SMART GARBAGE MANAGEMENT SYSTEM

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ABSTARCT

The modern civilization is now struggling with the problems of high buildup of waste and its impact on the immediate and global environment. Many times the garbage bins in the public places are overflowed with waste that leads in spreading many deadly diseases and human illness. Finding the garbage bins and cleaning them on a daily basis is a hectic task. To overcome that situation we are planning to design "Smart Garbage Management System". Our approach is to measure the level of waste in the garbage bin and to alert the municipal officers, via SMS. The proposed system consists of ultrasonic sensor to measure the level of waste, GSM module to send the SMS, and an Arduino uno which controls the system operations. When the waste level reaches the threshold limit an alert message will be transmitted to the concerned authorities and an immediate action can be made to clean the dustbins.

Keywords: Arduino uno, Global system for mobile communications, ultrasonic sensor, LCD.

INTRODUCTION

One such problem that has caught people's attention in the current scenario is the ever increasing waste and our Inability to deal with it. With the ever growing human population, major environmental challenges associated with inadequate waste collection, transport and disposal. This system monitors the garbage bins and informs about the level of garbage collected in the garbage bins via a SMS.

The garbage bins are placed in every location and it is fixed for that area. Ultra sonic sensor is placed over the bin to detect the level of waste based on the bin depth. The LCD screen is used to display the status of the level of waste in the bin. The GSM modem when inserted with a SIM used to send the receive messages. The Arduino board is responsible for controlling the operations among the sensors. Thus the proposed system is used to alert the concerned persons when the bin is almost or completely filled.

LITERATURE SURVEY

The proposed system is designed to detect the fill level of the garbage bin and acknowledge the municipal authorities, to achieve this, the required hardware components are Arduino Uno, Ultrasonic Sensor(used to know the fill level of bin), GSM modem(used to send alert messages), LCD screen. The core of our software is the Arduino IDE that is used to write and upload computer code to the physical device.The Arduino Uno is microcontroller based on ATmega328P (datasheet), used to control operations among the sensors

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**BLOCK DIAGRAM**
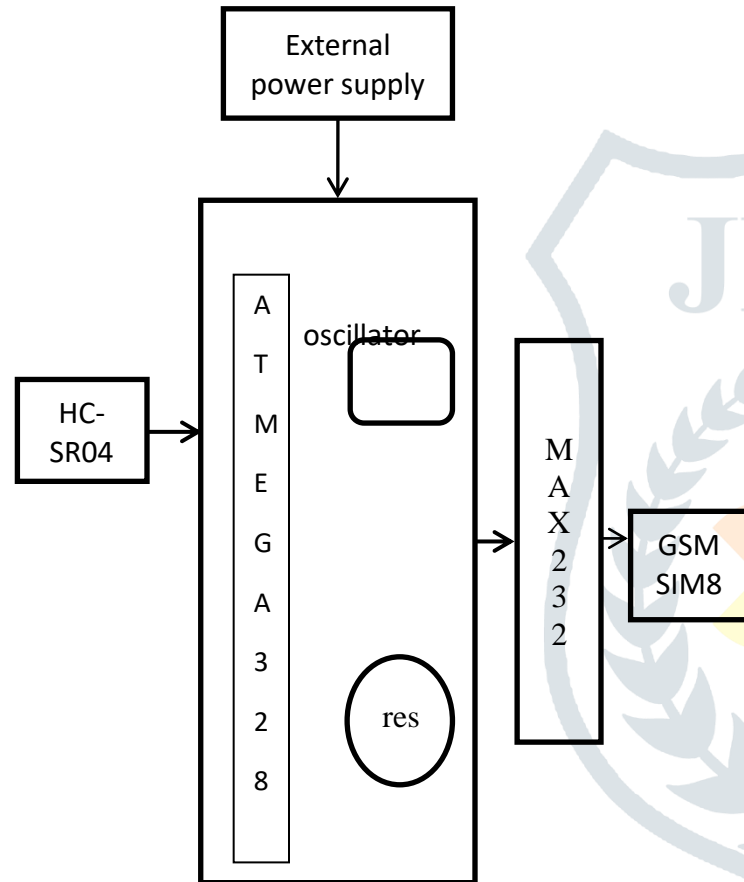
DESCRIPTION OF BLOCK DIAGRAM

Arduino is a platform used to design various electronic applications.

Arduino Uno is based on ATmega328P (microcontroller). It has 14 digital input-output pins and 6 Analog inputs, a 16MHz quartz crystal oscillator circuit, a USB connection, a power jack and a RESET button.

