Sensor Based Garbage Disposal System

Abdul Subhani Shaik, S. Usha

Abstract--- In public places and villages garbage accumulation is the serious problem now a days. The unhygienic condition leads to different diseases and ugly look of the place. An efficient method is proposed to handle this situation for proper disposal of garbage. Dry and wet wastes are collected in separate bins which are monitored by sensors and load cell. The sensors monitor the level of filling in bin and load cell checks the weight of the dustbin. When the threshold is reached an alert is given through SMS so that garbage can be disposed before overflowing.

Keywords: ARM CORTEX M3, Garbage disposal, Load cell, PIR sensor, Ultrasonic sensor.

1. INTRODUCTION

The Smart City provides upgraded living conditions with various implementation in hygienic condition. Considering the general situation in India, government and exclusive organizations are contributing every year basic proportion of their money related plans to research, headway and execution of Smart City.Those levels could be related to different accomplices (i.e. government, authorities, exclusive organizations, subjects, et cetera.) and in addition diverse fields (i.e. movability, open data, essentialness profitability and low carbon plans, approach and control, misuse organization). The data examination is a common place base-ground for already specified issues of the Smart City thought.

An Embedded System is a specialized unit where hardware and firmware are specific to meet the system expectations. Moderately every family has one, and endless they are used standard, yet not a lot of people comprehend that a processor and writing computer programs are locked in with the course of action of their lunch or dinner.

This is in direct separation to the PC in the family room. It too is incorporated PC hardware and Programming and mechanical parts (plate drives, for example). In any case, a PC isn't expected to play out a specific limit rather; it can do different things. Various people use the term all around helpful PC to make this refinement self-evident. As conveyed, an all-around helpful PC is a reasonable slate; the maker does not perceive what the customer will do wish it.

2. LITERATURE SURVEY

Since smart cities are becoming center of attraction for the advancement of developing countries and without the removal or solution to the garbage problem these cities will be not that attractive. Therefore, researches are carried out to implement garbage disposal in a proper way. Many projects with microcontroller are focused to provide real time solution to the garbage monitoring and disposal system.

To check the level of waste in garbage bin Yusof et al. [2], presented a system with microcontroller which sends alert through SMS to municipality to clear garbage.

A system based on RFID and sensors proposed by Issac and Akshai [3], proposed gathers data using RFID reader via Bluetooth to effectively control the waste.

The waste segregation system is proposed by Adil Bashir [4] in which sensors are employed to separate waste components before disposal.

3. PROPOSED METHOD

An efficient method is proposed to handle the proper disposal of garbage. Dry and wet wastes are collected in separate bins which are monitored by sensors and load cell. The sensors monitor the level of filling in bin and load cell checks the weight of the dustbin. When the threshold is reached an alert is given through SMS so that garbage can be disposed before overflowing.

3.1 ARM CORTEX M3 LPC 1768

The LPC1768 is ARM Cortex-M3 based microcontrollers used for many applications including a strange condition of joining and low power usage. The ARM Cortex-M3 is a front line focus that offers system changes, for instance, updated examine features and a more hoisted measure of assistance square compromise.

Features

ARM Cortex M3 is a 32 bit microcontroller.

LPC 1768 is microcontroller works on thumb instructions.

Interrupt priority is allowed to change during runtime.

It has built in debugging features.

It supports the operating system like windows, Linux.

It is a mixed signal processor working with high performance.

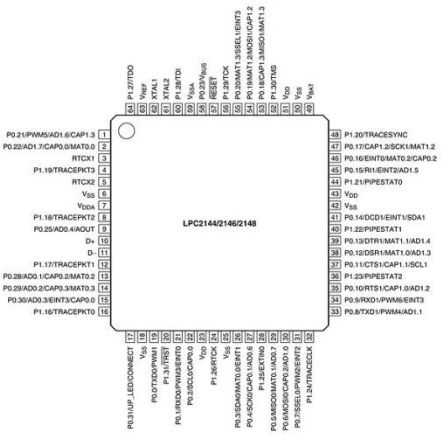


Fig 3.1 Pin diagram of lpc1768

Revised Manuscript Received on March 02, 2019.

