

Iot Based Smart Dustbin

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Abstract

All human being are throws waste in dustbin or some other different places. The waste are plastics, degradable and non-degradable. All people are trying to put the waste in dustbin or garbage bin only. In cities, there are many public places where we see that dustbin or garbage bin are placed but there are overflowing. This create unhygienic condition in the surrounding. And it also create some serious diseases. At a same time, an odor extends throughout the city, and degrading the environment. Recycling bin is really a waste management processing, but they are limited space in a garbage bin, it does not require extra waste. Waste disposal is an efficient method of eliminating garbage disposed in commercial settings such as businesses, classrooms, colleges, shopping centers, and other public areas. We have to design the project, where the dustbin is full or not and the waste level of the trash bin is measured. The NodeMCU and the ultrasonic sensor is a hardware component for measuring the garbage bin. The software component is an IFTTT Webhook, and it is used to receiving a notification. The main concept of this project is when more than 70 percent of the garbage bin is filled, the IFTTT Webhook sends the notification and we receive the email.

Keywords: NODEMCU, IFTTT webhooks, Ultrasonic Sensor, Dustbin, jumper Wires.

1. INTRODUCTION

One of a famous technology in this world is an Internet of Things (IOT). Network connecting objects is referred as IOT. The feature of this technology is to communicate and exchange the data among themselves. IOT are activate with the devices like sensor, motor and some UNO board. Trash bin is used for storage the waste management in the world. In regular activities, a normal dustbin utilised for throwing the waste and dustbin is filled to empty the waste inside a dustbin. This is the basic use of a normal dustbin where no components are used, no coding is performed, and everything is done by hand manually. If the dustbin is full, people start throwing the waste around the dustbin, it cause smell and various diseases. To avoid this kind of problem, we used for IOT and some technology to keep the dustbin or garbage bin and environment very clean.

A regular garbage bin is used to throw a waste. A Smart dustbin is used to throw the waste, and to measure the level of the bin. Using electronic components such as NodeMCU, Ultrasonic Sensor and IFTTT web hooks in a smart dustbin. Compare to normal dustbins, the smart dustbin is an effective one. Smart dustbin is integrated with NodeMCU, Ultrasonic sensor are a hardware components. In this project, Ultrasonic sensor is used to measure the distance and level of the dustbin and the NodeMCU is used to upload the code and connecting with Wi-Fi. IFTTT webhook is a server to send the notification. The advantages of this technique are as follows: The above dustbin also send the mobile notification, when the dustbin is almost complete. In this process, various electronic components are used to make this dustbin a smart dustbin. In this method, the disadvantages are as follows: the mobile should have a good notification signal from a carrier to receive notifications is very fast, if the mobile has not received a good signal, the notification will not be send.

2. LITERATURE SURVEY

The trash bin was proposed by [1], which accepted IoT then had 10 cm intensity. When garbage exceeds the threshold, the sensor activates the GSM modem, which warns the related authority before the bin is cleared. Various issues such as the affordability, the maintenance, and durability were addressed when these smart bins were planned, according to the conclusion. They only used a weight-based sensors to reduce the value, and the

sender only used Wi-Fi module to send and receive the data. The ultrasonic sensor detects the amount of garbage in the bin and communicates this information.

The author suggested method for coordinating a garbage collection in residences of communities [3]. The amount of the waste in bins are sensed from ultrasonic sensor, that can send data to the area through a GSM. Graphical user interface (GUI) are created the access data from trash in different places; the GUI were supported by Simulation. So, it was special. Within the process, it was 2 type: slave unit used to be in a bin, and a master unit located in an office. Sensor is used to check the amount of a waste in the bin and transmit messages to a slave device, where it informs to administrators for clear trash. The article suggests network, that has been used to collect a waste inside location[4]. The device worked with unnecessary trash in the town is isolated places. System had two components. First was the collect some information who had been interested to a waste collection or controlled automobiles as well as those who should arrange certain operators to transport garbage to different cities to town wastes.

3. EXISTING METHOD

In this project, we will try to built an Internet of Things (IOT) based system will automatically notify and keep such garbage clean in a proper manner. Each and every person in the world disposes the waste in the dustbin and it full, they empty the waste inside the bin. This is the basic use of a normal dustbin where no components are used, no coding is performed, and everything is manual.

The maintenance of the bin is also not proper where the lid in the overflowing of the waste from the bin. The second method is use of dustbin with different segregations like green and blue bins which is placed together or the dustbin where only recyclable waste should be disposed. The third method uses arduino, servomotor, GSM module, ultrasonic sensor for doing the same result and it is not cost efficient. Ultrasonic sensor is present inside the dustbin where the height of the waste inside the dustbin is measured and it send a mail when the dustbin is above 70 percent. Only sending the notification is the existing method.

