

Garbage Bin Management System

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ABSTRACT

In everyday life, the right management of the solid waste becomes bigger challenge to the government in cities, persistently the rubbish bins at public places are filled that create unsanitary conditions for the people and conjointly pollute the encompassing surroundings. To avoid such scenario IOT primarily based sensible trash a collection victimization associate degree IR device is enforced. During this project, an IOT technology has been projected for the garbage clearance. This model consists of Microcontroller, dustbins loaded with IR sensors, and that they are unceasingly monitored through the net. This method is the power-assisted by interfacing an IR device with Microcontroller to visualize the extent of waste-filled within the trash bin and delivers the alert message through cloud to web server. Once if the garbage is stuffed with the precise garbage location that is accessed victimization by GPS module. So the main points regarding the dustbins are accessed with the assistance of the net and immediate action will be taken to scrub the dustbins. Automatic cleansing of the bin is additionally enabled promptly when assembling the waste.

Keywords: Wi-Fi modem, Node MCU Controller, Solid waste management.

1. Introduction

Garbage will embody the unwanted things, food items, wastes left over from environment. This project will also contribute to the “Smart city” scheme. Proper maintenance of garbage will automatically result in healthy and safe environment. Due to the massive increase of world’s population, the extra waste is formed daily and in this condition waste management sector becomes challenging in the assortment of solid waste from the cities. In some cases the improper waste management results as the risk to the peripheral communities. The improper maintenance of garbage bins results in unhygienic condition of the environment and also causes foul smell[1-7]. The existing system of waste management is being done manually which has lack of knowledge on the waste management and has poor infrastructure. With the modern technology, it becomes easy to ensure the safety of the environment. By implementing IOT based monitoring in garbage management which is done with embedded units such as micro controller .This project can be implemented in all the cities since the cost of implementation is comparatively low. The whole system comprises of Arduino family micro controller, LCD, buzzer to alarm and a Wi-Fi module .The whole unit is driven with 12V device. The LCD screen will display the garbage level in the trash bin to the concerned authority. This paper contains the following sections as: describes the Existing systems, proposed method, system flow and discussed about the results and discussion and conclusion of the work.

2. Existing System

In the existing system, usually garbage is being collected manually in the interval of twice a week or two days once. The garbage overflows and makes unsafe environment. It also pollutes the environment and the animals roaming on the roads also eats the dumped garbage in the dustbin which is even worse. The unmanaged garbage bins creates dirty atmosphere, to avoid such state of affair we tend to be aiming to style IOT based Garbage management system for Clean and healthy environment.

3. Proposed System

In the proposed system, the garbage bin consists of three IR sensors to detect the level of waste in the garbage bin. Cloud is connected for brief vary communication to connect n number of dustbins at various places. In this paper, IR sensor detects the extent of garbage stuffed within the bin and sends the message to the municipal department internet server. If garbage is stuffed above a certain level, the message to alert the concerned person will be sent through cloud. This IOT concept of identifying and managing the garbage bins will be effective and implementable. Therefore, the scientist feels Internet of Things (IOT) is a rising concept with lots of advantages that will make our future better with new technologies. IOT includes various technologies which identifies, then sense the issue and communicate to the authorized person and then compute and then solve the issue. Waste management will be at better stage with IOT. The idea of IOT in this project will lead to proper management of wastes. The garbage bin can be converted into a complete functionable embedded system which detects and warns to clean the bin to the concerned authority. In smart garbage management system, garbage bin is designed to detect the garbage level with IR sensor and to warn the authorized person if the bin is about to fill through message. This system comprises of a NANO microcontroller to control the complete system, three IR sensors to detect the garbage level, 16X2 LCD screen to display the garbage level, Cloud system to transfer messages, a motor set to clean the bin and a power supply. The two levels of notification alert is provided to the concerned authorities with exact garbage bin location accessed through the GPS module. The Real time updates of garbage level in the garbage bin can be obtained .This will lead to the effective usage of dustbin. This IOT based Garbage monitoring system is an effective and innovative system which will contribute to keep the environment clean and safe. In real time system the proposed model gives details of the garbage levels. Before dustbins gets overflowed an alert signal is sent. The waste analysis can be effectively done using this proposed model. The waste collection will not be missed and also the overflow of the garbage and the mere consequences can be avoided. The microcontroller controls the total system which identifies the level of garbage, sends the message to the municipal department and clean the bin using motor pump. Fig.no 1 shows the block diagram of the proposed system.