Abdul Subhani Shaik, Assistant Professor Electronics and Communication Engineering CMR College of Engineering & Technology Medchal, Hyderabad, Telangana-501401, India

S. Usha, Assistant Professor Electronics and Communication Engineering CMR College of Engineering & Technology Medchal, Hyderabad, Telangana-501401, India

3.2 PIR Sensor:

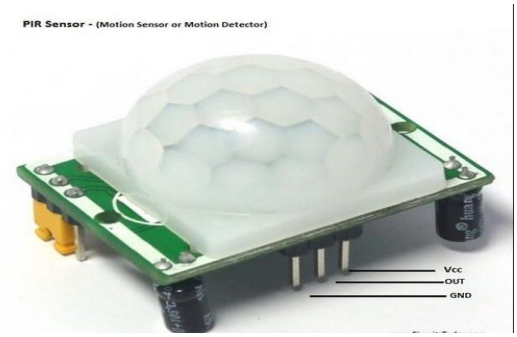


Fig 3.2 PIR Sensor

The PIR sensor detects the infrared radiation from the objects which are in front of it**.** The amount of radiation depends on temperature and surface characteristics.

3.3 Load cell

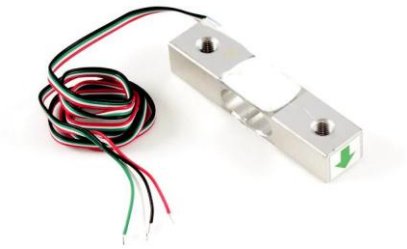


Fig 3.3 Load cell CZL635

Single point load cells are available in aluminium, steel and strain less steel. It is used to measure pushing fore along an axis. The load cell material is resistant to rust and scratches. It is compact and capable of measuring high loads up to few tones. The load cell output is highly accurate and produces stable output.

3.4 GSM modem

The words, "Compact Station" (MS) or "Adaptable Equipment" (ME) are used for versatile terminals Supporting GSM organizations. A call from a GSM compact station to the PSTN is known as an "adaptable begun call" (MOC) or Output: Digital pulse high (3V) when enacted (development perceived) propelled low when sit (no development distinguished). Pulse lengths are controlled by resistors and capacitors on the PCB and differentiation from sensor to sensor.

Fig 3.4 GSM Modem

3.5 Ultrasonic sensor

Fig 3.5 Ultrasonic Sensor

The Ultrasonic Sensor is a widely used sensor in many real time applications.

The sensor contains both transmitter and receiver module together in a pack. It operates with 5V supply.

The Ultrasonic waves transmitted gets reflected whenever it hits any object. The receiver in the module receive this reflected signals and the distance of the object is calculated by the basic formula

Distance = Speed x Time

The sensor used in the design has object detection at a close range 3 cm and far range 3 meters.

4. FLOW CHART

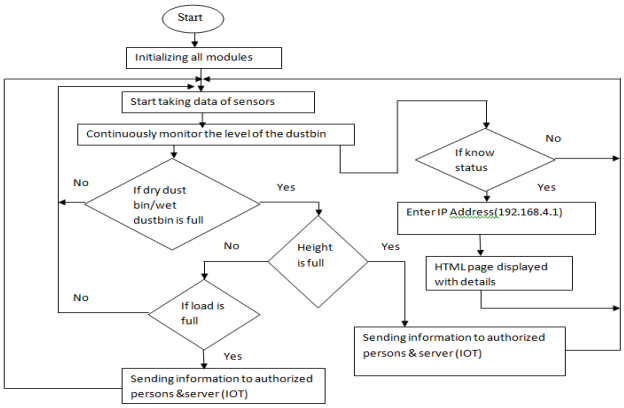


Fig 4.1 Sensor operation flow

5. SYSTEM HARDWARE

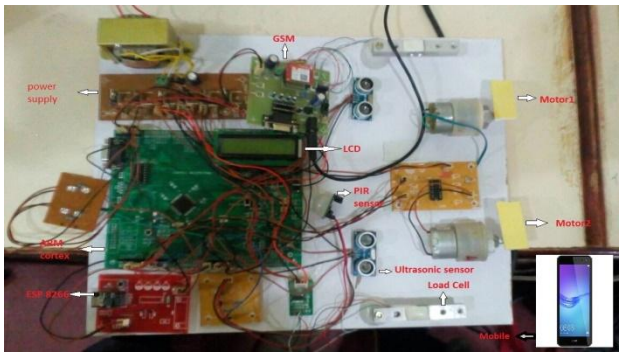


Fig 5.1 Hardware implementation of proposed system

5.1 Algorithm

Step 1. Initialization of ARM CORTEX M3 microcontroller, GSM modem and all sensors.

Step 2. Initialize the SIM and enable ESP8266

Step 3. When Wi-fi is available mobile is connected through IP address.

Step 4. When the margin is reached for height and weight of the bins, SMS alert is activated.

Step 5. Status of the bins can be known by using IP Address in HTML page.

