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IOT BASED GARBAGE MONITORING SYSTEM

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Abstract- GARBAGE MONITORING is it a big problem? Yes if not disposed properly. With the increased concern about the garbage collection, segregation, effective re-utilization and pollution free environment there is a need for TECHNOLOGY to tackle the situation. What is to be done regarding the issue? Timely disposal and segregation of waste into dry and wet before dumping into bins is implemented using Node MCU (Micro Controller Unit). As soon as the bin is filled, it should be brought to the notice of municipality department so that it can be taken to garbage monitoring plants before the bins are covered with flies, rodents, most importantly before it smells foul polluting the city environment. This can also save fuel of trucks.
Index Terms- GUI,MC

I. INTRODUCTION

The internetworking of physical world and sensors are described as Internet of Things (IoT). These physical devices are connected to wireless or wired internet connections i.e., IoT is connection of embedded systems to internet. The basic Embedded system consists of sensors examples Temperature, Humidity, Light, Ultrasound, IR, RF, Metal sensor, Accelerometer, Gyroscope and other inputs like switches, Keypads, Timers to the microcontroller e.g., 8051, ATMEG 168, 68HC11 and output from these to Actuators, Relays, switches, PWM, notification as Buzzers, LEDs. Memory mapped IO devices like RFID, GSM. Display units like seven segment display, LCD, graphic display units etc. The ideas of inter-connected devices or smart devices are designed to bridge the gap between the physical and digital world to improve the quality and productivity of life, society and industries. The most important application is the smart city next is the smart home and wearable on the internet, and these devices will use this data to interact with you on daily basis and complete tasks. Because of growing population of the world smart city application takes very important role. The smart city applications are smart surveillance, water distribution, smart security, environmental monitoring and smart waste management system. IoT will solve major problems faced by the people living in cities like pollution, traffic congestion and shortage of energy supplies, waste management system etc. We are interested in development of products like Smart Bin that will send alerts through cellular communication to municipal services when a bin needs to be emptied. In recent times, garbage disposal has become a huge cause for concern in the world. A voluminous amount of waste that is generated is disposed by means which have an adverse effect on the environment. The common method of disposal of the waste is by unplanned and uncontrolled open dumping at the landfill sites. This method is injurious to human health, plant and animal life. The purpose of this project is the realization of a compact, low cost and user friendly segregation system for urban households to streamline the waste management process. In this paper we introduce an IoT based Waste management system to achieve effective dynamic waste collection. This system consists of two Smart-Bins; one is for dry waste collection and second is for wet collection. We use Thing speak for analysis data and user friendly GUI (Graphical User Interface) to send the information to the municipal office. The rest of this paper is organized as follows.,

Section 2 deals with related works on IoT based waste management system. Section 3 describes about the sensors used in the implementation of smart-bin 6 gives the result of each sensor output and also results of data analysis using Thingspeak and also presents evaluation performance with the Android app, while Section 7 concludes the paper and discusses future work.

1.1 Problem statement

A big challenge in the urban cities is solid waste management. The garbage collecting authority in traditional waste management system doesn‟t know about the level of garbage in dustbin, if the dust bins gets full by garbage then it gets overflowed as well as spelled out from the dustbin leading to unhygienic condition in cities. People throw garbage on that dustbin which is already overflowed. Sometimes due to unclean garbage bins bad smell arises also toxic and unhygienic gases are produced which is way to support to the air pollution and to some

