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IOToT for managing Road Accident and Garbage Collection

[1]Prakash Choubey, [2]Palash Bansal, [3]Ambali Verma, [4]Fiona Thomas

[1]*Computer Engineering, DY Patil College of Engineering,Pune,Maharashtra,India*
[2]*Computer Engineering, DY Patil College of Engineering,Pune,Maharashtra,India*
[3]*Computer Engineering, DY Patil College of Engineering,Pune,Maharashtra,India*
[4]*Computer Engineering, DY Patil College of Engineering,Pune,Maharashtra,India*

Abstract —*Smart city is an emerging concept. This concept is being used all over the world with different nomenclatures context & meanings. A smart city is a city that is well planned, and it provides the cost-efficient services, environmental efficiency, and technological sound services for the welfare of the citizens. Smart solutions can be helpful in controlling the ever-increasing population in the cities.*

Keywords- *GSM, Arduino UNO, ultrasonic sensor, LCD*

I. INTRODUCTION

In the existing system, road accidents and garbage are not managed efficiently. The service provided during these situations is very slow and inefficient. This project uses ultrasonic sensors to detect potholes on road and if detected then it sends a message to its citizens to drive safely. Also, the project uses load cell to check if there is an overload of garbage in every bin. In case of a road accident, a switch is provided on the road through which immediate help can be provided to the injured person.
One of the major problems in developing countries is maintenance of roads. Well maintained roads contribute a major portion to the country's economy. Identification of pavement distress such as potholes and humps not only helps drivers to avoid accidents or vehicle damages, but also helps authorities to maintain roads. This paper discusses previous pothole detection methods that have been developed and proposes a cost-effective solution to identify the potholes and humps on roads and provide timely alerts to drivers to avoid accidents or vehicle damages. Ultrasonic sensors are used to identify the potholes and humps and also to measure their depth and height, respectively. The proposed system captures the geographical location coordinates of the potholes and humps using a global positioning system receiver.

II. PROBLEM STATEMENT

Due to the increasing garbage disposal on roads and accidents due to potholes, human life is in danger. To avoid these adverse conditions, this project provides an efficient way to get a cleaner and smarter city using the concept of IoT and its related sensor based system

III. LITERATURE SURVEY

1. **An internet based wireless automation system for multifunctional devices.**

Author :- Ali Ziya Alkar
Aim of this paper is to control devices from a central point. This paper presents the design and implementation of low cost but yet flexible and secure internet based system. The communication between devices is through sensors by using microcontroller. The system is design to be low cost and flexible with increase variety of devices to be controlled.

2. **IoT-Based Smart Garbage System for Efficient Food Waste Management**

Author:- Insung Hong, Sunghoi Park, Beomseok Lee In this paper, an IoT-based smart garbage system (SGS) is proposed to reduce the amount of food waste. In an SGS, battery-based smart garbage bins (SGBs) exchange information with each other using wireless mesh networks, and a router and server collect and analyze the information for service provisioning. Furthermore, the SGS includes various IoT techniques considering user convenience and increases the battery lifetime through two types of energy-efficient operations of the SGBs: stand-alone operation and cooperation-based operation.

3. IoT based City garbage collection indicator using GSM technology

Author:- M.S. Killedam, S.S. Navghane

In this project, dustbins are interfaced with microcontroller based system having IR wireless systems along with central system showing current status of garbage, on mobile web browser with html page by WiFi. Hence the status will be updated on to the html page. Major part of the project depends upon the working of theWiFi module; essential for its implementation. The main aim of this project is to reduce human resources and efforts along with the enhancement of a smart city vision.

4. Smart on board transportation management using GSM technologies.

Author:- Saed Tarapiah, Shadi Atalla, Rajaa AbuHania

This project implements a smart onboard GPS/GPRS system to be attached to vehicles for monitoring and controlling their speed. In case of traffic speed violation, a GPRS message containing information about the vehicle such as location and maximum speed is sent to a hosting server located in an authorized office so that the violated vehicle is ticketed. Moreover, this system can also track the vehicles current location on a Google Map, which is mostly beneficial when vehicles should follow a specific road and in case of robbery.

