

Garbage Monitoring System

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Abstract— Nowadays cities are more expanded and more population, so the amount of waste generates in the cities are increased day by day. Solid Waste Management (SWM) is important necessity for the environmental problem and sustainable development in many countries. One of the greatest worries with our environment has been solid waste management which in mixing the dustbin, the pollution of the environment has adverse also solid waste management effective public health and brings many diseases which causing poor health to the society.

So, introducing a revolutionary service that combines waste monitoring and waste collection to save time, money and environment is essential. Here, using and Arduino Uno, GSM network with SIM for send message to the mobile phone driver Truck from the Centre System. Smart ultrasonic sensors measurement real - time fill level data from waste containers or bins and forecast the ideal time and route for emptying each container would be used as a solution suits for municipal waste collection. The recommend System would be talented to applied monitoring and collection waste management in the city.

Keywords- Smart city service; Smart Trash bin; Smart Monitoring and Controlling; Smart Vehicle; Smart Monitoring; mobile; GSM; Arduino

I. INTRODUCTION

The ultimate need of the hour for a developing nation is the key for "Smart City". The influential ecological factors that poses to be a threat to this may include: hazardous pollution and its subsequent effects on health of humanity, alarming global warming and depletion of ozone layer etc. A Proper maintenance becomes mandatory for an efficient and effective removal of the generated Municipal Solid Leftover. It is perceived that often the waste space gets too much occupied due to irregular removal of garbage occupancy in the dustbin. This exposition proposes an e-monitoring system that putforths an embedded system and web based software assimilated with Ardiuno UNO and IoT technology.

Using the anticipated system, monitoring of the waste collection status could be monitored effectively. This design designates a technique in which the garbage level could be checked at regular intervals which would prevent the undesirable overflow of the bin. In addition to this it also has facilitations to intimate the authority to clean up in case of any overflows. The filling level of the garbage in the dustbin and its original level height could be sensed/ monitored by the ultrasonic sensor. Programming in the Arduino UNO is done

in such a way that once a particular level of filling is sensed information message is sent requesting a clean-up.

II. LITERATURE SURVEY

This is not an original idea, for the implementation of smart garbage bin; the idea has existed for many years, After the IoT field finding its grip in our lives. We are using Ultrasonic sensor and Wi-Fi module for transmission of data.

1. A State of the Art review on Internet of Things by P. Suresh, Vijay. Daniel, R.H. Aswathy, Dr. V. Parthasarathy. It gave the idea of IoT subject and addition details about IoT. The proper smart environment and various applications.
2. Internet of Things: Challenges and state-of-threat solutions in Internet-scale Sensor Information Management and Mobile analytics by Arkady Zaslavsky, Dimitrios Georgakopoulos.

III. MOTIVATION

- The Mission "Swachha Bharat Abhiyaan" started by Honourable Prime Minister Narendra Modi.
- His Vision is to Make India Garbage and Pollution free by the year 2019. So many of the organisations are coming forward for this mission.

IV. PROBLEM STATEMENT

- In Our project we are going to continually monitor all the dustbins in our system through and IoT website and also monitors all the events in system
- Ultrasonic sensors will measure the waste quantity in dustbin and give reading for waste available in bins.
- An update will be given to the Website is about the level of garbage in bins and also inform if it exceeds the Threshold level.

V. METHODOLOGY

In "IoT Garbage management system, the level of garbage in the dustbins is detected with the help of ultrasonic sensor. The ultrasonic sensor is used to find the height of garbage filled at different intervals of time. The data collected by ultrasonic sensor is send to web page with help of wifi module. Aurdino Uno board is used as microcontroller

platform. Interfacing is done between GSM modem and Arduino board. To provide the location of filled dustbins we have interfaced GPS module which will indicate the exact location of dustbins.

Threshold height is set to 10 cm. Threshold distance is the difference in height at which sensor is placed and the level of garbage fill. During the course of garbage accumulation, whenever the difference falls below threshold value, GSM modem is activated to send an alert signal and location of dustbin to the concerned authority through an SMS.

VI. HARDWARE IMPLEMENTATION

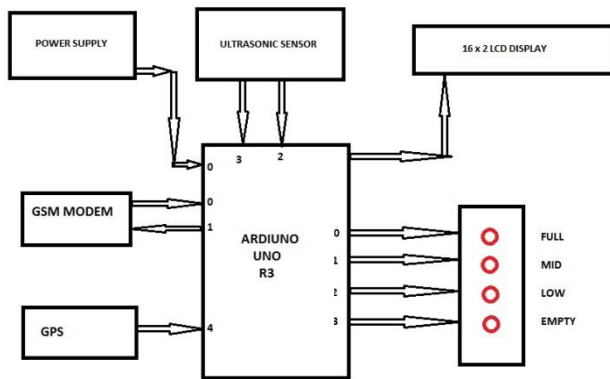


Figure1-Block diagram

Heart of this Garbage Monitoring System is Arduino UNO R3 which is a product developed originally in Italy. However there are many more companies who are providing the clone for the Arduino. This system is provided with the battery supply connected to the hardware at the Garbage Can. An Ultrasonic sensor has been installed on top of the can which is responsible for measuring the distance of the garbage in the trash bin. Based on the value provided by the Ultrasonic Sensor the duties of Arduino would be:

- If The trash bin is 90% occupied by the garbage then arduino will alert WiFi Module to update the value on the real time web page and GSM modem will send the message and GPS module will provide coordinates to the Driver of garbage collecting vehicle to collect it
- Else if trash bin is occupied less than 90% then only WiFi module will be in action to continuously update the value of the Occupancy of garbage.

