IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

SMART WASTE COLLECTION MONITORING AND ALERTING SYSTEM USING IOT

Dr.S.Vijayanand [1], Singh Vidhyalakshmi Charan [2]

[1] Professor, Dhanalakshmi College of Engineering

[2] Dhanalakshmi College of Engineering , Chennai 601301

ABSTRACT

In the present day scenario , as the needs of people are increasing day by day and similarly we see garbage bins or dustbins placed at public places are overflowing due to the increase in the waste everyday. Such conditions creates unhygienic conditions and produces bad smell that leads to deadly diseases and human illness .Hence to avoid such condition and to reduce the human illness we are planning to design "IOT Based Waste Management For Smart Cities". In the proposed system there will be multiple dustbins located throughout the city or campus which are provided with low cost embedded device which helps in tracking the level of the garbage bins and also separates the garbage which reduces the human efforts and reduces the mixing of the garbage. An unique ID will be provided for every dustbin so that it will be easy to identify whether garbage bin is full. When the level reaches the threshold limit, the device will transmit the level along with the unique ID provided. These details can be accessed by the concerned authorities from their place with the help of Internet and an immediate action can be made to clean the dustbins.

Keywords – ***ESP8266 , IR Sensor , PIC , Gas Sensor , LCD , Intel Galileo , Cloud.***

1. Introduction

Embedded devices that are connected to Internet and sometimes these devices can be controlled from the Internet is commonly called Internet Of Things . Here smart dustbins are connected to internet to get the real time information of the smart dustbins. In the recent years there was a rapid growth in the population which leads to more waste disposal.[1] 4.40 pounds is the rough average daily waste per person. Worldwide waste generated by person for a day averages 0.74 kg but ranges from 0.11 to 4.84 kg . It creates

unhygienic condition for the people and creates bad smell that leads to deadly diseases and illness. Managing the smart bins by monitoring the status of it and taking the decision accordingly. Multiple dustbins are provided throughout the city or campus (Educational Institutions, Companies, /Hospitals) [5]. It also helps to separate the wastes so that such technique is useful in companies, hospitals which contains dry and wet wastes and reduces human effort. These dustbins are interfaced with micro controller based systems with IR Sensors and IOT modules. IR Sensor detects the level of dust in the dustbin and sends the signals to microcontroller the same signal are encoded and sent through IOT module and it is received and decoded by mobile application by Intel Galileo. This data has been received, analyzed and processed in the cloud, which displays the status of the garbage in the dustbin on the GUI on the web browser or mobile. [2]

2 . ARCHITECTURE

In this system we have multiple dustbins located throughout the city or campus which are provided with low cost embedded device which helps in tracking the level of the garbage bins and unique ID is provided for every dustbin so that it is easy to identify which bin is full. In this system we could easily separate the different wastes so that the garbage will not mix and the spreading of bad smells will be reduced .These details can be easily accessed by concerned authorities from their place with the help of the internet and immediate action can be made to clean the dustbins. Here we use different types of bins such as degradable bin, plastic bin , metal bin. We keep a bin and different sensors in single bin so that it could sense the type of the waste and separate the wastes in particular bin. We have used mobile which gives the intimation about the type of the garbage whether it is filled or empty. As the sensor senses the garbage level it is displayed in the LCD and at the same time it is intimated to user in his /her mobile. Along with that we are using the gas sensor to detect the smell of degradable wastes. Hence such methodology will be useful for the future purpose to detect the smell or even the gas leakage [3].

