GARBAGE MANAGEMENT SYSTEM USING IOT

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Abstract: The Garbage Management System Using IoT identifies fullness and level of the waste materials in the bin as well as gas level present in the bin through the wireless sensor network (WSN), which is embedded to the Arduino Uno board. Once the garbage collector is filled, this module inform this information to the authorized person for the cleaning of the waste bin in time. The protocol is used for communicate with all the sensor nodes placed in the tested areas with the Arduino board. Also the ESP 8266-12E node MCU will act as a coordinated node in the wireless sensor network. The aim of the coordinator node is to collect the parameters like level of waste bin and odor it wirelessly. Each sensor node will have a level sensor and a gas sensors and IoT device for communicate with the coordinator node. The Cayenne store will collect the data in the database and then analyze the data it has stored. The coordinator will collect the data from xBee wireless communication protocol and allows the user to monitor the whole data in PC. Thus the cleaning authority can collect the garbage on time.

1. INTRODUCTION

"Swachh Bharat" may well be a national campaign by the statutory cities and cities to clean the roads streets and infrastructure of the country. When the massive amount of waste material is collected, it is difficult to separate and unhygienic. Now a day's garbage is separately thrown i.e. dry and wet. The Internet of Things (IoT) shall be able to incorporate transparently and coherently an outsized variety of various and heterogeneous finish systems, whereas providing open access to choose subsets of data for the developing a digital services. Building a general design for the IoT is therefore an awfully advanced task, chiefly thanks to the extraordinarily giant sort of devices, link layer technologies. One of the most issues with atmosphere our surroundings the environment has been solid waste management that additionally to heavy the balance of the environment conjointly has adverse effects on the health of the society. The detection, observation and management of wastes are one in every of the first issues of the current amount. The traditional means of manually observation the wastes in waste bins could be advanced, cumbersome method and utilizes a lot of human effort, time and price that isn't compatible with the present day technologies in any way. This is an advanced method in which waste management is automated.

In this "IOT based garbage observation and sorting system" Pollution is that the unfold of contaminants into Associate in Nursing surroundings that causes instability, disorder, hurt or discomfort to the surroundings. Solid waste management is one in every of the foremost environmental issues of Asian country. Solid waste management is that the assortment, transport, disposal, managing and monitoring of waste material. Garbage could carries with it the municipal solid waste construction waste, commercial Garbage may consist of the municipal solid waste construction waste, commercial waste, industrial waste etc… left over the city. This project is beneficial for making "Smart City" and it's supported "Internet of Things". For healthy life-style cleanliness is required and it begins with the utilization of trash bins. This project can facilitate to eradicate or minimize the solid waste disposal drawback. In gift state of affairs, over and over we tend to see the rubbish bins gets full thanks to increase in solid waste everyday. It creates unsanitary surroundings and dangerous smell within the society and since of this several illness get unfold within the society to avoid this case we tend to are planning "Garbage monitoring system mistreatment net of Things" during this planned system the

multiple trash bins are settled throughout town, these trash bins are embedded with low cost embedded device. When the bin gets 0.5 crammed that's once the brink wo

rth become five hundredth then the corporation can get notification and once the rubbish level can reach the brink value eightieth then the notification can get 0.5 crammed. The planned system is value effective as a result of it'll apprize doubly to the organization and that they will get time to optimize the value of transportation.

2. LITERATURE SURVEY

Waste management system using ZigBee network and MQTT (Message Queue Telemetry Transport) protocol is proposed to determine filled status of the garbage container. The data acquisition module placed within the container updates the server via ZigBee coordinator, whenever the level of the garbage reaches the threshold. MQTT is a lightweight protocol and it provides the communication link between coordinator and the server. Optimal path for collecting the filled containers is determined in the server using Have sine formula and travelling salesman algorithm. The information is intimated to the garbage collection unit through Telegram messaging application to minimize time and fuel cost.

In solid waste bin monitoring system garbage bin set the public place then Camera set for garbage bin location. The camera captured image for garbage bin. Radio Frequency Identification (RFID), GPS and GIS send image for work station. The RFID reader and camera are mounted in the truck, when truck come closer to the bin RFID reader communicated RFID tag. & send all information. The System are use controlling Hut. This Controlling Hut are SMS Technology. The GPS and GPRS mapping server to analyzing data of various location. The management station compiled all the knowledge and keep within the system info.