II. LITERATURE SURVEY

Literature survey This is not an original idea, for the implementation of smart dustbins; the idea has existed for many years, after the IoT field finding its grip in our lives. This is, however an original plan for designing a smart garbage bin with Ultrasonic sensor ,metal detector, microcontroller (16F877A), xbee-rx (an XBee reactive extensions API) and MAX232 for transmission of data to the server. The ultrasonic sensor will be used to detect the level of garbage in dustbin. Metal detector will be used to detect the opening and closing of lid We have set two threshold values 50% and 80%.when the garbage level reach 50% and 80% the notification will get display on the web page Accordingly information is processed that is controller checks if the threshold level is exceeded or not, and this information will transfer to the server by using Zigbee . By using garbage monitoring system the information of all smart dustbins can be accessed from anywhere and anytime by the concern person and he/she can take the decision accordingly. The front end to create web page is core java and the backend is MySQL.The software component used to create web page is JDK6 or JDK7 and the hardware component used is MPLab. Garbage monitoring system, which monitors the garbage bins and informs about the level of garbage collected in the garbage bins via a web page. It shows the System Architecture, in which system uses ultrasonic sensors placed over the bins to detect the garbage level and compare it with the garbage bins depth. The proposed system uses Arduino family microcontroller (The LPC2131/32/34//38 microcontrollers are based on a 16/32- bit ARM7TDMI-S CPU with real-time emulation), LCD screen, Wi Fi modem (The ESP8266 supports APSD for VoIP applications and Bluetooth co existence interface) for sending data and a buzzer, GSM (used to send message to the garbage depot if the Garbage Can exceeds the set threshold level) Ultrasonic Sensor (Sensor sends out a highfrequency sound pulse and then times how long it takes for the echo of the sound to reflect back. IOT Based Smart Garbage Monitoring System, in which dustbins are interfaced with microcontroller, based system having Ultrasonic sensors with wireless systems. These wireless systems central system showing current status of garbage, on mobile web application with connected via WiFi. This proposed system implemented using ultrasonic sensor (also known as transceivers when they both send and receive, also work on a principle similar to radar or sonar, which evaluate attributes of a target by interpreting the echoes from radio or sound waves respectively), microcontroller (AT89S52 was used and designed with static logic for operation down to zero frequency and supports two software selectable power saving modes) and Wi-Fi module. A network is established using wireless sensors, which are placed in the garbage bin, set at a particular level. Sensors will send a signal to the nearest vehicle driver if the level of garbage is crossed to set level. It shows the Architectural Diagram, which consists major three modules; Sensor Module, in which sensors are used to sense the garbage levels once and connected to the Arduino board, Communication Module, in which Bluetooth is used for communication between the sensors and Arduino Uno board, and last module is Analysis and Monitoring Module, in which collected is sent to the admin for analysis.

IOT Based Smart Garbage Monitoring and Air Pollution Control System, in which system monitors the garbage bins and informs about the level of garbage via a web page.

III. BLOCK DIAGRAM

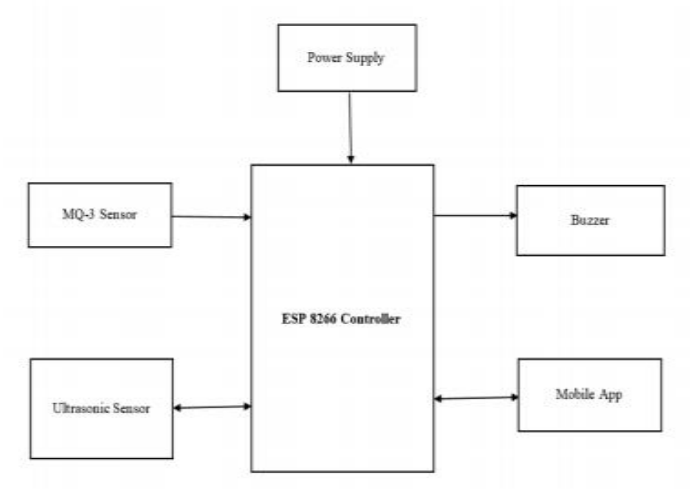

Fig.1 Block diagram

3.1 Components Required –

 ESP8266 Wi-Fi module Ultrasonic sensor MQ-3 Sensor Breadboard Buzzer Connecting wires

SOFTWARE -

 Arduino IDE

 Mobile App - Blynk

Specification –

 ESP8266 Wi-Fi module Specification -

 2.4 GHz Wi-Fi (802.11 b/g/n, supporting WPA/WPA2).

 General-purpose input/output (16 GPIO).

 Inter-Integrated Circuit (I²C) serial communication protocol.

 Analog-to-digital conversion (10-bit ADC).

 Serial Peripheral Interface (SPI) serial communication protocol.