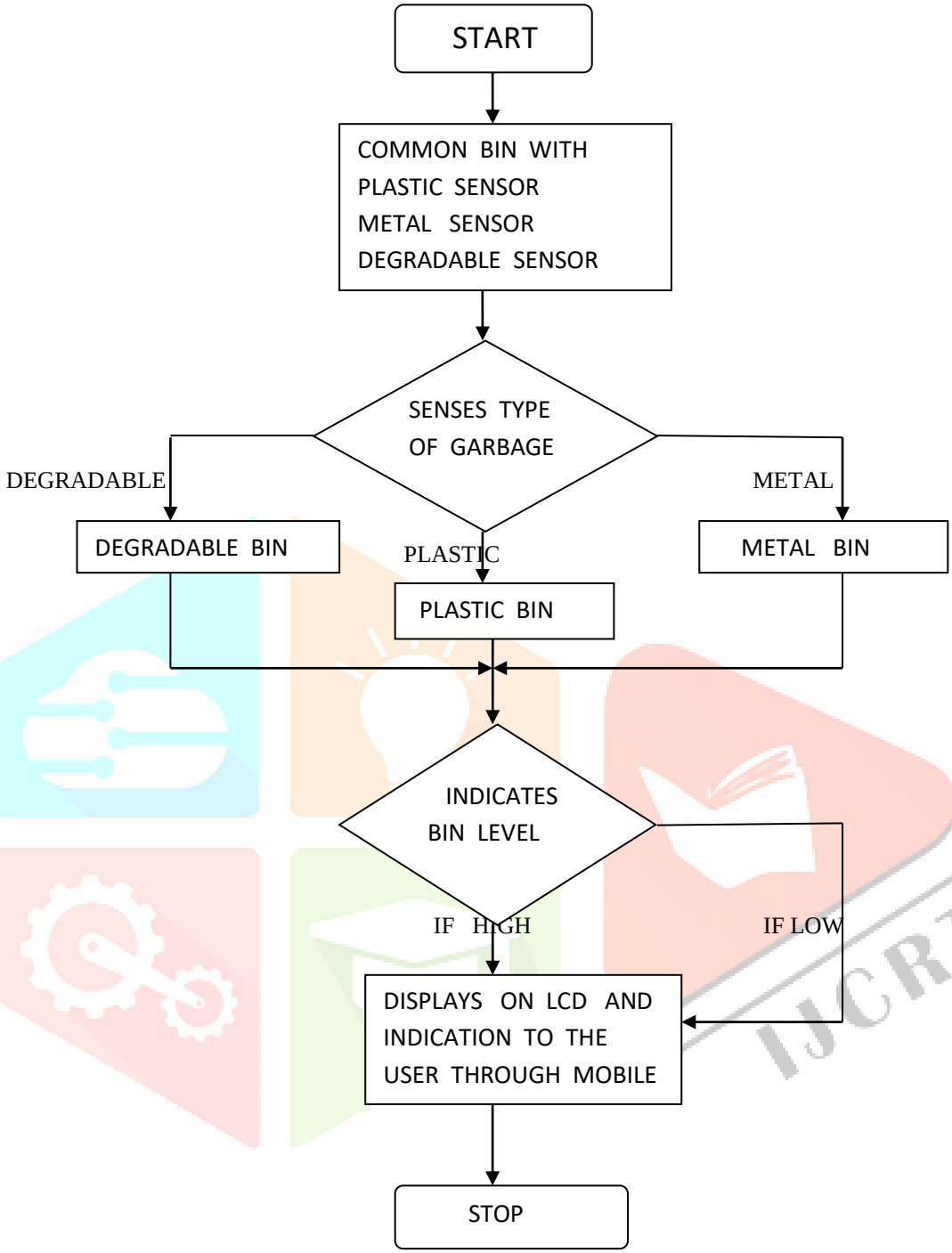


FIG 2.1 FLOW CHART OF WORKING PROCESS

3. HARDWARE DESCRIPTION

3.1 IR SENSOR

IR LED emits infrared radiation . It illuminates the surface in front. Depending on reflectivity of the surface, amount of the light reflected varies. This reflected light is made incident on reverse biased IR sensor. The amount of electron – hole pairs generated depends on intensity of incident IR radiation. Thus as intensity of incident ray varies, voltage across resistor will vary accordingly [4]. An infrared sensor can measure heat of an object as well as detects the motion. It works as a simple LED with voltage of 3V DC and a current consumption of about 20mA. The IR receiver such as photodiode or a photoresistor is capable to detect infrared radiation from IR transmitter.

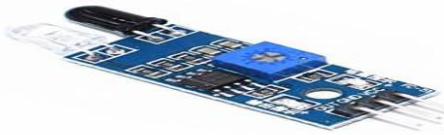


FIG 3.1 IR SENSOR

3.2 GAS SENSOR

A gas detector is a device which detects the presence of various gas within an area usually as part of a safety system. It is used to detect gas leak and interface with a control system so a process can be automatically shut down. A gas detector can also sound an alarm to operators in the area where the leak is occurring, giving the opportunity to leave the area. Gas detectors are usually battery operated. They transmit warnings via series of audible and visible signals such as alarms and flashing lights when, dangerous levels of gas vapours are detected. The sensor is actually enclosed in two layers of fine stainless steel mesh called Anti – explosion network [5].

