GARBAGE MONITORING & ALERT SYSTEM USING IOT

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ABSTRACT
Now days we see that dustbins are put at open places in the urban areas are overflowing because of increment in the waste continuously. It makes unhygienic condition and makes unpleasant smell around the surroundings nature leads in spreading some deadly diseases and human illness. To overcome such issues waste management system is proposed for Smart Cities which are based on Internet of Things (IoT). In this system there are numerous dust bins situated all over the city. It will take minimum efforts to clean all the dustbins over the city by checking whether the dustbins are full or not. Also it detects over weight through the load cell.
Control system sends SMS as well as updates of dustbin will be upload on webpage automatically.

KEYWORDS: PIC microcontroller, Arduino Ethernet Shield, IoT

INTRODUCTION

Things (embedded devices) that are connected to the Internet and infrequently these devices can be checked from the web are normally called as IoT i.e Internet of Things. In this system dustbins are situated all over the city. The Smart clean dustbins are associated with the web to get the real time status. Ultrasonic sensor is fixed at the top of the dustbin and is interfaced with PIC microcontroller. Weight sensor is fixed at the bottom of the dustbin and is also interfaced with controller to detect over weight of the garbage filled in the dustbin. Both sensors send the signals to the controller. The RF-transmitter encode the data coming from PIC and send to arduino kit, it sends the data to RF-receiver in wireless manner. RF-receiver is connected to the arduino Ethernet shield. Arduino gets data received by the receiver and upload on webpage through the Ethernet shield.

LITERATURE SURVEY

[1] Kanchan Mahajan gives an idea in Waste Bin Monitoring System Using Integrated Technologies about the system using GSM and PIC. The GSM and PIC is used to create the integrated system to control the waste bins remotely. In [2] this paper, Microcontroller Atmel328 is used. It gives the weight of the garbage in the dustbin. But it doesn't provide any information about the level of the garbage in the dustbin. In [3], the composed framework portrays that the level of waste in the dustbins is checked with the assistance of various Sensors. They use IR sensor for detection of garbage level and interconnected to the approved control room through GSM method. Microcontroller is utilized to interface the sensors with GSM procedure. GPS is used to provide real time routing directions. 4) Prakash Prabhu gives an idea for "Waste Management for Smart Cities". In this proposed System there are multiple dustbins located throughout the city or the Campus, these dustbins are provided with low cost embedded device which helps in tracking the level of the garbage bins and an unique ID will be provided for every dustbin in the city so that it is easy to identify which garbage bin is full.
This is an idea taken for designing a smart garbage bin with ultrasonic sensor, web server and GSM module for transmission of data and message for reducing air pollution and health problems due to overflow of dust bins.

BLOCK DIAGRAM AND ITS DESCRIPTION

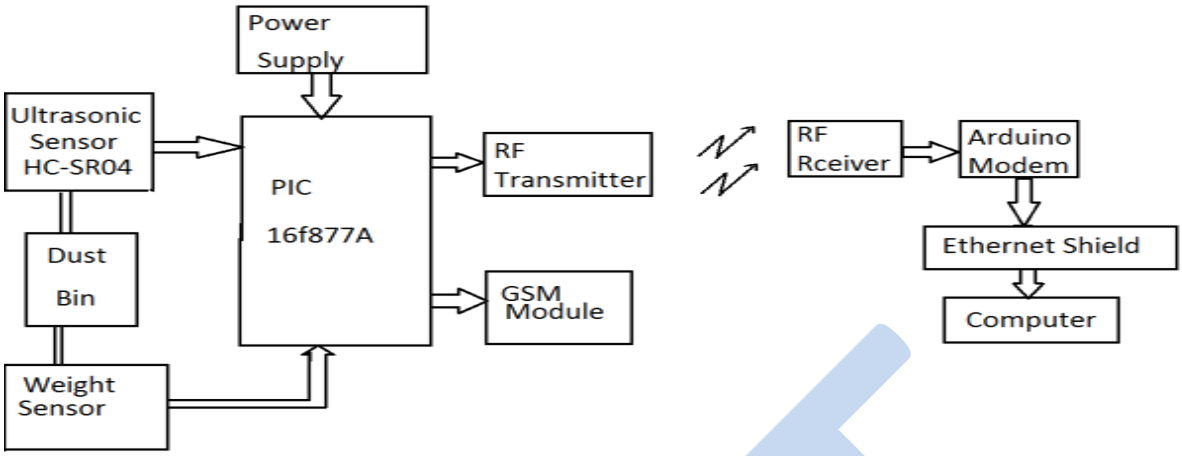

Figure1. Block Diagram of Proposed System

POWER SUPPLY

In power supply firstly the DC socket is used to convert the 230v AC supply into DC supply. The output DC supply of DC socket is given to bridge rectifier as an input. We will get pulsating DC at the output of bridge rectifier. The LM7805 regulator is used to convert the pulsating dc to pure 5v DC output. The supply is given to the PIC-controller and GSM. In the schematic there are Port C, pin no 25 and 26 in the PIC are used as transmitter and receiver respectively. Also in port A, pins from 2-7 are used as input pins. PIC16F877a Controller is used. The GSM modem and Aurdino Ethernet shield are interfaced with PIC controller. The DC socket, rectifier and regulator are used for power supply. The ultrasonic sensor is used to detect the level of garbage and the load cell is used for checking the overweight.