VII. COMPONENTS OR SUBSYSTEMS DESCRIPTION

A. ARDUINO

Arduino UNO is a microcontroller board based on the AT

mega 328p. It has 14 digital input/output pins, 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an I2C header and reset button. Simply connect the controller using USB cable or power it with AC-to-DC adapter or battery to get use. The arduino UNO can be programmed with arduino software IDE. Select "Arduino UNO from tools -> Board menu". The arduino UNO becomes a default programs with about header that allow to upload new code to it without the use of external hardware program.



B. POWER SUPPLY CIRCUIT

The main building block of any electronic system is the power supply to provide required power for their operation. In this IoT based garbage monitoring system we are using a 9 Volt Adapter which will be connected to the Arduino UNO R3 and then the further required voltage for Wifi module is 3.3V , LCD, Ultrasonic Distance sensor, GSM modem and GPS module is 5V . This voltages are then provided by Arduino.

C. ULTRASONIC SENSOR

The object distance is determined by calculating the duration of ultrasound that reflects back to sensor. They send pulsed ultrasonic waves of a certain frequency and determine the objects distance from the duration of ultrasound that it reflects. Ultrasonic sensor ranges from 2cm-400cm measurement function of non-contact. The connecting wires such as 5v power supply trigger pulse input, echo pulse output, 0v ground.



D. GSM MODEM

A GSM modem is a device which can be either a mobile phone or a modem device which can be used to make a computer or any other processor communicate over a network. A GSM modem requires a SIM card to be operated and operates over a network range subscribed by the network operator. It can be connected to a computer through serial,

USB or Bluetooth connection.

A GSM modem can also be a standard GSM mobile phone with the appropriate cable and software driver to connect to a serial port or USB port on your computer. GSM modem is usually preferable to a GSM mobile phone. The GSM modem has wide range of applications in transaction terminals, supply chain management, security applications, weather stations and GPRS mode remote data logging.



E. WiFi MODULE

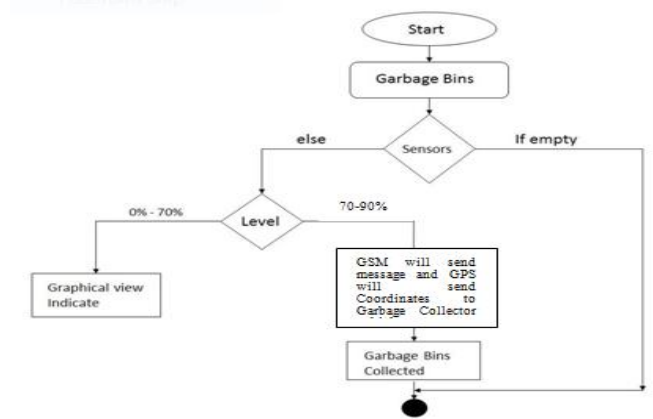
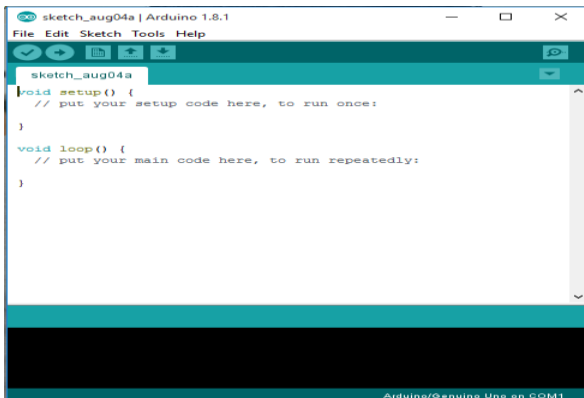
The ESP8266 is a low-cost Wi-Fi microchip with full TCP/IP stack and microcontroller capability produced by Shanghai-based Chinese manufacturer, Espressif Systems. This chip is responsible for providing internet access to the Arduino and upload the data continuously on the web page.



VIII. SOFTWARE IMPLEMENTATION

For the software implementation, we used Arduino IDE Software for programming the heart of the System.

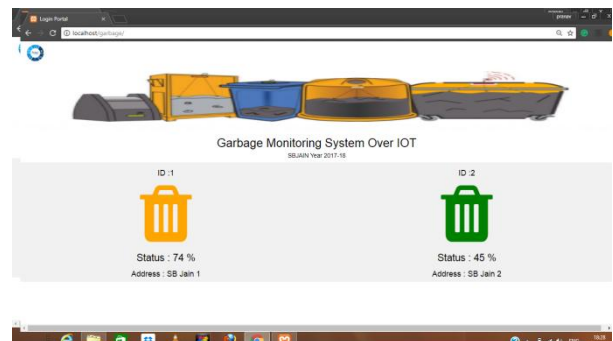
The programming of IoT Based Garbage Monitoring System is done in C.



IX. RESULTS AND DISCUSSION

The Values or the amount of garbage in dustbin is then reflected on the website or webpage. These values are given by the Ultrasonic Sensor.

The webpage looks like.



X. APPLICATIONS

- Can be used in the Project “ Swacch Bharat Abhiyaan”
- Can be used in developing “

XI. CONCLUSION

This make our environment clean and ensures hygienic surrounding. Improper disposal and improper maintenance of the domestic waste creates issues in public health and environmental pollution. This paper attempts to provide practical solutions to help the local municipal administration in waste management system. i.e., monitoring of domestic wastage clearance at proper time to avoid damage to the public health.

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. Therefore, the smart

garbage management system makes 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.

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