IV. BLOCK DIAGRAM AND DESCRIPTION

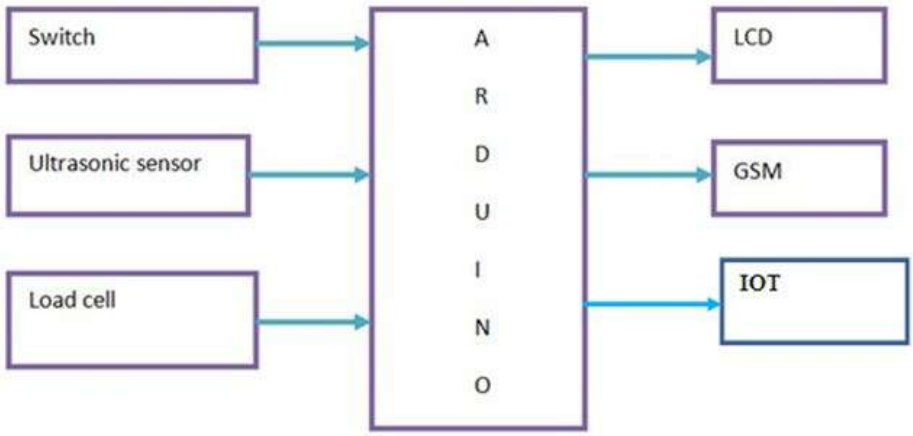


Fig 3.1 : Block diagram

3.1 DESCRIPTION

As shown in diagram we used Arduino uno for controlling purpose. We used switch for detecting accident occurred or not. Another ultrasonic sensor are used detect pothole on road. If potholes detected than sms send via gsm to particular number.

Load cell are used for garbage detection. When garbage is full than sms send via gsm module. As shown as diagram LCD used for display purpose. IOT module used for sending data to coloud. Here we used thingspake coloud. All sensor value are updated on cloude.

V. HARDWARE REQUIREMENT

1 Arduino uno
2 Switch
3 Gsm
4 Ultrasonic sensor
5 Load cell

4.1 Arduino uno

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, 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. The Uno differs from all

preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter.

MicrocontrollerATmega328
Operating Voltage5V
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 S
RAM 2 KB (ATmega328)
EEPROM 1 KB (ATmega328)
Clock Speed 16 MHz

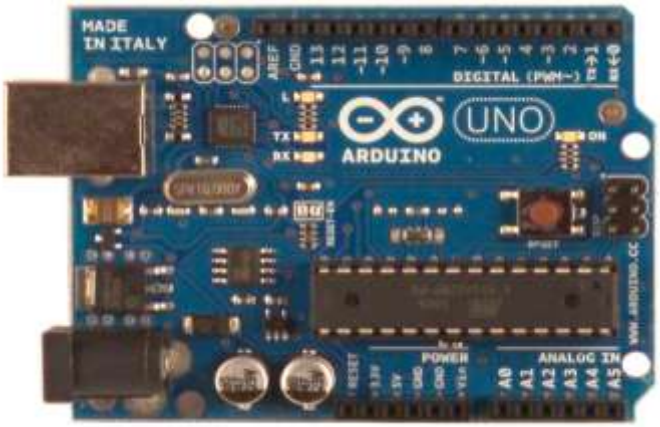


Fig 4.1 Arduino uno

4.2 GSM

GSM/GPRS-compatible Quad-band cell phone, which works on a frequency of 850/900/1800/1900MHz and which can be used not only to access the Internet, but also for oral communication (provided that it is connected to a microphone and a small loud speaker) and for SMSs. Externally, it looks like a big package (0.94 inches x 0.94 inches x 0.12 inches) with L-shaped contacts on four sides so that they can be soldered both on the side and at the bottom. Internally, the module is managed by an AMR926EJ-S processor, which controls phone communication, data communication (through an integrated TCP/IP stack), and (through an UART and a TTL serial interface) the communication with the circuit interfaced with the cell phone itself.

Fig 4.2 GSM

The processor is also in charge of a SIM card (3 or 1,8 V) which needs to be attached to the outer wall of the module. In addition, the GSM900 device integrates an analog interface, an A/D converter, an RTC, an SPI bus, an I²C, and a PWM module. The radio section is GSM phase 2/2+ compatible and is either class 4 (2 W) at 850/ 900 MHz or class 1 (1 W) at 1800/1900 MHz.

4.3 Ultrasonic sensor

Ultrasonic sensors are devices that use electrical–mechanical energy transformation to measure distance from the sensor to the target object. Ultrasonic waves are longitudinal mechanical waves which travel as a sequence of compressions and rarefactions along the direction of wave propagation through the medium. Apart from distance measurement, they are also used in ultrasonic material testing (to detect cracks, air bubbles, and other flaws in the products), Object detection, position detection, ultrasonic mouse, etc.

