TUF | THE UNIVERSITY OF FAISALABAD

Smart IoT Project: Garbage Monitoring System for Smart Cities

INTRODUCTION

Garbage may consists of the unwanted material left over from city, public area, society, college, home etc. This project is related to the “Smart City” and based on “Internet of Things” (IoT). So for smart lifestyle, cleanliness is needed, and cleanliness is begins with Garbage Bin.

This project IoT Garbage Monitoring system is a very innovative system which will help to keep the cities clean. This system monitors the garbage bins and informs about the level of garbage collected in the garbage bins via a web page. For this the system uses ultrasonic sensors placed over the bins to detect the garbage level and compare it with the garbage bins depth. The system makes use of ESP8266 NodeMCU microcontroller sending data. The system is powered by a 5V chargeable cells. The blynk application display the status of the level of garbage collected in the bins.

Whereas a blynk application is built to show the status to the user monitoring it. The application gives a graphical view of the garbage bins and highlights the garbage collected. The blynk application shows the status in percentage of the garbage level. Thus this system helps to keep the city clean by informing about the garbage levels of the bins by providing graphical image of the bins via a blynk application.

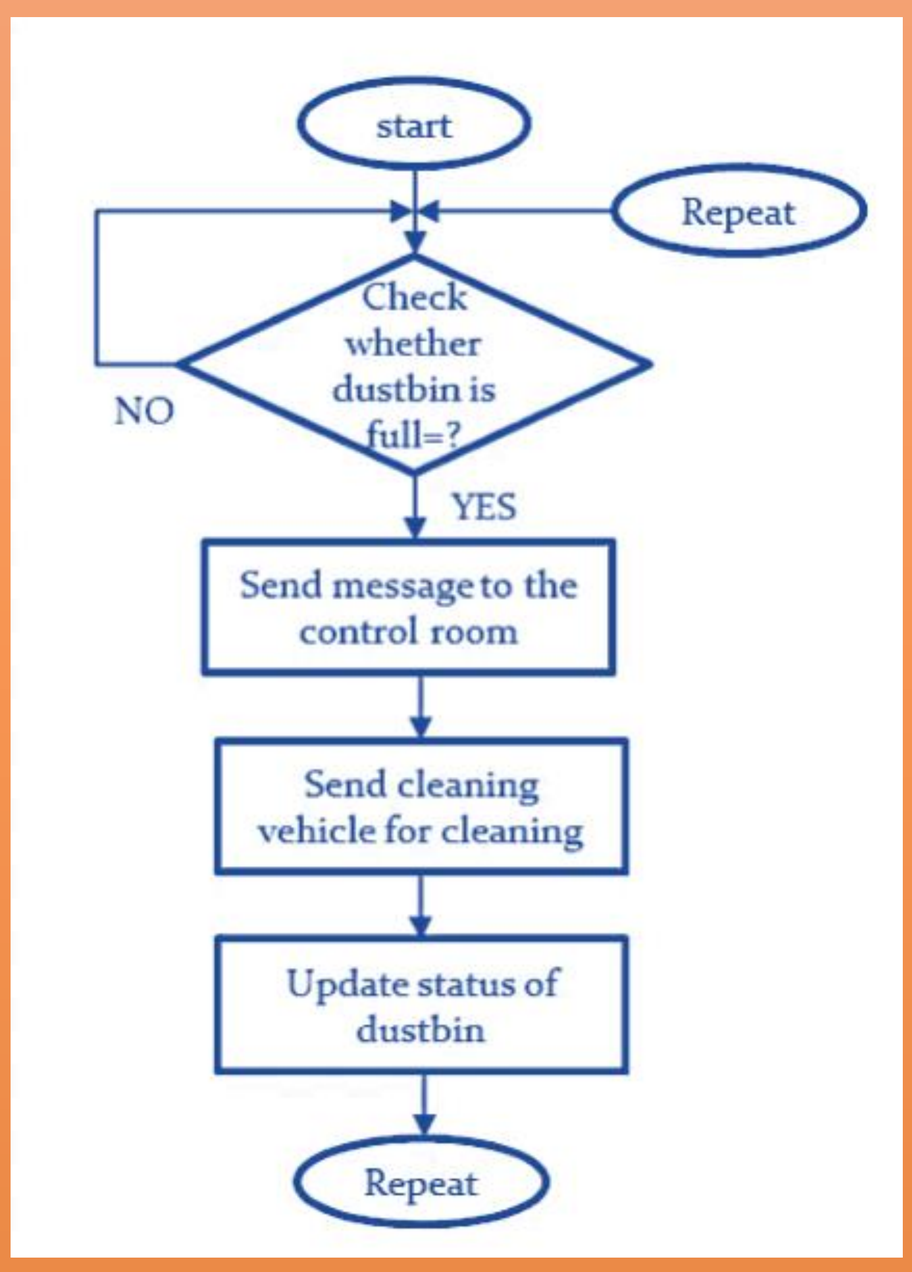
PROBLEM STATEMENT

There are millions of public dustbin out there that people use and are emptied in a few days by the public authorities. Now the problem is not all dustbins are filled at the same rate and the dump vehicle waste time checking each and every dustbin. This leads to more fuel usage, labor and cost.