4. PROPOSED SYSTEM

The proposed technique will create an IOT-based dustbin. The existing system is that, it send the notification when the bin is filled. The air will become unsanitary if garbage is not properly disposed of, and serious disease can spread rapidly. Many of these drawbacks will be addressed by the proposed scheme.

To determine that trashcans were completed or not, their capacity is measured using actual sustainability. A sensor and a node that gathers and transmits data make up a smart bin. We have to design the project, where the dustbin are completed and waste for the garbage is measured.

To use a webpage, we can identify a dustbin is completed or otherwise. A dustbin updates its status percentage, and when more than 70 percent of the dustbin is filled, it sends an email that the dustbin is almost full. IFTTT Webhooks are used for collect NodeMCU data and, send an email when the trash level exceeds 70%. The device removes the need for people to regularly monitor the trash cans; instead, we will receive a message once the trash reaches fully functional.

4.1 BLOCK DIAGRAM

The block diagram of this project is given below. Ultrasonic sensor utilize to measure distance and height on a dustbin then NodeMCU were used the program to upload a code to connecting with Wi-Fi. To get data from NodeMCU, and to measure the distance from the sensor to show the level in the serial monitor. Once the NodeMCU is generated, it will start to connect with IFTTT webhook. This applet is allowte user to connect with other web based services. Then, IFTTT webhook private key is connect with project authentication ID. The application of this project, communicates with its server to store information and send the updated status and the level of the bin.

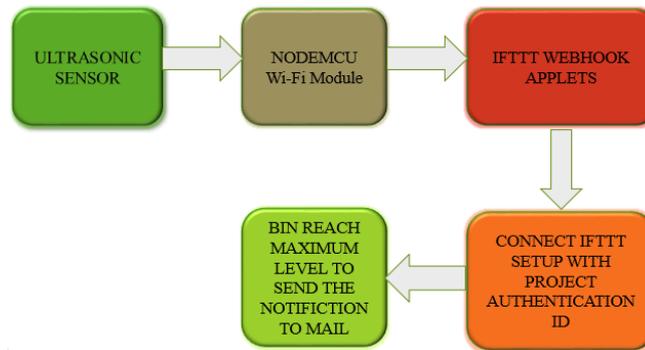


Figure 1: Block diagram of the smart dustbin

4.2 FLOW CHART

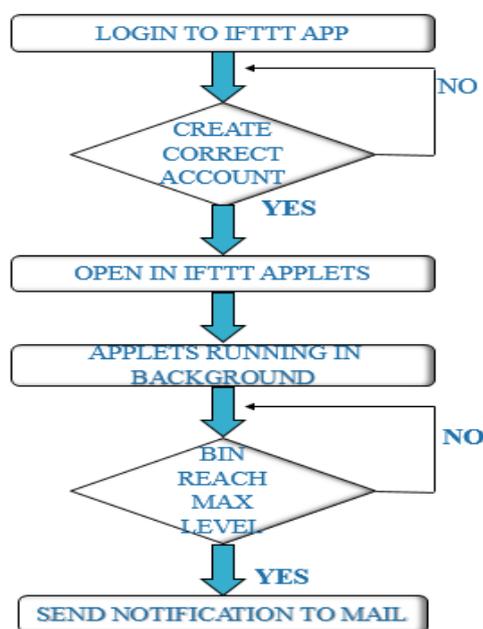


Figure 2: Flow diagram of the smart dustbin

First of all we create an account in IFTTT webhook. Then open the applet and to connect mail id for send the notification. After that webhook private key and host id is connected with project code. Now the applet are start to work and generated the code in webhook server. If the bin reach maximum level, the server start to send the notification to particular mail otherwise it doesnot send the message to mail.

4.3 ULTRASONIC SENSOR

A distance is determined with great sensitivity and correct measurements by an ultrasonic sensor. A Ultrasonic sensor have four pins. Two pin are VCC , GND the other two pin are: The information would be supplied by the trig pin, while it would be absorbed by the echo pin.

$$\text{Distance} = \text{Time} * \text{Velocity of sound} / 2 / 2$$

Where Time= is the time transmitted and received between an ultrasonic wave.



Figure 3: Ultrasonic Sensor

4.4 NODEMCU

NodeMCU is an open-source IoT project that is completely free and it is used for Wi-Fi to make things work. A NodeMCU can be powered through a USB port and this pin can be supplied with regulated 3.3v to power the board. There are 16 general purpose input-output pins for NodeMCU.