These sensors are categorized in two types according to their working phenomenon – piezoelectric sensors and electrostatic sensors. Here we are discussing the ultrasonic sensor using the piezoelectric principle. Piezoelectric ultrasonic sensors use a piezoelectric material to generate the ultrasonic waves.

An ultrasonic sensor consists of a transmitter and receiver which are available as separate units or embedded together as single unit. The above image shows the ultrasonic transmitter and receiver.

Fig 4.3 Ultrasonic sensor

4.4 LOAD cell

Load cell is a type of transducer which performs the functionality of converting force into an electric output which can be measured. You can find load cell at the heart of any weighing machine or electric scales. This type of transducer is highly accurate which provides user with required information that is difficult to obtain by other technology owing to certain commercial factors.

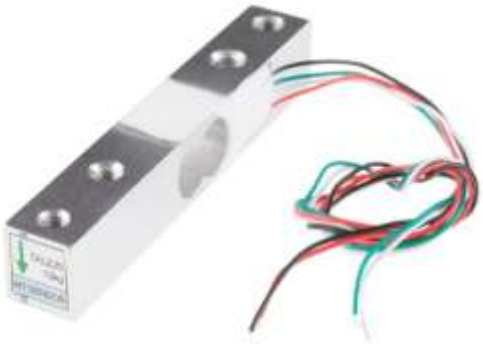
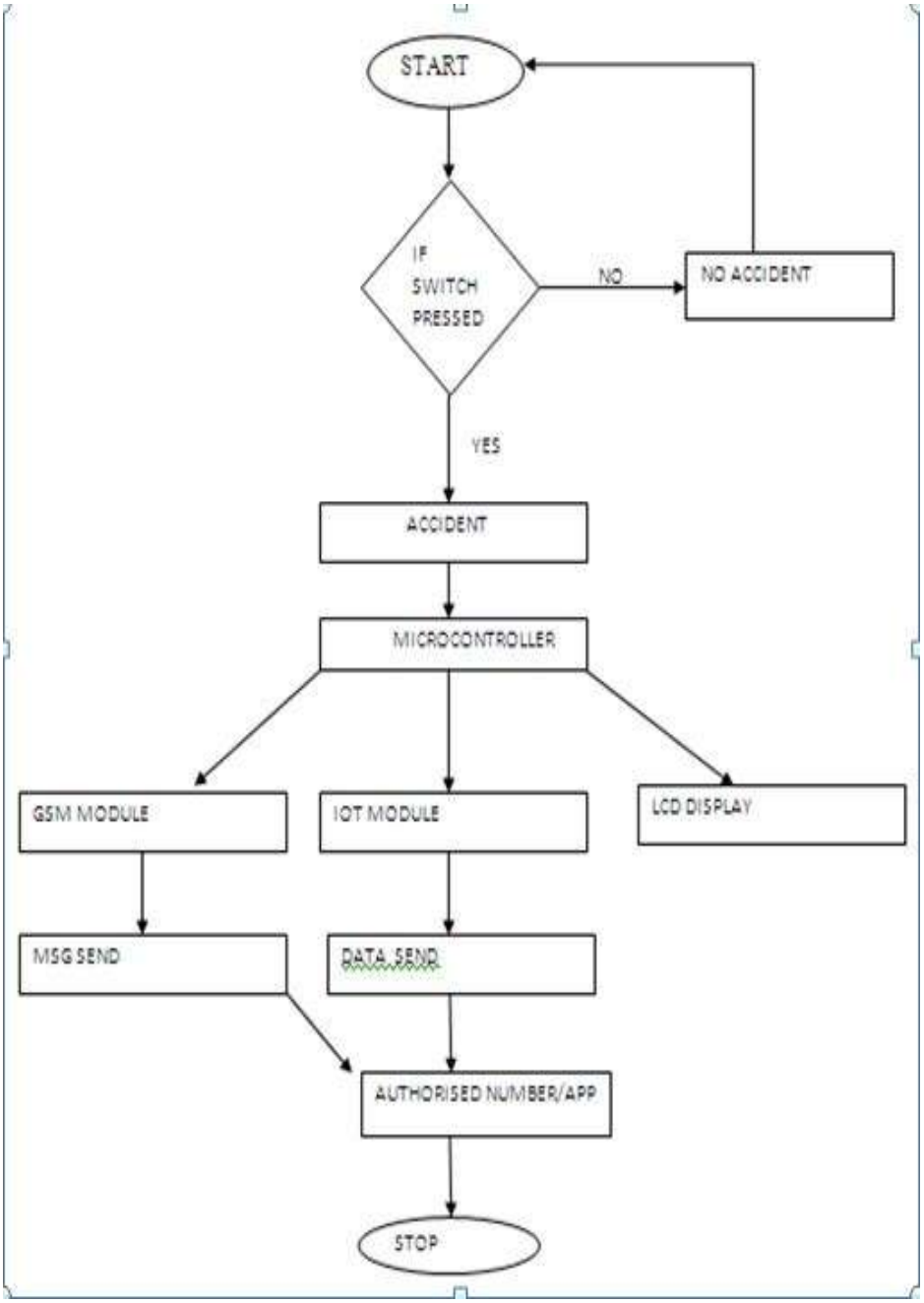


