

SMART DUSTBIN MONITORING SYSTEM USING NodeMCU AND IOT

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Abstract - This paper presents an inexpensive, simple, and scalable intelligent garbage management system. The system uses ultrasonic sensors to measure fill levels and send notifications to garbage collectors when bins need to be emptied. The web-based interface allows waste collectors to monitor fill levels in real time. Smart dustbin monitoring systems have the potential to improve waste management by making it more efficient, sustainable and cost-effective. Smart dustbin monitoring systems use sensors and IoT technology to improve waste management by increasing collection frequency, saving money and improving efficiency.

Keywords – Smart Dustbin, Smart City, NodeMCU, Smart System

I. INTRODUCTION

Garbage is a Very Serious Problem in India for a Quite Long Time. In Cities, We Can See Many Places Where Dustbins are Present but Due to Overflowing of Dustbin, it Creates an Unhygienic Conditions as Garbage has Bad Odor, Resulting in Degrading the Environment as Well. Also It can Lead to Some Serious Health Related Problem to Neighboring Peoples.

Every individual would want everything that looks clean and beautiful, one of which is environmental cleanliness. There are still many individuals who tend to be less aware of the cleanliness of their environment. This is reflected in a large amount of garbage scattered on the streets and in city parks. Dustbins Provided by the

Authorities Need to be Operated Manually and are Cleaned only a Single Time in the Full Day. Due to Manual Opening of Dustbins, People Find it Unhygienic to Open the Lid of Bin and Dispose Their Garbage and Then Close the Lid Manually. Also This Method can Lead to Transfer of Bacteria to Human Body Which Can Lead To Causing Diseases.

For Solving These Problems, A Smart Dustbin and Monitoring System can be Implemented. The Lid Would Open Automatically as soon as The Person Arrives to Dispose The Garbage. And The Monitoring System Would Measure The Level of Dustbin and Alert The Respective Authorities for Emptying The Dustbin. Also Authorities can View The Real Time Data of The Level of Dustbin. By These Data Authorities Can Plan The Emptying of Dustbin More Effectively. This Would Prevent The Litter in the Surrounding Making The Environment Nice and Clean. This Would Further Help Environment by Emission of Lesser Fuels by Garbage Vehicles.

The benefits include:

- Reduced environmental footprint by reducing methane emissions
- Improving public health by eliminating breeding grounds for bacteria and disease.
- Money saved by reducing fuel and labor costs

II. REQUIREMENTS

1. NodeMCU



Figure 1

2. Servo Motor



Figure 2

3. Dustbin



Figure 3

4. Ultrasonic Sensors



Figure 4

5. Jumper Wires



Figure 4

6. IOT Cloud

III. PROPOSED METHOD

We Would Connect Two Ultrasonic Sensor to NodeMCU. Servo Motor Will be Connected to One of the Ultrasonic Sensor. When the User Arrives in the Dustbin Ultrasonic Sensor Will Send Ultrasonic Sound and Would Open The Lid Of the Dustbin Using Servo Motor. After the Disposal of Waste The Lid Would Close Automatically and Then The Other Ultrasonic Sensor Would Transmit Ultrasonic Waves and Measure The Level of the Dustbin. After Measuring the Data It Would be Sent to IoT Cloud and Would Be Presented In Graphs. This Data Can be Viewed by Authorities and an Alert Would Be Generated for Authorities to Empty the Dustbin if The Dustbin is Full. Also Many Dustbin can be Connected to a Single Cloud Which Could Help to Monitor Multiple Dustbins at a Single Time. Then Authorities Could Plan to Empty the Dustbin.

IV. PROPOSED BLOCK DIAGRAM

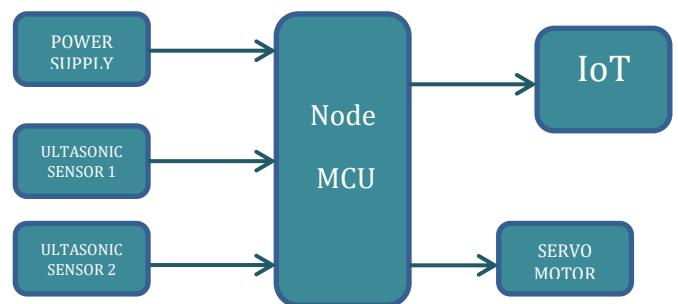


Figure 5

In This Proposed Block Diagram, Power Supply, Ultrasonic Sensor and Servo Motor is Connected to NodeMCU Which is Further Connected to IoT Through Wifi. Ultrasonic Sensor 1 Will First Send Data To NodeMCU Which Will Control Servo Motor for Opening Lid of Dustbin. Ultrasonic Sensor 2 Will Measure Levels of Dustbin and Output Will be Displayed on IoT Cloud Through NodeMCU.

V. RESULT

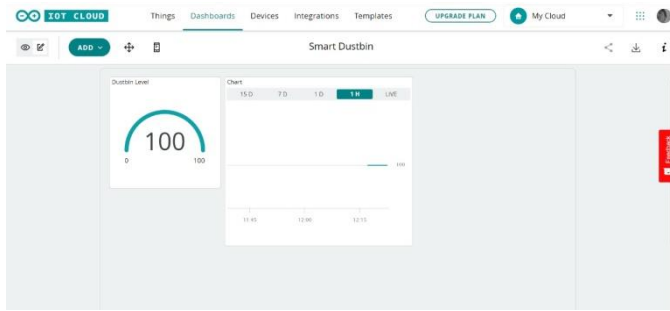


Figure 6

Here, We Can See the Real Time Level of Dustbin in Form of Gauge and Also Previous Data is Accumulated in Form of Graphs Where We can View Data of Pervious 1 Hour, 1 Day, 7 Days and 15 Days. For Multiple Dustbins. There Would be More Gauges and a Bar Graph Where all Dustbin Levels can be Seen Simultaneously.

VI. CONCLUSION

Smart Dustbin Monitoring Systems (SDMS) are a Promising New Technology That has the Potential to Revolutionize Waste Management. By Collecting Data About the Fill Level and Type of Waste in Dustbins, SDMS can Help Waste Management Companies to Optimize Their Routes, Reduce the Environmental Impact of Waste, and Improve Public Health.

SDMS are Still Under Development, but They Have the Potential to Make a Significant Impact on the Way We Manage Waste. By Conducting Comprehensive Research and Development, and by Implementing SDMS in a Thoughtful and Strategic Way, We can Create a More Sustainable and Healthy Future for All.

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