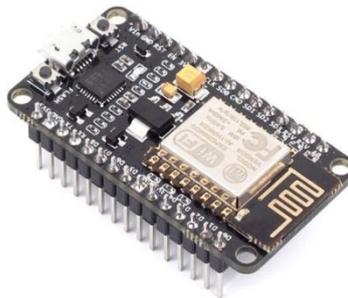


Figure 4: NodeMCU

4.5 IFTTT SETUP

IFTTT is commonly referred to as a web-based service that allows users to connect between web services as IF This Then That. To create conditional trigger chains that work on certain websites, including Microsoft outlook and Twitter message and Facebook. The conditional chains are referred to as applet.

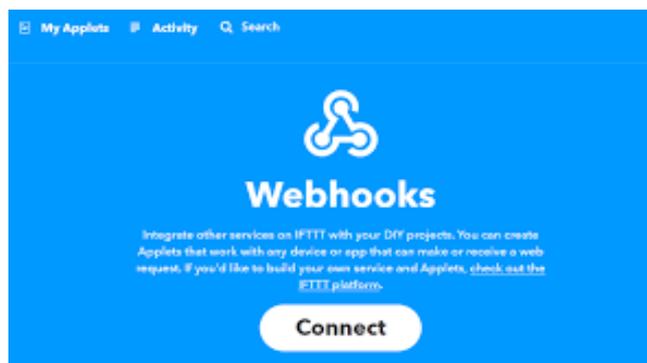


Figure 5: IFTTT Webhooks

4.6 CIRCUIT DIAGRAM

We are interconnecting a ultrasonic sensor with a NodeMCU. The VCC and the GND pin of a sensor connected to 3.3V and the GND pin of the NodeMCU. The Trig pins are connected with a D6 pins, while the information-gathering pins are connected to D5 pins.

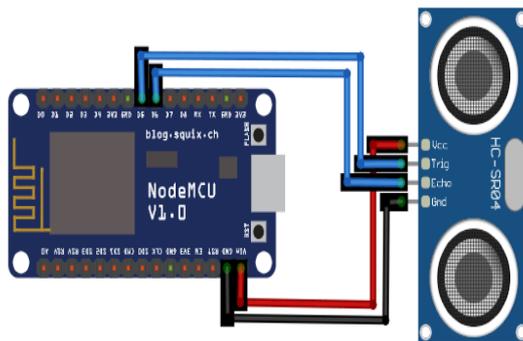


Figure 6: Circuit Diagram for Smart Dustbin

5. RESULT

5.1 Simulation part

To upload and compile the code, once the hardware and coding was done. The main purpose in this method is: To upload the code in NodeMCU through USB port and the Node MCU (esp8266 Wi-Fi) is connect to mobile Wi-Fi and ultrasonic sensor also connected.If the NodeMCU and the ultrasonic sensor was generated, a IP address, distance and level are displayed on a serial monitor.

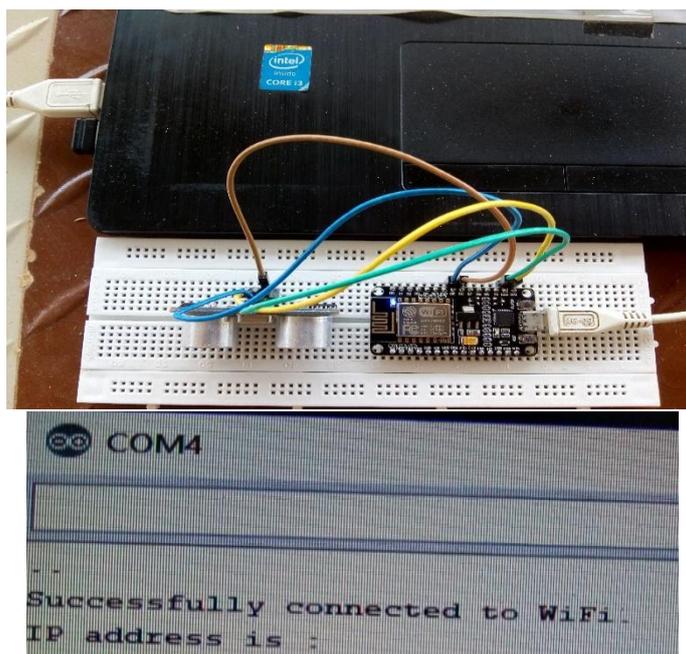


Figure 7: Hardware connections of the smart dustbin

5.2 Output status of empty dustbin

The NodeMCU is attached to the ultrasonic sensor and the ultrasonic sensor was positioned in the maximum level to an empty dustbin. And a code is upload toNodeMCU and an ultrasonic sensor measure the distance and level of the dustbin. Then, use an IP address and a level, to check a webpage to show a garbage bin percentage.