Fig 4.5 Load cell

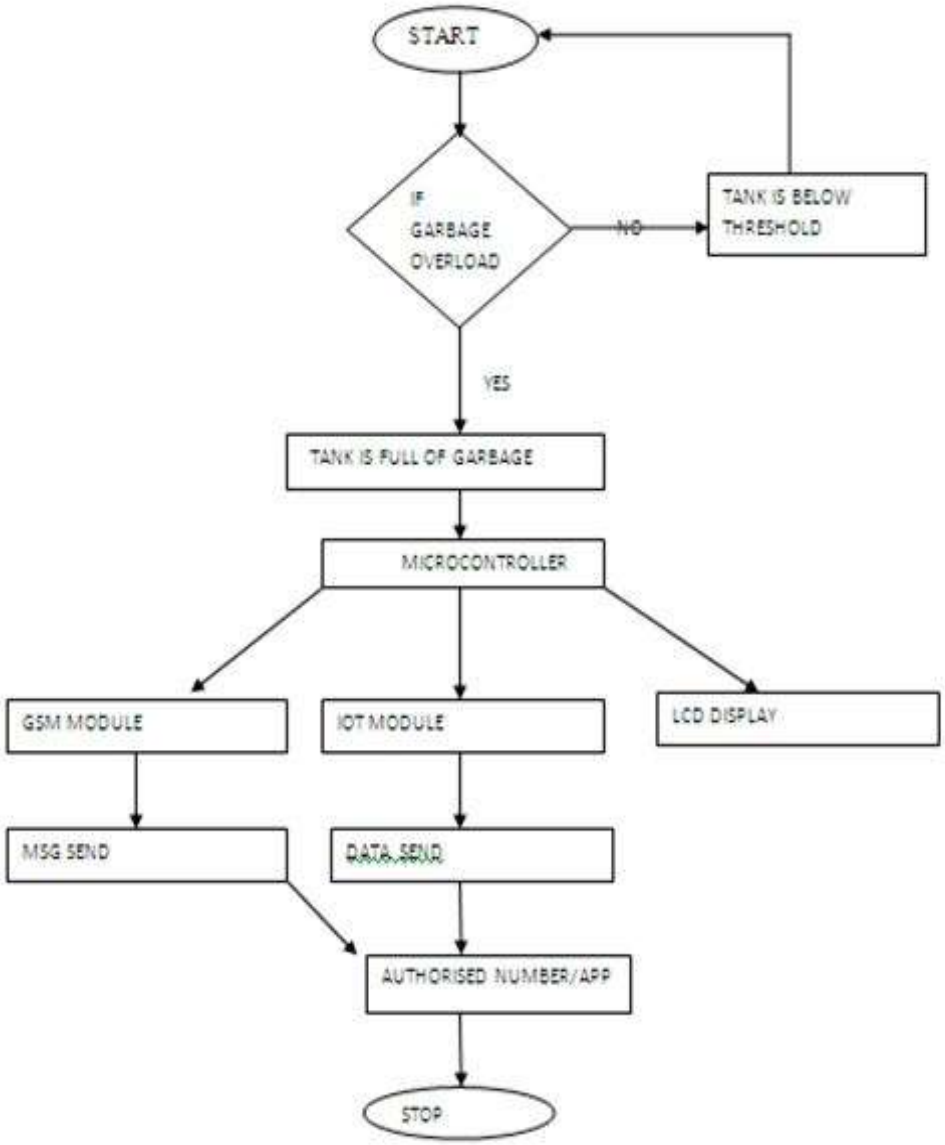
V Flowchart

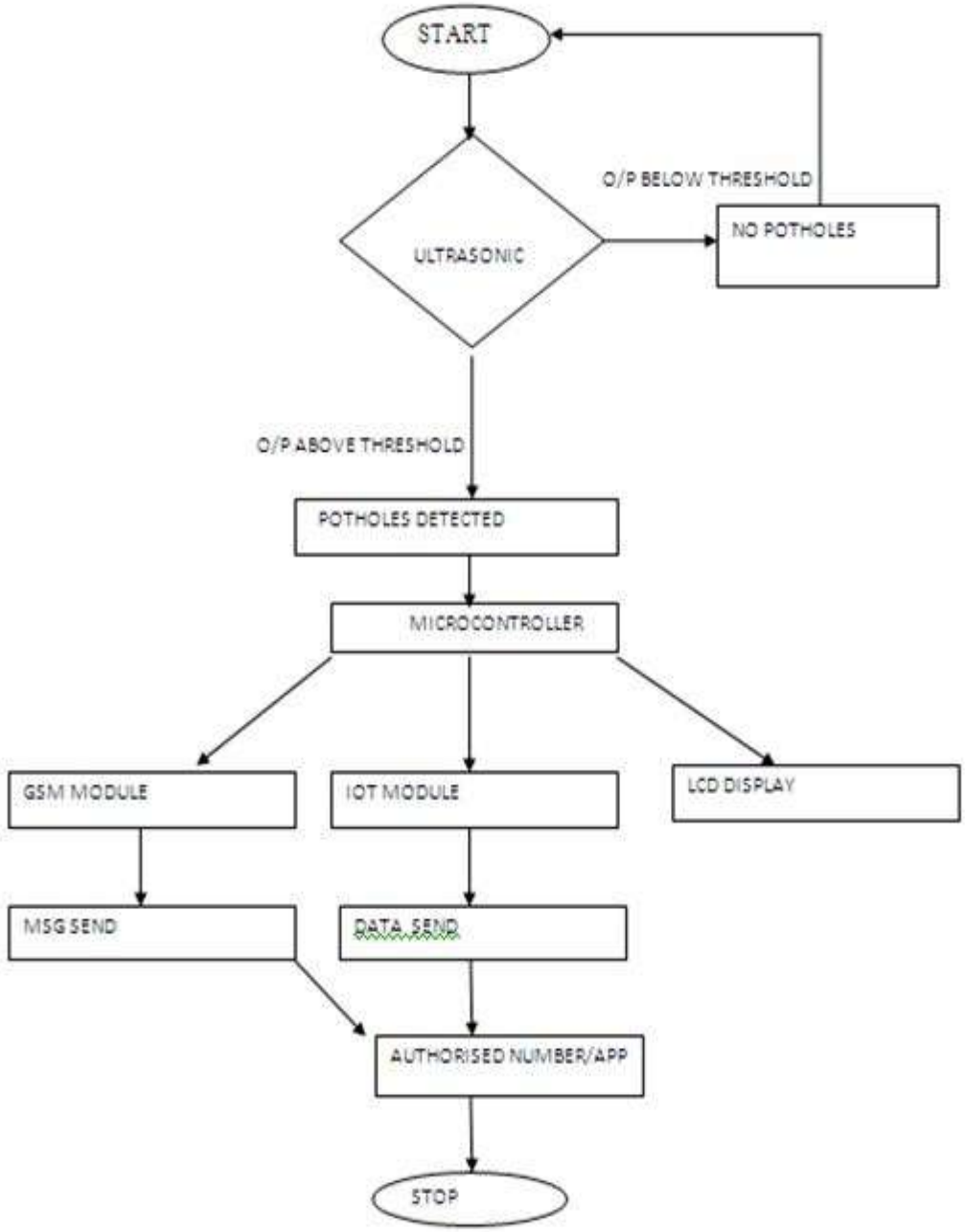
Flow of system when accident detected:



1. Hardware initialize
2 check switch is pressed
3 if switched status pressed than accident detected. Sms send to particular number and data upload on cloud
4 if garabage overload than SMS send and data will upload on cloude

Flow of system for garbage overflow detection:





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FLOW FOR POTHOLES DETECTION:

VI Conclusion

In this project model is Automatic detection of pothole and alerting vehicle drivers, to reduce the vehicle speed and then avoid potential accidents. Also we detect garbage status. If garbage is overloaded than sms send to particular number. We successfully send sensor data on cloud.

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