FIG 3.2 GAS SENSOR

3.3. IOT MODULE

ESP8266 DI Mini Node MCU Wifi Development Board is an Aurdino Compatible mini WiFi board with 4 MB flash based on ESP8266EX . It is with 11 digital input/output pins , all pins have interrupt/PWM/I2C/one-wire supported (except D0) 1 analog input (3.3 V max input) and a Micro USB connection. Node MCU V3 is an open source and development kit that plays a vital role in designing your own IOT product using a few Lua script lines . Multiple GPIO pins on the board allow you to connect the board with other peripherals and are capable of generating PWM, I2C , SPI , UART serial communication [6] .The interface of the module is mainly divided into two parts including both Firmware and Hardware where former runs on the ESP8266 Wi-Fi SoC and later is based on Lua – A scripting language easy to learn , giving a simple programming environment layered with a fast scripting language that connects you with a well – known developer community.

4. IMPLEMENTATION TECHNOLOGY

Here smart bins are connected to the internet to get real time information of the smart bins . These dustbins are interfaced with the microcontroller based system with IR sensors and IOT modules [7]. When the dust or garbage reaches the threshold level it sends the signal to microcontroller and the same signal is encoded and passed through the IOT module and it is received and decoded by the mobile application at the central system. This data has been received analyzed and processed through the cloud, which displays the status of the garbage in the dustbin on the GUI on the browser or mobile [8]. Also we have included the method of separating the waste in different bins automatically. We have metal bin, plastic bin and degradable bin which is used to separate the garbage accordingly in the respective bins with the help of the sensors. These dustbins are provided with unique ID which is useful for the user to identify that which bin is full or empty on getting the intimation [9].

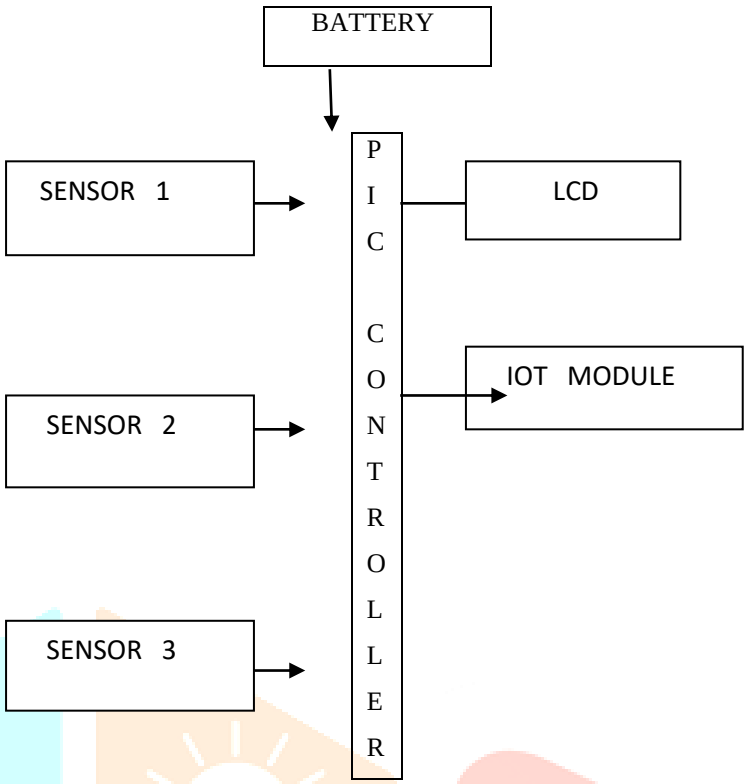
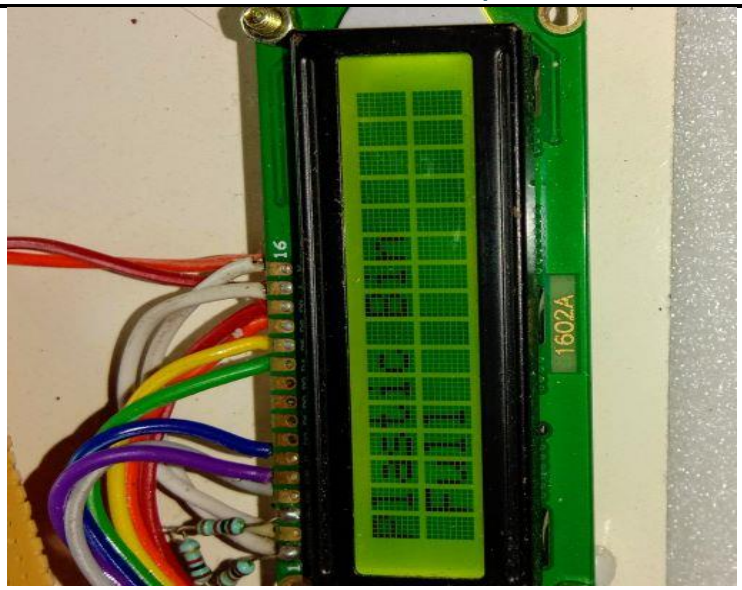