1) Power Supply

Arduino board, GSM modem, LCD display, sensor circuit operates with DC 5V supply and this supply is provided by batteries.

2) Ardiuno Uno Board
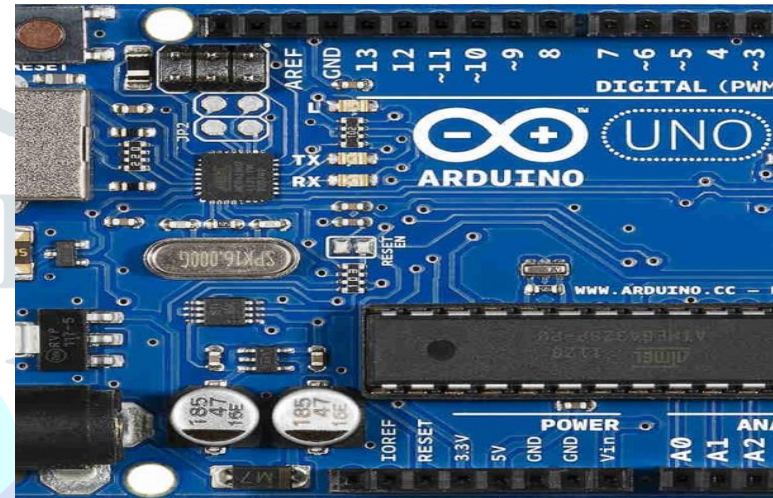
Features Of ATmega328

- The ATmega328 is a microcontroller, which belongs to megaAVR family.
- It is designed by Atmel company.
- It is a8-bit AVR RISC-based micro controller.
- It has 32kB ISP flash memory with read-while-write capabilities.
- It has one kB EEPROM, 2kB SRAM working registers.

3) Ultrasonic Sensor

The ultrasonic sensor emits high frequency sound waves through the air and receives the waves reflected from the target. Ultrasonic sensor measures the distance by evaluating the time between emission and reception using the formula:

$$Distance = Speed * time$$

Where, speed of sound in air=340m/s

Connecting ultrasonic sensor with Arduino

The HC-SR04 sensor has four pins namely Ground, VCC, Trig and Echo. The Ground pin and the VCC pin of the sensor has to be connected with the Ground and the 5 volts pins on the Arduino respectively. The trigger and echo pins of the sensor can be connected to any of the digital input-output pins of the Arduino.

4) GSM MODEM:
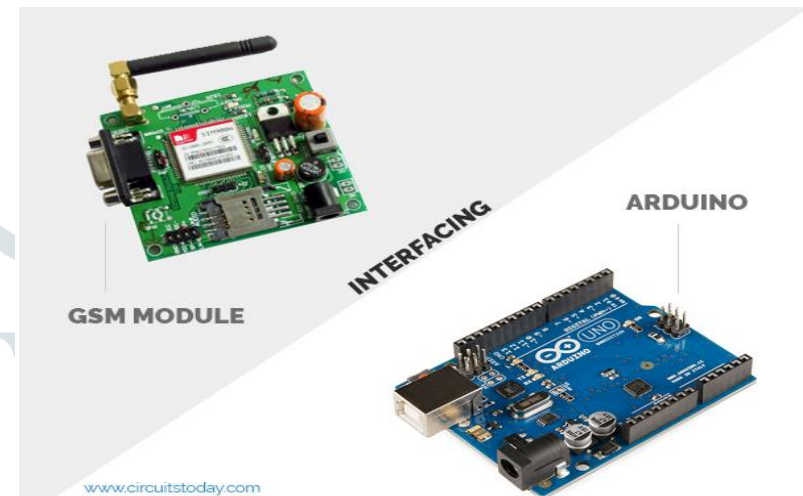
A **GSM Module** is used to send and receive messages. We use SIM800 GSM Module, means the module supports communication in 800MHz band.