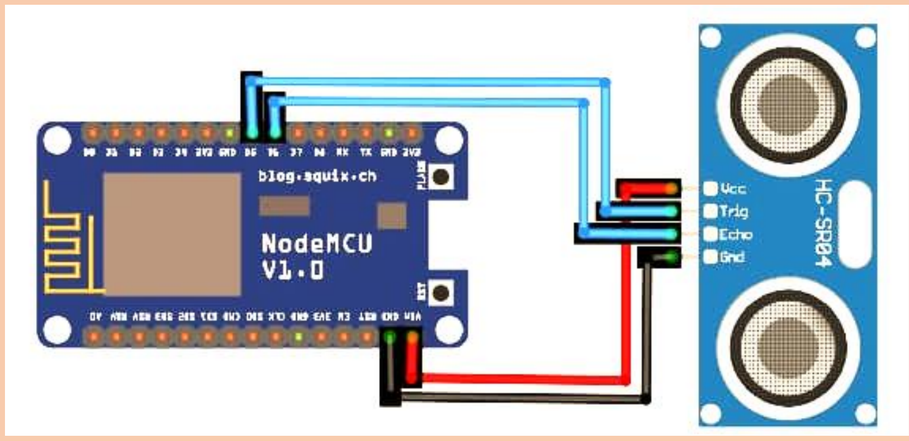
OBJECTIVES

The basic idea in this project is to design a smart garbage detection system which would automatically notify the officials about the current status of various garbage bins in the city, with the real time monitoring capabilities under remote controlled IoT technique.

METHODOLOGY



CIRCUIT DIAGRAM/ SCHEMATICS



RESULTS AND DISCUSSION

This work introduces the design and development of smart green environment of garbage monitoring system by measuring the garbage level in real time and to alert the municipality where never the bin is full based on the types of garbage. The proposed system consisted the ultrasonic sensors which measure the garbage level, an ARM microcontroller which controls system operation whereas everything will be connected to blynk application.

This work demonstrates a system that allows the waste management to monitor based on the level of the garbage depth inside the dustbin. The system shows the status garbage level; domestic waste, paper, glass and plastic through blynk application in a real time to store the data for future use and analysis, such as prediction of peak level of garbage bin fullness. It is expected that this system can create greener environment by monitoring and controlling the collection of garbage smartly through Internet-of-Things.

FUTURE WORK

This method described above is to move towards IoT implantation. All smart dustbin methods based on IoT are very helpful for cleaning the waste. An Ultrasonic sensor utilize the maximum peaks of rubbish on a dustbin. Many devices may be used in a variety of systems.

CONCLUSIONS

For this project, the smart garbage monitoring system (IoT-based) is produced to improve the garbage waste management system. This project is considered successful because it achieved the main objective. Besides, this smart dustbin can contribute to the hospitality and for the multilevel building. This project has implemented the smart dustbin that can reduce the humidity and time waste management system by using the smart dustbin that can monitor the level of the garbage, whether it is full or not. In this smart dustbin system, it can be accessed from anywhere and anytime by the cleaner. This smart dustbin also can inform the user about the status of the garbage by the blynk application. At the end of this project, the smart dustbin is able to notify the cleaner when the dustbin is full. Besides, the user is also able to see the status of the garbage inside the dustbin. The result contains three types of status there is normally, 50%, and 100%. The dustbin only notifies the user when the garbage reaches 100% of the dustbin. The distance of the dustbin is based on the distance of the garbage from the ultrasonic sensor. The ultrasonic sensor is set-up in three conditions of garbage level that are FULL, HALF-FULL and EMPTY.

REFERENCES

1. M. Fazio, M. Paone, A. Puliafito, and M. Villari. “Heterogeneous Sensors Become Homogenous Things in Smart Cities”, IEEE 6th International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing (IMIS), 2012, pp. 775-780.
2. C. Balakrishna, “Enabling Technologies for Smart City Services and Applications”, IEEE 6th International Conference on Next Generation Mobile Applications, Services and Technologies (NGMAST), 2012, pp. 223-227.

DEPARTMENT OF ELECTRICAL ENGINEERING