 I²S (Inter-IC Sound) interfaces with DMA (Direct Memory Access) (sharing pins with GPIO).

RAM. External flash memory can be accessed through SPI.

 Ultrasonic sensor – Supply voltage 5 v Global Current Consumption 15 mA Ultrasonic Frequency 40k Hz Maximal Range 400 cm Minimal Range 3 cm Resolution 1 cm Trigger Pulse Width 10 µs Outline Dimension 43x20x15 mm

3) MQ-3 Sensor –

- Power requirements: 5 VDC @ ~165 mA (heater on) / ~60 mA (heater off)
- Current Consumption: 150mA
- DO output: TTL digital 0 and 1 (0.1 and 5V)
- AO output: 0.1- 0.3 V (relative to pollution), the maximum concentration of a voltage of about 4V
- Detecting Concentration: 0.05-10mg/L Alcohol
- Interface: 1 TTL compatible input (HSW), 1 TTL compatible output
- Heater consumption: less than 750mW
- Operating temperature: 14 to 122 °F (-10 to 50°C)
- Load resistance: 200kΩ

3.2 Flow Chart

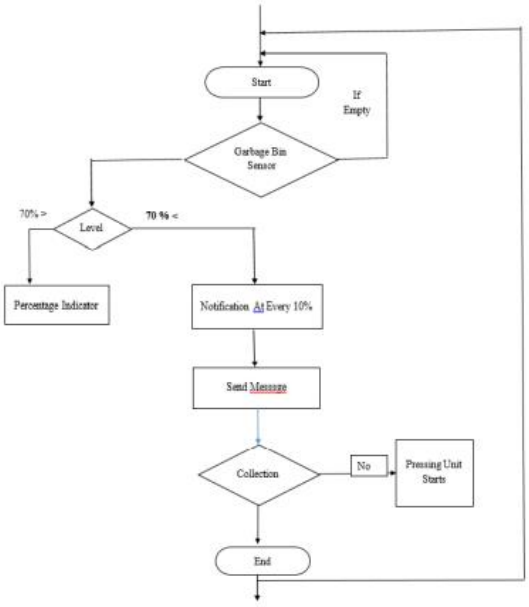

Fig.2 Flow Chart

3.3 Advantages

India. 2 - 4 August 2017. pp.184-189. 8) Namakambo Muyunda, Muhammad Ibrahim “Arduino-based Smart Garbage Monitoring System Analysis Requirement and Implementation” in 978-1-5386-0765- 7/17/$31.00 ©2017 IEEE 9) Dr.N.Sathish Kumar, B.Vijayalakshmi, R. Jenifer Prarthana, A.Shankar “IOT Based Smart Garbage alert system using Arduino UNO” in 978-1-5090-2597-8/16/$31.00_c 2016 IEEE 10) V. N. Bhat, "A Model for the optimal allocation of trucks for solid waste management," Waste Management & Research, vol. 14, (1), pp.87- 96, 1996 • Time consumption is less • Fuel consumption is optimized • Air pollution from garbage collection trucks and due to foul smell is reduced • Fill level-based garbage collection route mapping is

employed • Real-time and live data from the garbage bin can be obtained • Share of solid waste management cost spent on waste collection and transportation is reduced • Introducing smart garbage system makes city „SMART" • Infrastructural needs such as garbage containers and trucks are reduced as the collection is based on fill level data and optimized route planning Manpower required for waste collection and transportation is reduced

IV. CONCLUSION

The multispecialty smart bin designed above can lead to an Eco-friendly, clean and healthy surrounding. This implementation can efficiently deal the problem of waste disposal which has been proved to be great threat to any developing country. The top 4 developed countries spent most of their economy on effective waste management, recycling and disposal. Proper integrated work force can work collectively with distributed networks located all over the city for timely and fast decision making based on analytical data collected from sensors alarm alerts from virtuino, bins shall also be provided with GPS connectivity for tracking the exact location . Further we continue the work to provide message interfacing to know the condition of the bin. In addition to this we are trying a method to detect sanitary and medical related wastes in order to segregate it separately.

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