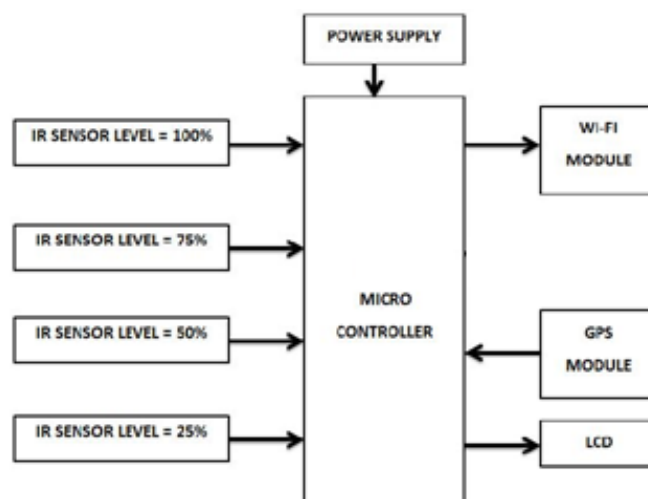


Fig. 1. Block Diagram of Smart Garbage Monitoring System

A.Node MCU

Node MCU is associate open provide code that open provide prototyping board designs unit of measurement on the market. The term "Node MCU" to be precise mention in a code on the other hand identified the development tools .The code as well as the prototype board designs unit of measurement provides open. The language used in the coding part is Lua scripting. The code formed on the eLua project. Many open provides are used similar of lua-cjson and also SPIFFS. Because of resource require users must compelled to settle on the same modules for his or her projects and to develop a code customized to their purpose. Encourage for the 32-bit ESP32 has been imposed.

B.IR Sensor

This sensor detects the garbage bins at different levels. It contains a combination of both transmitter and receiver. Infrared LED is reflected and it is transmitted by the transmitter and then crash on detector. In this module it contains comparator IC 358.It has only single input by which it will change the resistance of photo detector also changed .By the help of LED the change is revealed.

C.GPS Module

In this we have used SKG13BL GPS module. This GPS module has fast sensitivity and it consume very low power. It consume a very low power at 45ma at 3.3v.If the signal is given to antenna, it process step by step and then it gives the location, speed and timing information. This is generally used to find the location and commonly used in mobiles and vehicle system. It can be easily connected to camera, mobiles, vehicles and other objects.

4. System Flow

Fig 2 shows the algorithm of the smart Garbage monitoring System.

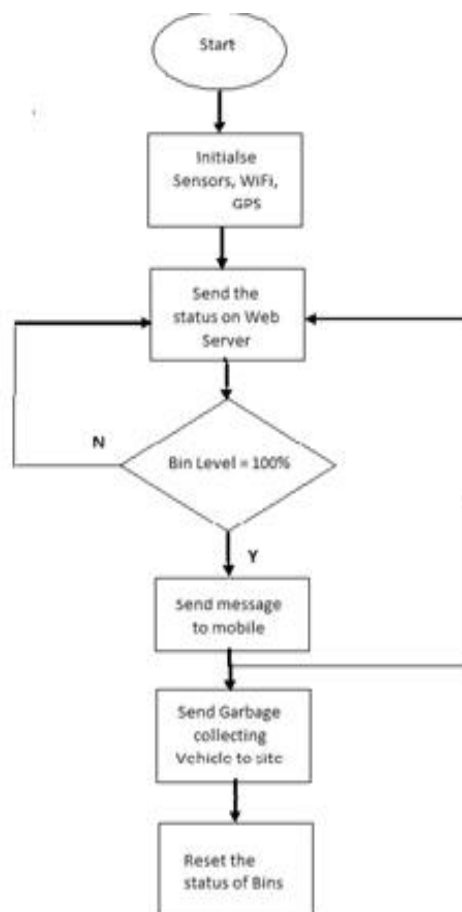


Fig.2 Flowchart of the proposed systems

Step 1: Initialise the components of the system.

Step 2: The IR sensors detects the level of garbage and sends the status of the bin on web server.

Step 3: If the level of the bin is not between 90% - 100%, the status will be sent through web that the bin is empty to waste management company.

Step 4: If the level of the bin is 100%, the alert message will be sent to the waste management waste management company through web server.

Step 5: Waste management company will send the mobile notification to the waste collecting truck to the site and collects the garbage from the bin.

Step 6: After collecting the garbage, the status of the bin will be reset and the process will be repeated.

5. Results and Discussion

The Smart garbage monitoring was successfully introduced as a result of the study. The dustbins are fitted with IR sensor at three different levels. Garbage level is detected by IR sensors and displayed on LCD. If the threshold level is attained, instantly the message is sent through the cloud to legalized person next to geographical location of the bin. The

microcontroller controls all the devices fitted in the garbage bin and makes decision according to the algorithm. Fig.3 shows the warning message to clean the bin to the authorized person, so that they can alert the waste collection truck to clean the bin immediately. Fig.4 shows that the bin is ready to be emptied. Fig.5 shows the level of the garbage in the bin as 75, so that the authorized person can plan accordingly to clean the bin. Fig.6 shows cleaning process happening in the bin after the garbage was collected by the waste collecting truck. This process is done by the motor pump associated with the bin. This step ensures the safety of garbage collectors as well as the environment also the foul smells due to garbage residues in the bin can also be eliminated. Fig.7 Mobile notification output showing the level of a garbage bin as 75% , by this method of indication we can spot the particular bin which is actually needed to be emptied. Fig.8 Mobile notification output showing the level of a garbage bin as 50%, With this information the waste collection truck driver can make the best route possible to reach the bins which are needed to be emptied.