(Prof. R.M.Sahu et al, 2016).This paper discuss with level of refuse in the dustbins is distinguished with the assistance of ultrasonic sensors framework, and conveyed to the approved control room through GSM framework. Arduino microcontroller is utilized to interface the sensor framework with GSM framework. (Vikrant Bhor et al, 2015).This paper has another strategy for waste management and administration. A dustbin is interfaced with microcontroller based framework having IR remote frameworks alongside focal framework demonstrating current status of refuse, on portable web program with html page by Wi-Fi. Subsequently the status will be refreshed on to the html page. At the sender side they utilized just a Wi-Fi module to send and get information. But since of the utilization of weight sensor for location of measure of waste in dustbin it will just identify the heaviness of waste; not how much level it is of.(S.S. Navghane et al,2016).A single directional cylinder is suspended next to the lid of ashcan. The piston is free to move up and down vertically inside the dustbin to a certain level. A plate is attached to the cylinder for compressing the garbage. The shape of this plate depends upon the shape of the dustbin. The compressing plate consists of a side hole through which the leaf switch is suspended upside down. Technology use Piston, Switch, microcontroller, the single directional cylinder, smart dustbin. Only use for smart dustbins, they are not provide garbage collection. Smart Dustbins will stop the buildup of the rubbish on the margin to a good extent thereby dominant the widespread of the many diseases. It will stop pollution and additionally stop the consumption of the displayed garbage by the road animals. (Twinkle Sinha et al,2015). City Garbage collection indicator using RF (Zigbee) and GSM technology. This paper gave the details for the module required for the transmission of the data to the receiver side and also the main channel follow of the project. Initially we used GSM technology for our project but later on decided to us Wi-Fi module for the ease of data transmission. The waste management is built around several element. Waste item, domestic bin, trash bags, collective containers and collecting vehicles. The waste flow start from the waste item and the domestic bin to end in the collecting vehicles. Use the waste identification for sorting process. Base on RFID technology new trash bag is added in a collective container. The technology use Radio Frequency Identification (RFID), Smart vehicular and Trash Bag. They only identify RFID tags garbage bins, Low data speed, high cost. The zig bee and GSM system would be able to monitor the solid waste collection process. This technique overcome some disadvantages which are use of minimum route, low cost, fuel use, clean environment.(Md. Shafiqul Islam et al,2012).

3. IMPLEMENTATION

This project IOT Garbage observance system could be a terribly innovative system which is able to facilitate to stay the cities clean. This system monitors the garbage bins and informs about gas & 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 and with the help of the load cell measures the weight when weight reaches the given level and the bin reaches the depth the bin door has been closed and intimate to the particular in charge person. The system makes use of PIC family microcontroller, LCD screen, IOT modem for sending data. The system is powered by a 12V transformer. The liquid crystal screen is employed to display the standing of the extent of garbage collected within the bins. Whereas an internet page is made to indicate the standing to the user observance it. The web page offers a graphical read of the rubbish bins and highlights the rubbish collected in change order to indicate the extent of garbage collected. The liquid crystal display screen shows the standing of the rubbish 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 IOT cayenne web development platform.

