

IOT Based Waste Management System

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Abstract - Urban India generates tones of wastes annually. Our country faces major challenges associated with waste management. Conventional garbage collection is not efficient since the authorities are not notified until the waste bin is full, and this leads to overflow of waste material. Efficient way of waste disposal and collection of disposed garbage is essential for a sustainable and clean India. This paper presents smart waste management using IoT based waste bin for collection and monitoring the level of waste inside bin. The system is implemented using two ultrasonic sensors which is being controlled by Node MCU. One of the ultrasonic sensors detects the level of the waste in the bin and other detects the person approaching the bin to dispose the waste. This detection helps in automatic opening and closing of the lid. Servo motor is connected to the lid which serves the action of closing and opening of the lid. In this system, level of waste in the bin will be sent to concerned authorities. The IoT data is stored and monitored using Blynk app. The proposed system is reliable, cost effective and can be easily implemented.

Keywords: ATMEGA328, ultrasonic sensor, dry and wet sensor, IOT.

I. INTRODUCTION

Management and disposal of waste is a challenge in today's world. The dumping of garbage wastes at open landfill sites is the common method of disposal. The disposal method of dumping in open land sites has an adverse effect on the environment. Uncontrolled dumping of waste on outskirts of towns and cities has created overflowing landfills which are not only impossible to reclaim because of the haphazard manner of dumping but also has serious environmental implications. When viewed on a larger scale, the poor recovery rate has impeded the growth of the country as well as the economy of the nation. Smart cities are covering the population that are seeking the best lifestyle and fulfilling their needs. Through smart cities, necessary modern facilities using ICT emerging technologies such as the internet of things (IoT) had been installed to ensure the sustainability of the city. In the perspective of waste management, several different IoT-based solutions also had been proposed as an alternative to monitor and to ensure the health of communities

It will be very useful and can be installed in the trash cans at public places as well as at home. Garbage may consist of the unwanted material left over from the city, public Areas, society, college, home etc. his system is related to the "Garbage Monitoring" and based on "Internet of Things".

This system will help to minimize the garbage disposal problems and help to keep the clean city.

II. METHODOLOGY

In this system AT-Mega 328 Microcontroller retrieves the data from various sensors and transmits it through IOT. In proposed system two ultrasonic sensors and one gas sensor module has been employed along with dustbin by using Atmega328 .Ultrasonic sensor is used to check the garbage level in the dustbin, so dustbin can be clean timely. Gas sensor will be detecting the gases from the surrounding. And all data save on the IOT platform.

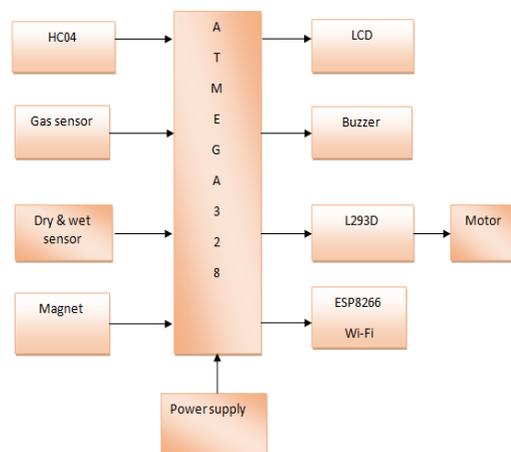


Figure 1: Block diagram

The IOT based waste management system is a very innovative system which will help to keep the cities clean. The system is composed of components: Atmega328, ESP8266 Wi-Fi module, Gas sensor, dry & wet sensor.

This system monitors the garbage bins and informs about the garbage collected is dry or wet and separate it. HC-04 is ultrasonic sensor will detect the level of garbage. Gas sensor detects the gases from the surrounding. If level of the garbage is detected then alert the system through buzzer. And show the result on LCD display. The L293D is a 16-pin Motor Driver

IC which can control a set of two DC motors simultaneously in any direction if the object is identified as dry by the dry and wet sensor detector then the motor rotates & dumps in dry bin. Else if the object is wet then the motor rotates with an angle of dumps in wet bin. In this system 12 v of adapter power supply is used. This Power supply is given to the Arduino board.

Two are VCC and the distance GND which will be connected to the 5V and the GND of the Arduino while the other two pins are Trig and Echo pins which will be connected to any digital pins of the Arduino. All the data will save on the IOT and present in the graphically format.

III. RESULTS AND CONCLUSION

This system presents a smart and cost effective solution for waste segregation. The proposed Smart Bin is an efficient waste segregation system that requires no human intervention to separate dry and wet waste and all data of is saving on the IOT Module. Improper disposal and improper maintenance of domestic waste create issues in public health and environment pollution thus this system attempts to provide practical solution towards managing the waste collaborating it with the use of IOT i.e. providing free internet facilities for a specific time once the trash is dumped into the bin. The proposed system will definitely help to overcome all the serious issues related to waste and keep the environment clean.

Result

The analysis has been directed for wet and dry wastes. It is discovered that the difference in dampness value is more prominent for wet waste and less for dry waste. This system checks corresponding intended information from different sensors to help oversee about the bin status. The proposed research enhances the smart waste management and minimal exposure to pollution.



Figure 2: Project Prototype

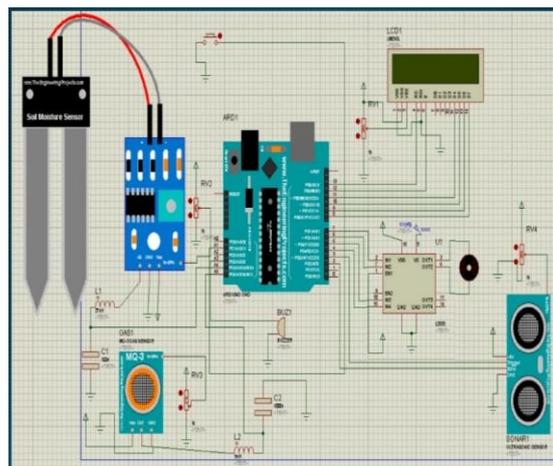


Figure 3: Circuit Diagram

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