Booting the GSM Module:

1. Insert the SIM card to GSM module and lock it.

2. Connect the adapter to GSM module and turn it ON

3. Now wait for some time (say 1 minute) and see the blinking rate of 'status LED' or 'network LED' (GSM module will take some time to establish connection with mobile network)

4. Once the connection is established successfully, the status/network LED will blink continuously every 3 seconds. You may try making a call to the mobile number of the SIM card inside GSM module. If you hear a ring back, the GSM module has successfully established network connection.
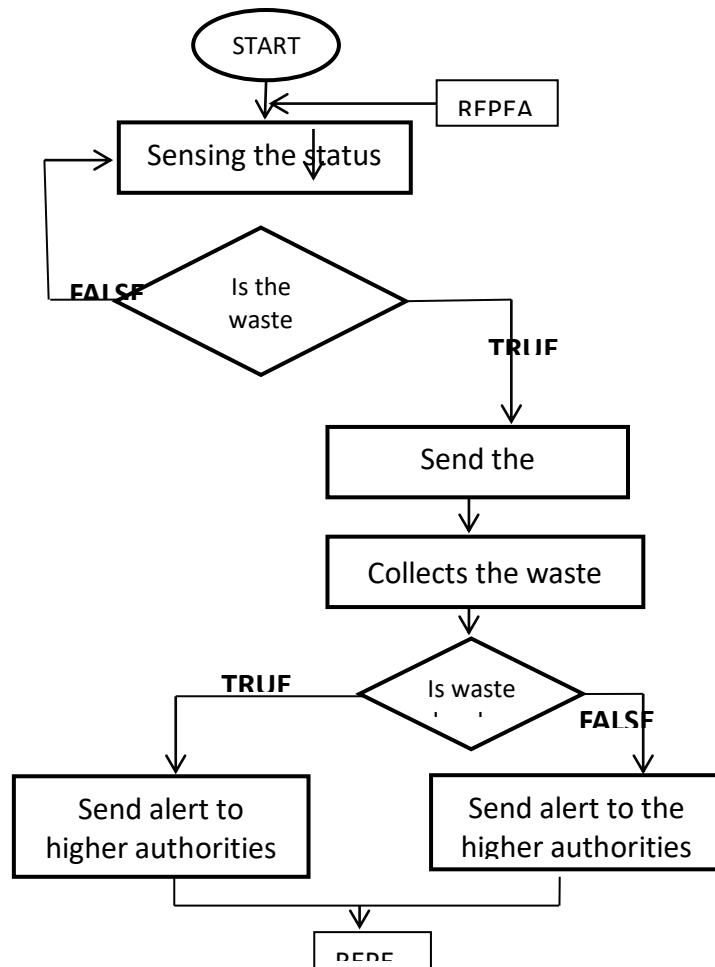
Connecting GSM Module to Arduino:

The serial pins of arduino (Rx and Tx) are used to connect GSM Module to Arduino.

Connect **GSM Tx –>Arduino Rx** and **GSM Rx –>ArduinoTx**.

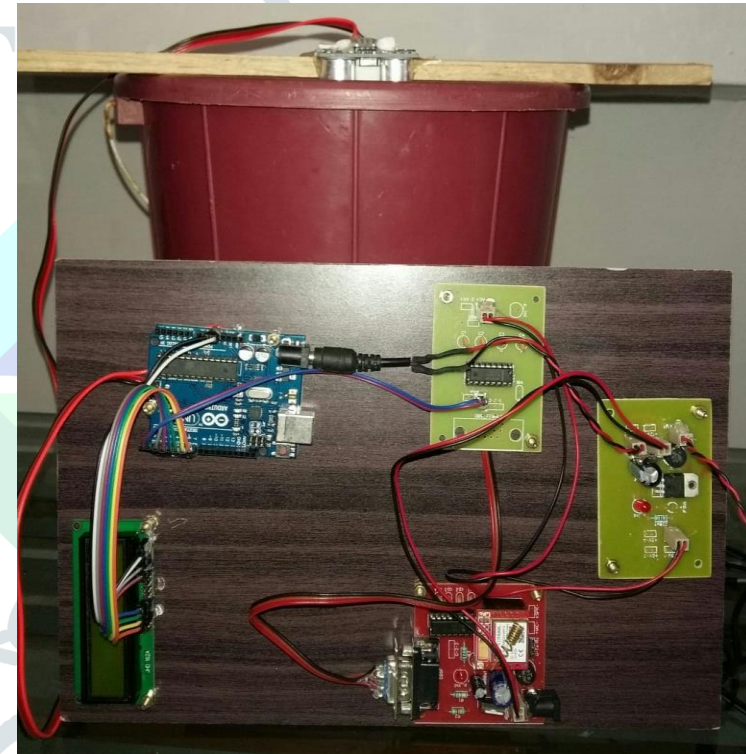Connect the ground pin of Arduino to ground pin of GSM module.

FLOWCHART

RESULT

The project titled "SMART GARBAGE MANAGEMENT SYSTEM" has undergone all phases of software development life cycle.

Our smart system has tested to detect the status of the bin. It sends SMS to the mobile number which has been pre-programmed to the device.

ACKNOWLEDGEMENT

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