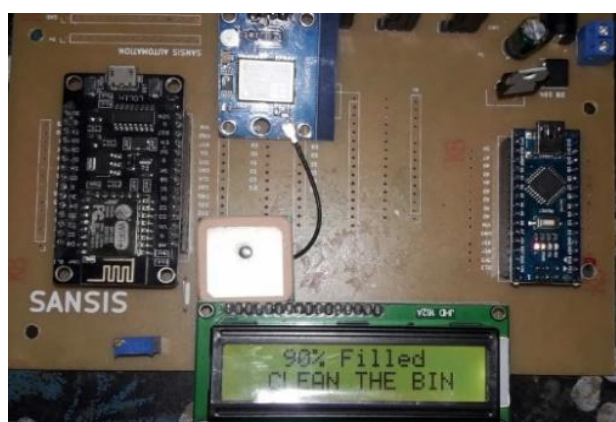


Fig.3 Warning message to clean the bin to the authorized person.



Fig.4 Ready to collect bin message to the authorized person.

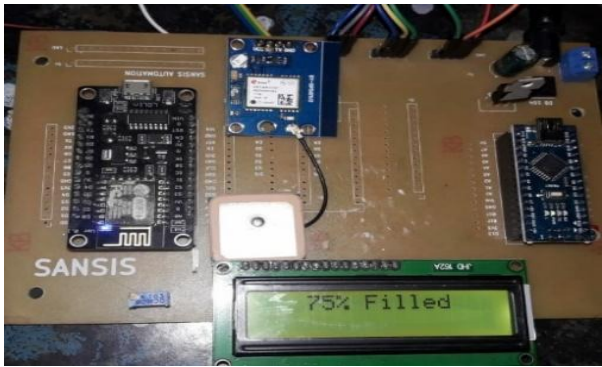


Fig.5 Level of the garbage in the bin.



Fig.6 Cleaning Process happening in the bin.

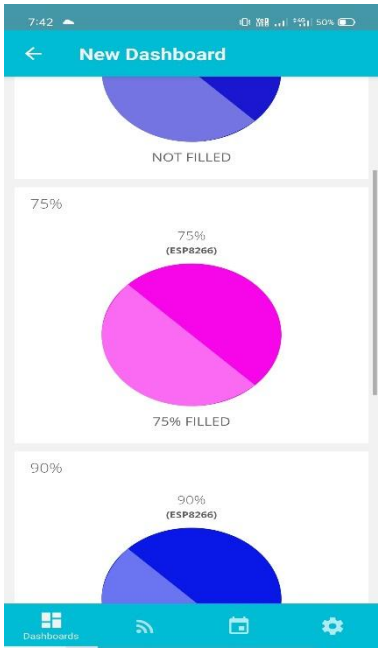


Fig.7 Mobile notification output showing the level of a garbage bin as 75%

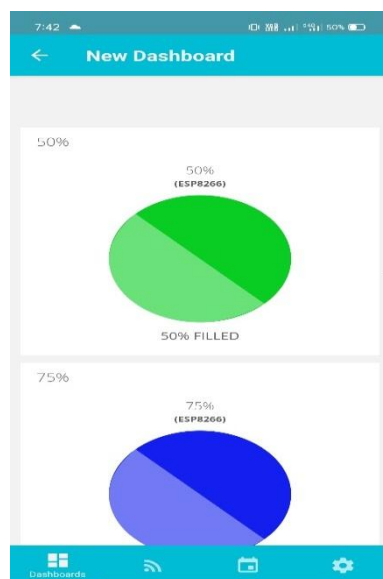


Fig.8 Mobile notification output showing the level of a garbage bin as 50%

6. Conclusion

This project proposes a Smart garbage monitoring system using IOT. This integrated system consisting of Wi-fi modem, IR sensors and IOT ensures the effective management of garbage which leads to the safe and clean environment. This system provides complete database of the garbage details of each and every garbage bin in the city. The waste collection system ensures the proper maintenance of garbage bins placed at different locations in the city. By implementing this project, the overflowing of the garbage bins and unhygienic conditions caused following it will be reduced to a greater extent. Since it automatically monitors the garbage bin, the manual effort will be reduced and the warning to clean the bin will be sent directly to the garbage collecting truck with the location of the bin, which is very fast and applicable. The technologies used in the proposed system is practical, efficient and affordable for garbage monitoring system for safe and secure environment.

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