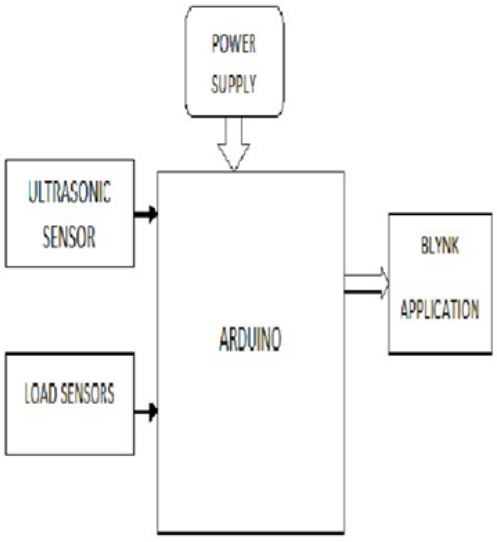


Figure 7 system architecture

ALGORITHM

Step 1: process is started.

Step 2: Data is collected from the sensors. Step 3: Data is transferred to Arduino board.

Step 4: Data is received by Blynk application using wi-fi module.

Step 5: Threshold limit is checked if yes alarm is beeped if no it returns back.

Step 6:The process is stopped.

There is an application named blynk which is used to upload data to the internet and can be seen using it. The screenshots from it when the dustbin is completely filled shows all the three color.

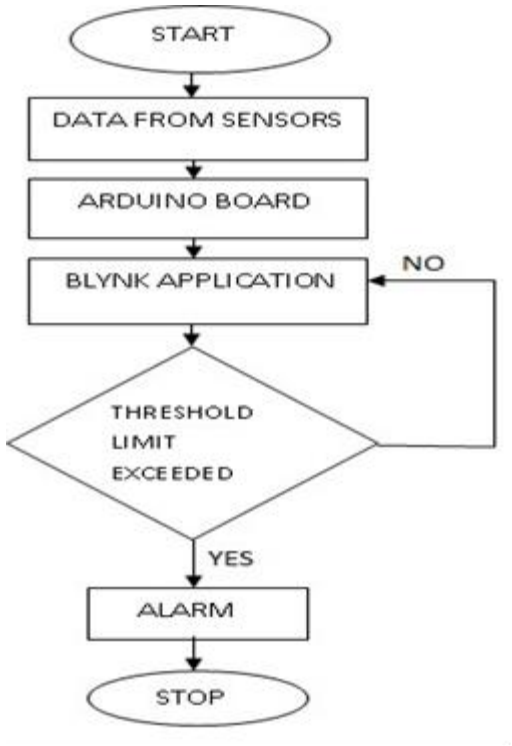


Figure 8 flow chart

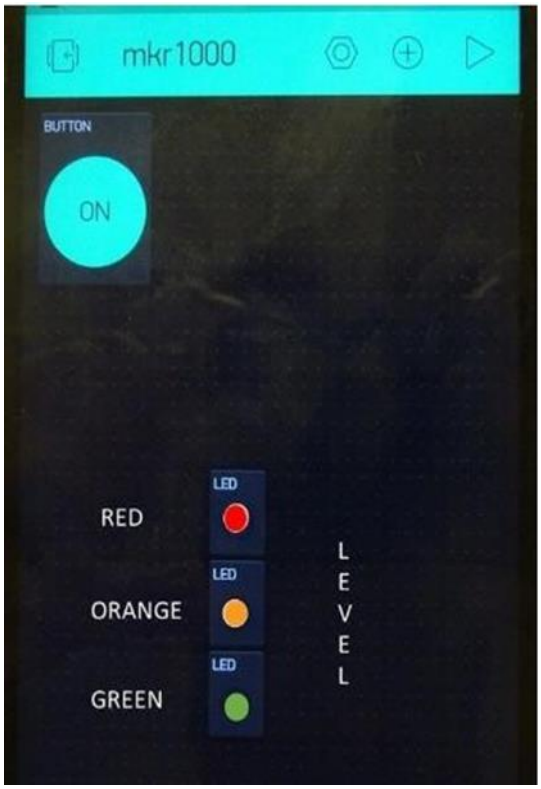


Figure 9 screenshot on mobile

## 4. CONCLUSION

In our project we have developed the efficient garbage disposal management system. In this project we have used internet of things which is getting trending in every aspect of the technology. we have used ultrasonic sensor and a load sensor in order to know the levels of the garbage to empty it. This project helps in diminishing human intervention which involves a lot of effort and time.it helps in reducing the manual work in coming and collecting the garbage without the knowledge of knowing the quantity of garbage and reduces the usage of vehicles. It further improves the system additionally by endorsing the status of cleaning in real time and measure the performance of the team. This system averts the irregular cleaning of the bins by sending the alerts to the user individuals. we can also develop an android application through which user can find the bin near him to throw trash. In this way every citizen plays their role in maintaining the clean environment in his surroundings.

## ACKNOWLEDGMENT

We hereby express our sincere gratitude to the Head of the Department of Computer Science and Engineering, Dr.J.Jagadeesan for providing us with the necessary arrangement for the completion of our project. We also heartly thankfully to our faculty advisor Prof.c.Aswini for her valuable guidance. We express our very sincere gratitude to our guide Asst. Prof. pandiaraj, Department of Computer Science and Engineering, without whose valuable guidance and support the project would not have been a success. We thanking her for good will and encouragement extended to us.

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