

IoT Based Smart Waste Management System Smart Dustbin

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Abstract: Strong waste administration is a major test in urban zones for the greater part of nations all through the world. A proficient waste administration is pre-demand to keep up a protected and green condition as there are expanding a wide range of waste transfer. Numerous innovations are utilized for waste accumulation and overseen reusing. In order to provide solution for this we have done a project “IoT based smart waste management system”.

1. INTRODUCTION

To make our conditions maintainable treatment of strong waste in family and mechanical cleaning and sea conservancy is a confused task. To diminish the human work in cleaning and clearing, to create a counterfeit keen robot in enterprises, to diminish the human exertion and labor in cleaning and thereby isolating degradable and non-degradable squanders. The entire motivation behind doling out robots to complete man’s work is to lessen our outstanding work at a hand and in particular, carry out the responsibility for us in conditions that are unreasonably threatening for us.

2. LITERATURE SURVEY

In this proposed system, we have done IoT based smart waste management system where, we can manage and maintain municipal solid wastages for sustainable smart cities. It means we are providing a simple solution for our day-to-day life problem. In our model we have included cloud-based analytics for better accessibility. This system provides an information when bin hits 25%, 50%, 75% and full. So, it would be useful for the workers to point out the precise location of the bin by the GPS module provided in the bin. Once someone puts any waste in bin, it will measure the amount of gas and temperature of the items present inside. Hence this system overcomes our day-to-day life problems in a simple manner. This product is simple but useful system for waste management. By using normal simple method, we have designed this for our daily basis needs. In the two previous models one was proposed to classify and monitor the waste collected using Convolutional Neural Network. Another one was an UV sanitized dustbin which can neutralize the viruses and pathogens present in the wastebin. Our model comes with a new method where the municipal person can directly know where the waste is filled and when to be collected. This is a useful system for Government to work more efficiently.

3. PROPOSED SYSTEM

In this proposed system we are using suitable sensors and Arduino Uno, Wi-Fi module and Internet of Things. This system is developed importantly to separate the metal and dry waste using DC motor. Using Ultrasonic sensors will maintain garbage level. If the garbage is filled, through GPS location information Municipality will go there. Finally, the received information will be displayed in webpage, message and LCD display in the bin.

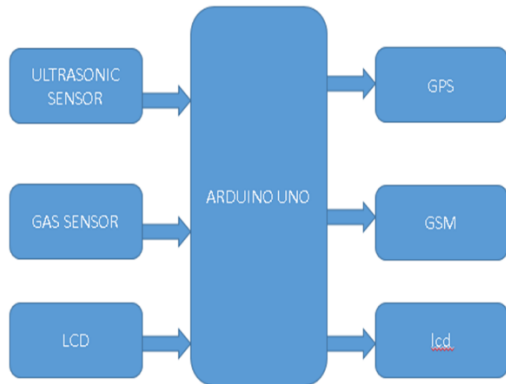


Fig: Block Diagram of proposed system

4. HARDWARE SPECIFICATION

A. Arduino Uno

A micro-controller is a small computer on a single integrated circuit containing a processor core, memory, programmable input/output peripherals. This micro-controller board is based on ATmega328P. It has 14 digital input/output pins

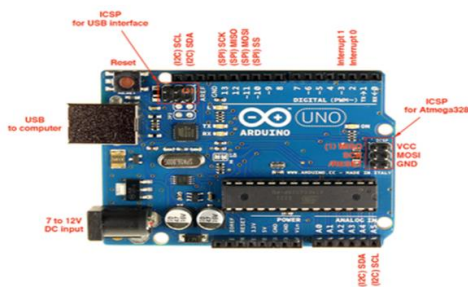


Fig: Arduino UNO

B. NodeMCU

NodeMCU is an open-source LUA based firmware developed for ESP8266 Wi-Fi chip. This hardware design is open to edit/modify/build. This is mainly used for establishing connection between Wi-Fi board and station micro-controller.

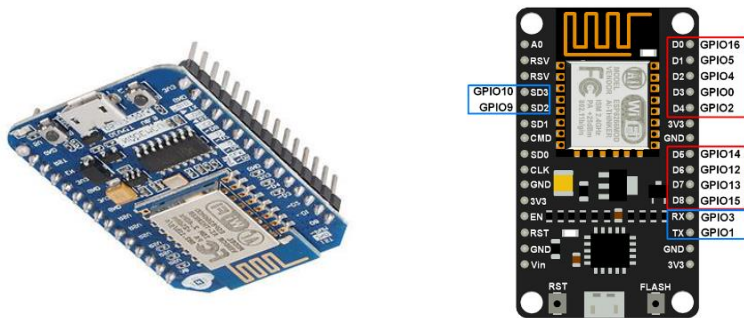


Fig: NodeMCU

C. Ultrasonic Sensor

Sonic waves are best reflected from hard surfaces. Targets maybe solid, liquid, granules or powder. In general, this is deployed for object detection



Fig: Ultrasonic Sensor

D. Gas Sensor

It detects the presence or concentration of the gas in the bin. When the concentration of the gas exceeds the thresh hold value, the pin goes high and it will be displayed

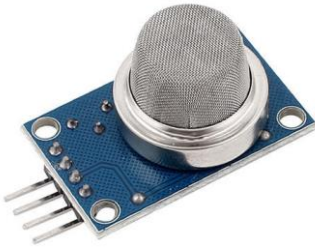


Fig: Gas Sensor

E. LCD Display

This is the display unit where the messages like amount of waste in the bin, gas ratio etc... will be displayed.



Fig: LCD Display

F. GPS Module

The Global Positioning System is used to point out the precise location of the desired object. In our module we use GPS for redirecting the Municipal worker to the bin that is full of waste.



Fig: GPS Module

5. SOFTWARE SPECIFICATION

Arduino IDE

The Arduino Integrated Development Environment consists of word processor for developing codes, a tool bar for board and port selection, menu bar, Serial monitor and an upload section to feed the code into micro-controller.



Fig: Arduino IDE software

6. EXPERIMENTAL RESULT

By using the Arduino IDE, we can feed the mobile number to which the dustbin status has to be notified. The message like – “Dustbin is filled 25%”, “Dustbin is full” will be sent to registered mobile number. Using GPS, the registered mobile number will get latitude and longitude of the bin.

7. Concluding, our module shows how the smart waste management system using IoT can be implemented. The proposed system assures the collection of garbage once it hits 75% which can reduce the problem of waste overflow. The real time monitoring of garbage level with the help of sensors and GPS will reduce the total expenditure and total number of trips required of GCV. Thus, we are giving way to cleaner and smart cities.

8. FUTURE ENHANCEMENT

Currently, the module is sufficient to run for next few years. In the view of future, we would be introducing UV sensor, more sensors for more accurate data. Proximity sensors would be added for automatic opening and closing of the flip.

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