

IOT Based Smart Garbage Monitoring System Using ESP8266 with GPS Link

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Abstract - In India, SWACCHA BHARAT ABHIYAN is a mission started by our P.M, Which aims to clean up the roads, streets and to develop the infrastructure digitally of India's cities and rural areas. Focusing towards the clean India mission, we have provided an efficient solution for monitoring the garbage level on the real time basis.

Whole system is IOT based. The level sensors in the garbage bin detect the garbage level continuously and accordingly the system provides the information to the municipality office. This will avoid the overflowing of the garbage bins. Ultimately it will help us to keep our environment clean and also reduces the health issues.

Key Words: IOT, Cloud, GPS, ID, IR sensor, ESP8266, ATMEGA328, Raspberry-Pi, GSM, etc...

1. INTRODUCTION

The overflowing of the garbage bins is very common in India, but this will impact our society, our surroundings. It will damage the environmental values that lead to cause the pollution along with the health issues for human and other animals also.



Fig-1: Overflowing Of Garbage Bins

We proposed an IOT based cost efficient garbage monitoring system which will monitor and alert when the garbage level crosses the threshold level of the garbage bin. This process will be carried out with the help of sensors, microcontroller and ESP8266. It will also provide the GPS link along with the alerting text message to find the shortest

path of the mentioned bin ID. This will reduce the human efforts, also reduces the fuel consumption.

1.1 Existing System

In the existing system, the garbage is collected by the municipality servants on the scheduled routine basis i.e. weekly or 2-3 times within the months. As we see many times that garbage bins are placed in the public places in the cities are overflowing due to increase in the waste everyday. Due to this, the garbage shrinks and produces the bad smell which will tend to cause the air pollution and spread diseases. That can cause the harm to human health. Thus cleaning is the big issue. Also finding the path of garbage bin is one of the task specially for new driver. Thus to avoid such conditions we have designed the improved system.

1.2 Proposed System

In our proposed system, which is the IOT based smart garbage monitoring system along with the GPS link, there is the real time monitoring with alerting facility. Earlier systems which was design was not cost efficient also they are bulky in size, as they were using Raspberry-Pi module, GSM module, also some using GPS antenna, etc. Here in our purpose system we have removed all the hardware part to reduce the size of circuitry this will also reduce the cost of the system. Additionally we are using Solar panel here for power supply with the battery backup for cloudy situations.

2. WORKING

IOT based smart garbage monitoring system using ESP8266 is very simple and real time. Basically the process starts from the garbage bin. IR sensors are fixed on the each level of the garbage bin. Here we are taking the 5 levels of the garbage bin for our project demonstration. We are providing the unique ID for each garbage bin. Also we are selecting the threshold level for alerting purpose. Garbage level is sensed by the IR sensors. As soon as the garbage in the garbage bin crosses the threshold level, the alerting text message will get provided to the concerned person or in the municipality office. This message contains the garbage bin ID along with the GPS link. This GPS link will help to find the shortest path of that garbage bin. This is helpful especially for new drivers of that municipality vehicle.

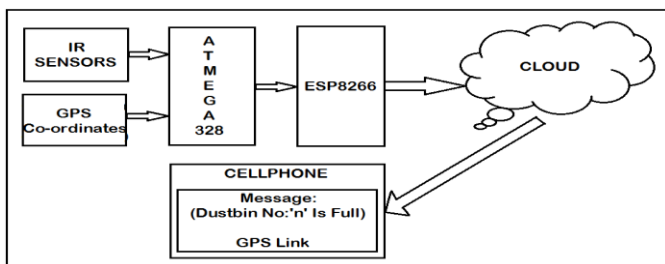


Fig -2: Working Block Diagram of Garbage Monitoring System

Block diagram shows the working of the system. Basically there are five main parts of the whole system. Power supply part, sensing part, processing part, uploading to the server/cloud, and the alerting part. IR sensors, senses the garbage level and accordingly sends the signals to the ATMEGA328 microcontroller. Also the GPS co-ordinates of the garbage bin are provided to the microcontroller. ATMEGA328 process the received signal and passed further to the ESP8266. ESP8266 is a Wi-Fi module which is also working as a transmitter in our system. ESP8266 plays very important role in reducing the hardware of the system. It replaces the Raspberry-Pi module. As our system is IOT based, the alerting will get taking place with the help of IOT. Due to this GPS module is removed. The alerting message with the GPS link has no need to use the GPS antenna because we can feed the co-ordinates of the garbage bin in the programming part as the position of the garbage bin is fixed. In this way when garbage crosses the threshold level, the alerting message will get continuously send until the garbage in the garbage bin is removed by the concerned person. In this way our whole system will work. For the power supply, we are using the solar panel here along with the battery backup.



Fig -3: Garbage Monitoring System

3. RESULTS



Fig-4: System output on the LCD Display

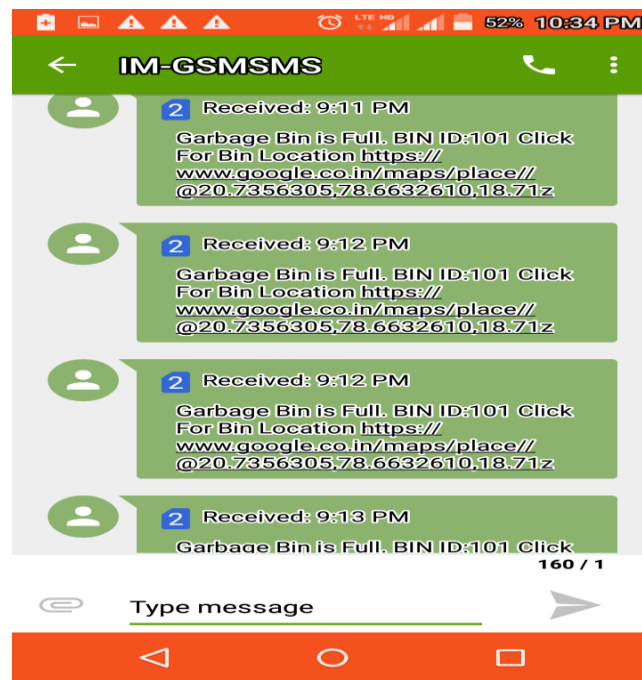


Fig-5: Screenshot of the Alerting Message

4. CONCLUSIONS

This paper introduced the IOT based smart garbage monitoring system using ESP8266 with the GPS link. It will provide the improved efficient solution to the waste management issue over the previous systems. This will responsible to reduce the health related issues and putted the best example for real time garbage management system.

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