3.1 ARCHITECTURE
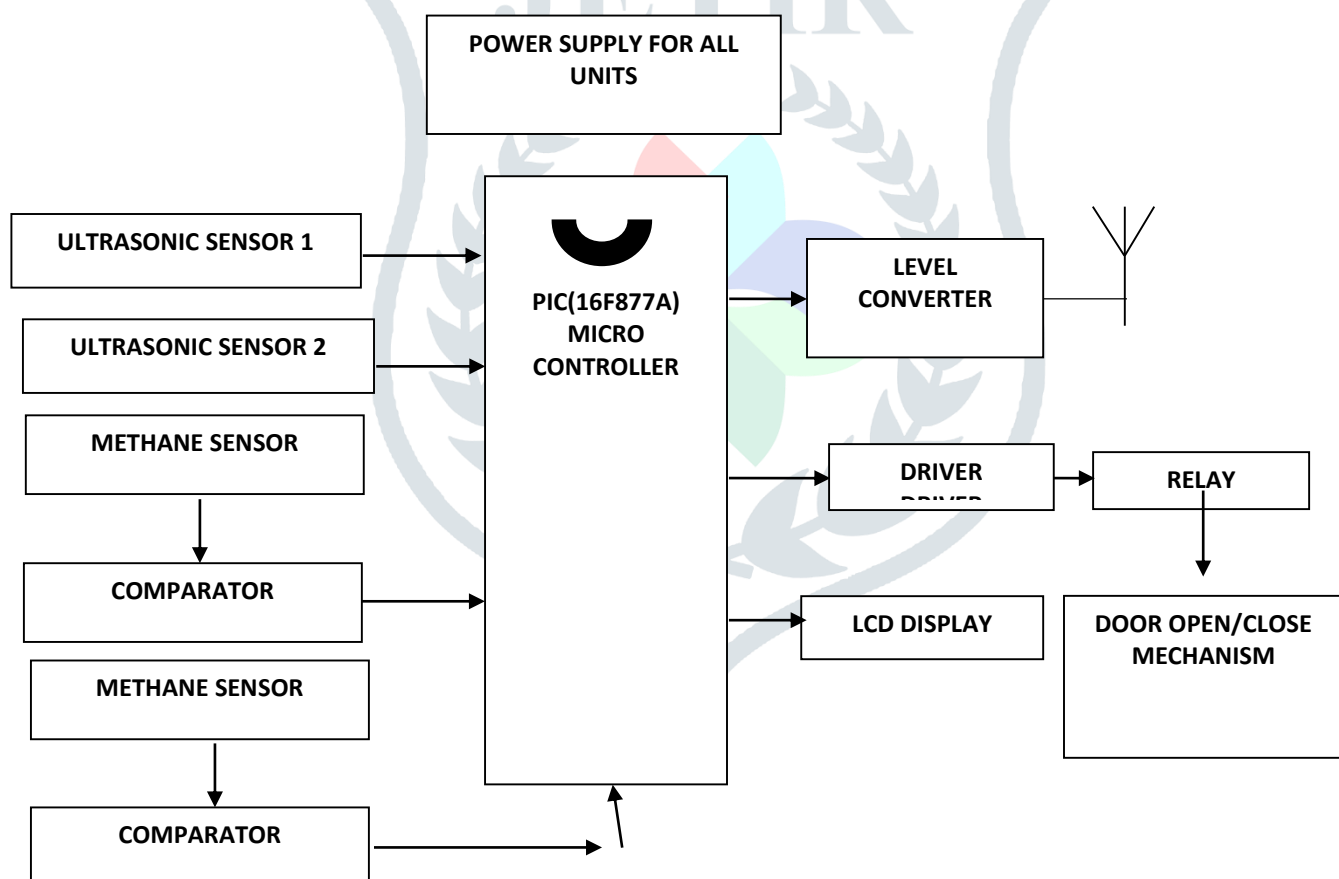
3.2 Ultrasonic Sensor

Ultrasonic sensor emit ultrasonic pulses, and by measuring the time of ultrasonic pulse reaches the object and back to the transducer. The sonic waves emitted by the transducer are reflected by an object and received back in the transducer. After having emitted the sound waves, the ultrasonic sensor will switch to receive mode. The time elapsed between emitting and receiving is proportional to the distance of the object from the sensor.
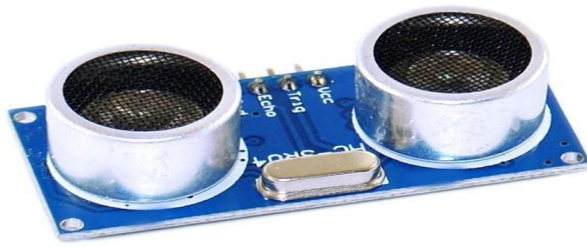
Figure 1 : Ultrasonic Sensor

FEATURES

- Working Voltage: $5V_{DC}$
- Quiescent Current : <2mA
- Working Current: 15mA
- Detecting Range: 2cm - 4.5m
- Trigger Input Pulse width: 10uS

3.3 ARDUINO UNO

Arduino/Genuino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.. You can tinker with your UNO without worring too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again.
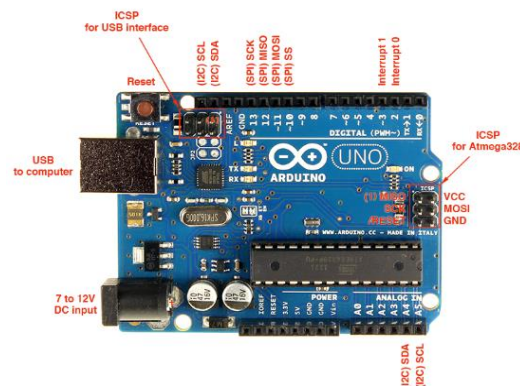
Figure 2 : arduino uno

FEATURES

- Microcontroller ATmega328.

- Operating Voltage 5V Input Voltage (recommended) 7-12V.
- Input Voltage (limits) 6-20V.
- Digital I/O Pins 14 (of which 6 provide PWM output).
- Analog Input Pins 6.
- DC Current per I/O Pin 40 mA.
- DC Current for 3.3V Pin 50 mA.
- Flash Memory 32 KB (ATmega328) of which 0.5 KB used by bootloader SRAM 2 KB (ATmega328) EEPROM 1 KB (ATmega328) Clock Speed 16 MHz.

3.4 LOAD CELL ADC OUT

A load cell is a transducer that is used to create an electrical signal whose magnitude is directly proportional to the force being measured. This electronic signal can be a voltage change, current change or frequency change depending on the type of load cell and circuitry used. The electrical signal output is typically in the order of a few milli-volts and requires amplification by an instrumentation amplifier before it can be used. The various types of load cells include hydraulic load cells, pneumatic load cells and strain gauge load cells. Here, we are using string gauge load cells.

Figure 3 : load cell adc out

FEATURES

- Input voltage: 5v DC.
- Rated load: 10Kg.
- Insulation resistance: 5000 Mega Ohm (50V DC).
- Operating Temperature: -20 °C to +65 °C.

4. CONCLUSION

This project work is the implementation of smart garbage management system using IR sensor, microcontroller and Wi-Fi module. This system assures the cleaning of dustbins soon when the garbage level reaches its maximum. If the dustbin is not cleaned in specific time, then the record is sent to the higher authority who can take appropriate action against the concerned contractor. This system also helps to monitor the fake reports and hence can reduce the corruption in the overall management system. This reduces the total number of trips of garbage collection vehicle and hence reduces the overall expenditure associated with the garbage collection. It ultimately helps to keep cleanliness in the society. Therefore, the garbage management system using IoTmakes the garbage collection more efficient. Such systems are vulnerable to plundering of components in the system in different ways which needs to be worked on.

EXPRIMENTAL RESULTS

Table 1 : experimental results

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