6. RESULTS

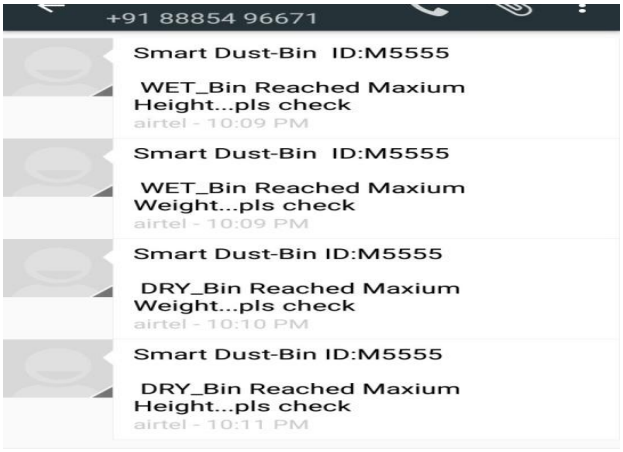


Fig 6.1 SMS Results

When height/weight of the Dry Dustbin/Wet Dustbin is reached maximum limit, then message will be sent to the authorized persons through the GSM modem.

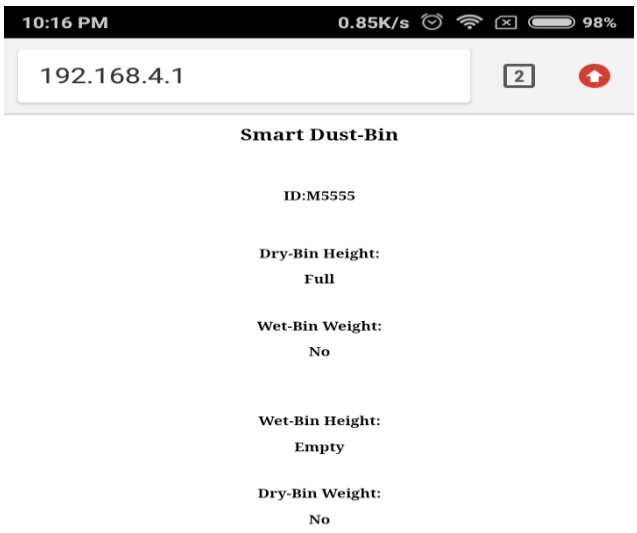
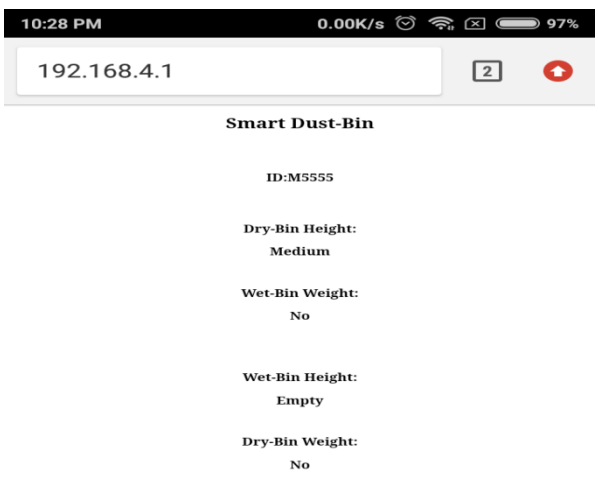
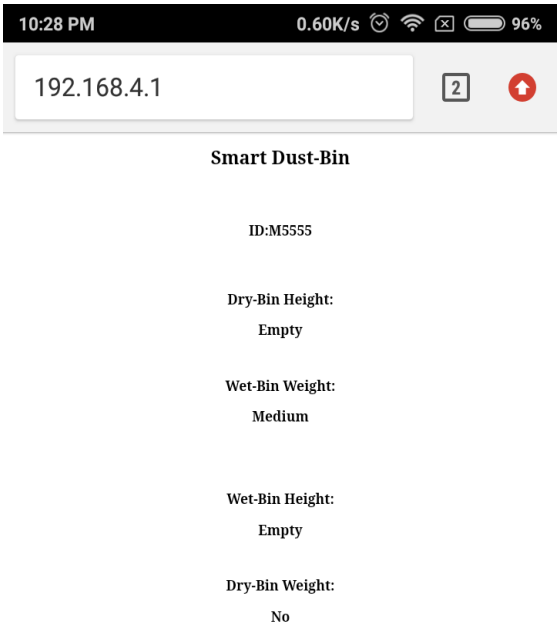
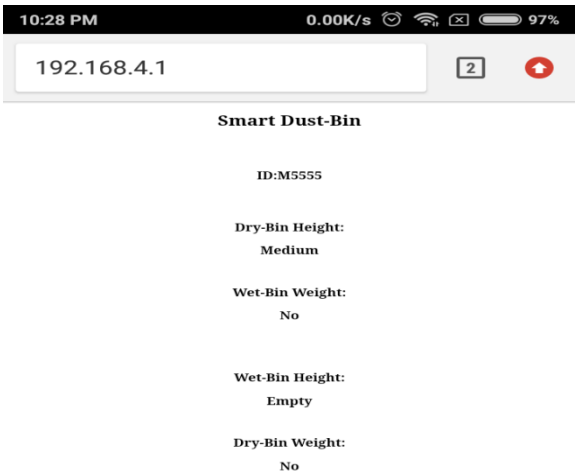
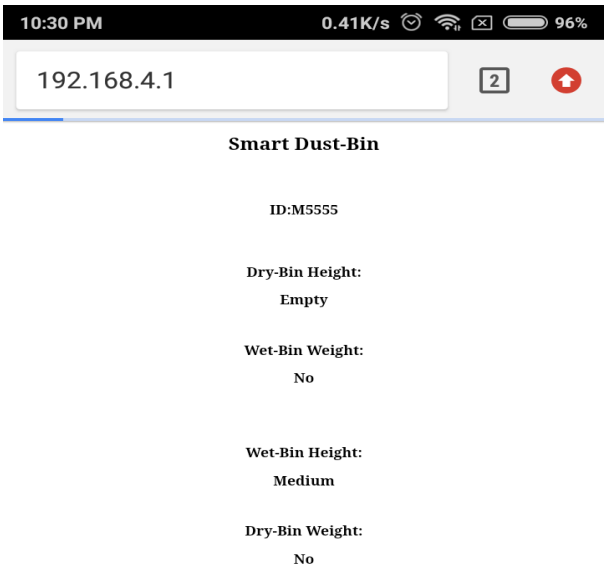