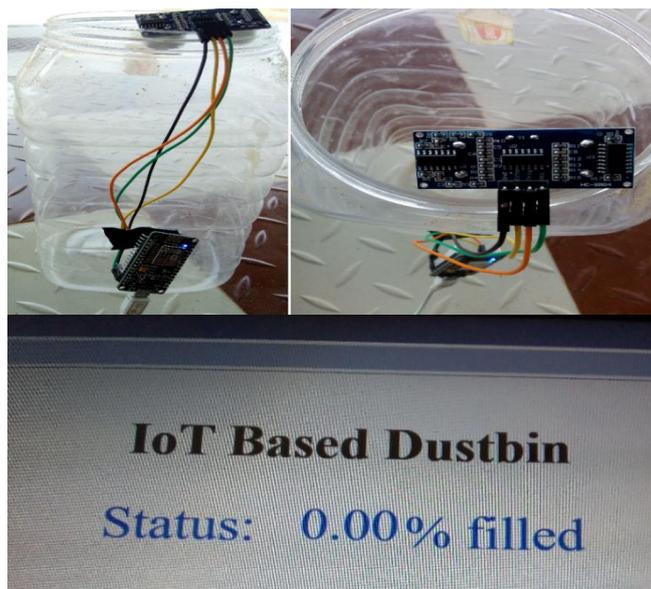


Figure 8: Initial status of the smart dustbin

5.3 Measuring the waste level

Again the same procedure is done with some waste. Use an IP address to check a serial monitor and a webpage to show the dustbin's waste level. Then an IFTTT Web is connected to send an email if a trash bin is above 70%.

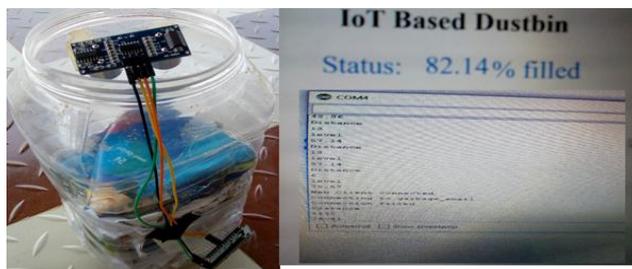


Figure 9: Final updates status level of the smart dustbin

5.4 Email notification

And again, using the IP address, check the serial monitor and webpage to show the dustbin's waste level. Then an IFTTT Web is connected to send an email if a trash bin is above 70 percentage. To use a webpage, we can identify a dustbin was completed or not completed. And a dustbin updates its status percentage, and when more than 70 percent of the dustbin is filled, it sends an email that the dustbin is almost full.

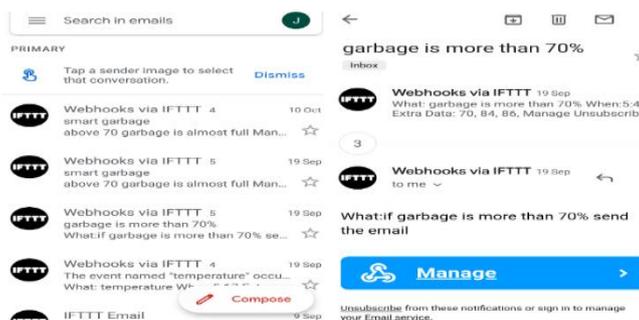


Figure 10: Mail Notification

6. CONCLUSION

Consider the significance of a lack of cleanliness anywhere in the workplace and the need to create a more breathing-friendly atmosphere. Such a system ensures that the recycling bin is cleaned when the dustbin volume exceeds a certain point. Using an ultrasonic sensor and a NodeMCU, each proposes the design of a smart dustbin system. Garbage collection bin vehicles operate on a continuous basis in cities and towns, concentrating on regional growth, and all of these dustbins might not always be complete. By the proposed method of this device will track the rubbish with in dustbins that are located in the city. People can use their electronic devices to view the accuracy of these trash cans at each time. Smart dustbin or garbage bin makes the garbage collection more efficient. Any discarded object that has been passed to a party, a crowded room, a social structure, a school, or an apartment is considered waste. The project focuses on "IoT technology" and how it can be used in "Smart City applications" (IOT). The initiative will aim to minimize the use of trash cans in the future. The main purpose is to clean the dustbin and better clean the environment. By continuously using this system to find a maximum height of a rubbish in a dustbin that is placed in it. If a dustbin is nearly 70 percent, a mail notification can be sent immediately. It helps to keep the environment clean and without causing any kind of disease.

7. FUTURE ENHANCEMENT

This method described above is to move towards IOT implantation. All smart dustbin methods based on IOT are very helpful for cleaning the waste. An Ultrasonic sensor utilize the maximum peaks of rubbish on a dustbin. Many devices may be used in a variety of systems.

8. REFERENCES

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