PIC MICROCONTROLLER

PIC refers to input and output interface controller. It is family of microcontroller formed by Microchip Company. It is more popular due to their low price, large availability, free development tools and reprogramming in flash memory. PIC microcontroller has fabulous features and they are good for a wide range of applications. It has enhanced Harvard architecture which is built by microchip technology. PIC microcontrollers are mostly used in the embedded based projects. It supports a low power consumption sleep mode. System uses 16F877A for implementation because it has low power consumption less than 2mA at 5V and 3mA, 18microA at 3V more efficient, less time consuming. It is flash microcontroller. It has 10 bit A to D convertor and two PWM modules. PIC16F877A is used as smart microcontroller which performs two main functions. It identifies operated data from batteries and Because of its high performance, low power consumption, more efficient, we are going to use PIC 16F877A microcontroller.

ULTRASONIC SENSOR

This is the HC-SR04 ultrasonic running sensor. This temperate sensor gives non-contact estimation usefulness with a going exactness that can reach up to 3mm. Each HC-SR04 module incorporates the ultrasonic transmitter, a recipient and a control circuit. There are just four sticks that you have to stress over on the HC-SR04: VCC (Power), Trig (Trigger), Echo (Receive), and GND (Ground). You will discover this sensor simple to set up. Operating Voltage: 5V, DC Operating Current: 15mA, Measure Angle: 15°.

GSM

The GSM Module is used to send the message to the contractor for cleaning the dustbin. A GSM modem is a specialized type wireless modem that works with a GSM wireless network. It accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. A GSM modem can be an external device. An external GSM modem is connected to a computer through a serial cable or a USB cable. When a GSM modem is connected to a computer, this allows the computer to communicate over the mobile network. While these GSM modems are most frequently used to provide mobile internet connectivity, many of them can also be used for sending and receiving SMS. GSM Modem sends and receives data through radio waves. In this project GSM modem is used to send the messages.

ARDUINO IDE

The Arduino Software (IDE) is free source based on easy-to-use hardware and software. It makes easy to the code, assemble the

code and upload it to the board. It supports different plant from Windows, MAC OS, Linux. The program is written in C and before running the IDEC software to be installed on the machine this software can be used with any Arduino board. Arduino boards are able to read inputs on a sensor, a finger on a button. Arduino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins, out of these 6 are analog inputs, and 6 are PWM output, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. Operating Voltage: 5V, Input Voltage (limits): 6-20V, DC Current per I/O Pin: 40 mA. DC Current for 3.3V Pin: 50 mA.

COMPONENTS USED

1. PIC MICROCONTROLLER 16F877A
2. LCD 16*2
3. MAX 232
4. GSM MODEM
5. RESISTORS
6. CAPACITORS
7. CRYSTAL 20MHZ
8. ARDUINO SHIELD
9. ETHERNET SHIELD
10. ULTRASONIC SENSOR
11. LOAD CELL

FLOW CHART

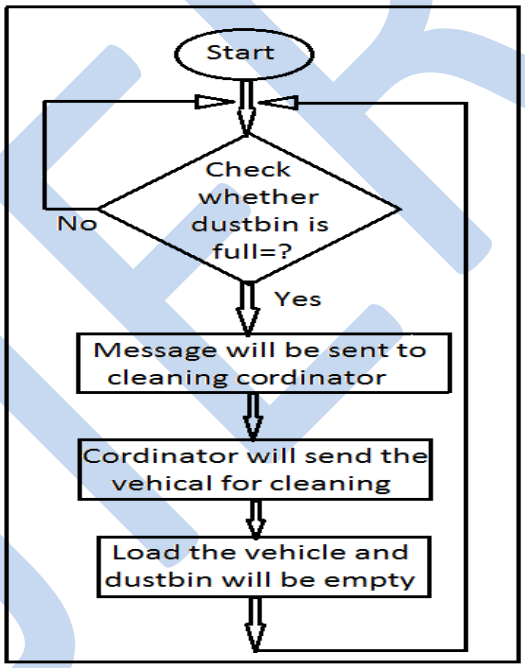

Figure2. Flow Chart of working

RESULT

Sensor checks the level of garbage. It shows percentage 50%, 80% and if dustbin is full i.e greater than 90% it displays message on LCD and sends the SMS via GSM module to the respective cleaning coordinator. Coordinator send the cleaning vehicle for cleaning. After cleaning, dustbin becomes empty and status of the dustbin over the city is displayed on webpage through the Ethernet shield. Also we have used the load cell for industrial waste application.

CONCLUSION

In this system the data of every smart dustbin can be accessed from anyplace and anytime. Utilization of the resources can be done. The information of the dustbin is automatically updated on the webpage as well as the message can be sent to particular co-ordinator so that he or she will come and clean the dustbin. Overflow of dustbin is avoided due to the smart system. The unpleasant smell around the surroundings and some diseases are reduced.

REFERENCES

1) Kanchan Mahajan, "Waste Bin Monitoring System Using Integrated Technologies", International Journal of Innovative Research in Sci-ence, Engineering and Technology, Issue 3 ,Issue 7 , July 2014.
2) Vikrant Bhor, Pankaj Morajkar, Maheshwar Gurav, Dishant Pandya4 "Smart Garbage Management System" International Journal of Engineering Research and Technology (IJERT) ISSN: 2278-0181 IJERTV4IS031175 Vol. 4 Issue 03, March-2015
3) Insung Hong, Sunghoi Park, Beomseok Lee, Jaekeun Lee, Daebeom Jeong, and Sehyun Park, "IoT-Based Smart Garbage System for Efficient Food Waste Management", The Scientific World Journal Volume 2014 (2014), Article ID 646953.
4) Parkash, Prabu, "IoT Based Waste Management for Smart City" International Journal of
5) Innovative Research in Computer and Communication Engineering (An ISO 3297: 2007 Certified Organization) Vol. 4, Issue 2, February 2016.