Fig 6.2 Webpage with IP Address









7. CONCLUSION

Based on the observations in the city, it is understood that proper garbage disposal is very much needed for hygienic environment. The proposed system meets the demand of constant check on garbage content in the bins. It helps to dispose the waste material before it overflows from the bins. So regular monitoring and intimating make the system useful in waste management. This leads to clean city for the better living.

ACKNOWLEDGEMENT

We would like to thank our department Professors for their support and encouragement in writing and editing this technical paper.

REFERENCES

1. Yusof, N.M., Jidin, A.Z., Rahim, M.I, "Smart garbage monitoring system for waste management", MATEC Web of Conferences Engineering Technology International Conference, vol. 97, EDP Sciences (2017), p.01098.
2. Issac, R., Akshai, M, "SVASTHA: an effective solid waste management system for Thiruvalla Municipality in Android OS", Global Humanitarian Technology Conference: South Asia Satellite, GHTC-SAS, Trivandrum, India, IEEE (2013), pp. 254–259.
3. Rajkamal, R., Anitha, V., Nayaki, P.G., Ramya, K., Kayalvizhi, E. "A novel approach for waste Segregation at source level for effective generation of electricity—GREENBIN.", International Conference on Science Engineering and Management Research, ICSEMR, Chennai, India, IEEE(2014), pp. 1–4.
4. Adil Bashir, Shoaib Amin Banday, Ab. Rouf Khan, Mohammad Shafi, "Concept, Design and Implementation of Automatic Waste Management System", International Journal on Recent and Innovation Trends in Computing and Communication ISSN 2321 – 8169 Volume: 1 Issue: 7 604 – 609.
5. Meena Deswal and J.S Laura (2014) "Application of GIS in MSW management in India", International Journal of Engineering Research and Development e-ISSN: 2278-067X, Volume 10, Issue 1, PP. 24-32.
6. Ohri.A, Singh.P.K (2010), " Development of Decision Support System for Municipal Solid Waste Management in India" International Journal Of Environmental Sciences Volume 1, No 4.
7. Simon Mayer, Ruben Verborgh, Matthias Kovatsch, and Friedemann Mattern, "Smart Configuration of Smart Environments", IEEE Transactions on Automation Science and Engineering.
8. Surendra Kumar Yadav(2013), "GIS Based Approach For Site Selection In Waste Management", International Journal of Environmental Engineering And Management, ISSN 2231-1319, Volume 4, Number 5, Pp. 507-514.
9. Valcourt, Y. D. L. Hoz, and M. Labrador (2016), "Smartphone-Based Human Fall Detection System", IEEE Latin America Transactions, Vol. 14, No. 2.
10. Zhenghua Chen, Qingchang Zhu, and Yeng Chai Soh, "Smartphone Inertial Sensor Based Indoor Localization and Tracking with iBeacon Corrections", IEEE Transactions on Industrial Informatics.

Published By:
Blue Eyes Intelligence Engineering
& Sciences Publication