FIG 4.1 BLOCKS DIAGRAM

5. RESULT AND DISCUSSION



As we have provided the bins with unique ID , the user gets intimation about the type of the bin which is full and it is displayed in the LCD . Also we have set a rotator with three bins i.e. Plastic bin, metal bin, degradable bin which can automatically separate the garbages with the help of the sensors . A common bin is placed at the top with all the three sensors and as the garbage is put inside , it senses the type of the garbage and with the help of bin rotator the garbage falls into the respective bin. Specially, if such bins are implemented for industries, hospitals, .etc. it will be useful for future generations.

5. CONCLUSION

We are very sure and clear that waste management is the thing that will be endless even for future generations. Hence we have introduced smart waste management technique which is used by low cost embedded device which provides unique ID and that is useful to track the garbage level. As a future work we will try to extend this technique to reduce the hazardous waste material that is very dangerous for human lives. Hence by using this technique of low cost embedded device with well developed IOT we would surely reduce the waste by managing and cleaning it simultaneously before the bin gets filled. Thus, this paper gives a proper waste management and alerting system with the help of IOT.

6. REFERENCES

1) H. Lingling , L.Haifeng, X. Xu and L. Jian, "An Intelligent Vehicle Monitoring System Based on Internet Of Things, "Proceedings of 7th IEEE International Conference on Computational Intelligence and Security (CIS) , pp . 231 -233 , December 2011,
2) B.N. Silva , M. Khan, and K. Han ,"Towards sustainable smart cities : a review trends, architectures, components, open challenges in smart cities, "Sustainable Cities and Society , vol .38,pp. 697-713, 2018
3) Dr. S Vijayanand, Mr. Kumar A, Dr. Roopa M, Mr. Jagir Hussain S,(2019) "Lung Pattern Classification for Interstitial Lung Diseases Using Ann-Back Propagation Network" International Journal of Recent Technology and Engineering (IJRTE), ISSN: 2277-3878
4) Dr. S Vijayanand ,Dr. Roopa M, Mr. Jagir Hussain S,(2019) "Anomaly Detector for Manufacturing Industries using LabVIEW" International Journal of Engineering and Advanced Technology (IJEAT), ISSN: 2249 - 8958
5) S Vijayanand & Shantha Selvakumari, R. (2018). Noninvasive method of epileptic detection using DWT and generalized regression neural network. Soft Computing. 10.1007/s00500- 018-3630-y.
6) Dr. Vijayanand S "Disease Detection Of Reap" Journal of Interdisciplinary Cycle Research Volume XII, Issue IV, April/2020 ISSN NO: 0022-1945
7) Dr.S.Vijayanand "Cragged Terrain Scrutiny" The International journal of analytical and experimental modal analysis Volume XII, Issue IV, April/2020 ISSN NO:0886-9367
8) Dr. S. Vijayanand "Performance Analysis of Beenish Protocol under Fuzzy Logic and Neural Network Scenario" The International journal of analytical and experimental modal analysis Volume XII, Issue II, February/2020 ISSN NO: 0886-9367
9) Dr. S. Vijayanand "Designing a Li-Fi based Hierarchical IOT Architecture for Automatic Billing System" JAC : A Journal Of Composition Theory , Volume XIII Issue I JANUARY 2020 ISSN : 0731-6755