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PEDESTRAIN TRACKING AND MONITORING USING GPS AND GSM

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Abstract - *Now a days, Improving level crossing safety (lcs) has become important part in road and railway systems. Improving safety of people and road facilities remain as a key element for good operation of transport. In normal signal system such as level and zebra crossings, the probability of accidents are very high. In this paper, ultrasonic sensor is used to detect the human obstacle and the vehicle is, made to stop before a particular distance from the obstacle. Here, Arduino UNO is used for programming. In case of accidents, the location is shared using GSM and GPS.*

Key Words: **Zebra crossing, Level crossing, Pedestrian safety, Arduino UNO, GSM and GPS**

1. INTRODUCTION

Each year, more than 270 000 pedestrians lose their lives on the world's roads. Many leave their homes as they would on any given day never to return. Globally, pedestrians constitute 22% of all road traffic fatalities, and in some countries this proportion is as high as two thirds of all road traffic deaths. These incidents cause much suffering and grief as well as economic hardship. The capacity to respond to pedestrian safety is an important component of efforts to prevent road traffic injuries. Pedestrian collisions, like other road traffic crashes, should not be accepted as inevitable because they are both predictable and preventable. The key risks to pedestrians are well documented, and they include issues related to a broad range of factors: driver behavior particularly in terms of speeding and drinking and driving; infrastructure in terms of a lack of dedicated facilities for pedestrians such as sidewalks, raised crosswalks and medians; and vehicle design in terms of solid vehicle fronts which are not forgiving to pedestrians should they be struck. Our aim is to provide pedestrian safety with the use of ultrasonic sensor and location sharing using GPS and GSM.

2. OBJECTIVE

In signal system, lots of accidents occur in level crossing and zebra crossing. Ultrasonic sensor is used to detect a pedestrian, ensuring the safety of the pedestrians.

3. PROPOSED SYSTEM

In proposed system, we prefer embedded method to avoid accident during pedestrian crossings in road. Ultrasonic sensor is interfaced with Arduino controller to predict the pedestrian. If the ultrasonic sensor detects the person at the same time vision method also detect the person means our vehicle will stopped automatically with indication. In this we used Water Sensor used to predict whether sewage water is available in the road side or not. SOS switch used for that any person suffering from Alzheimer, GPS location shared using GSM to caretaker.

4. BLOCK DIAGRAM

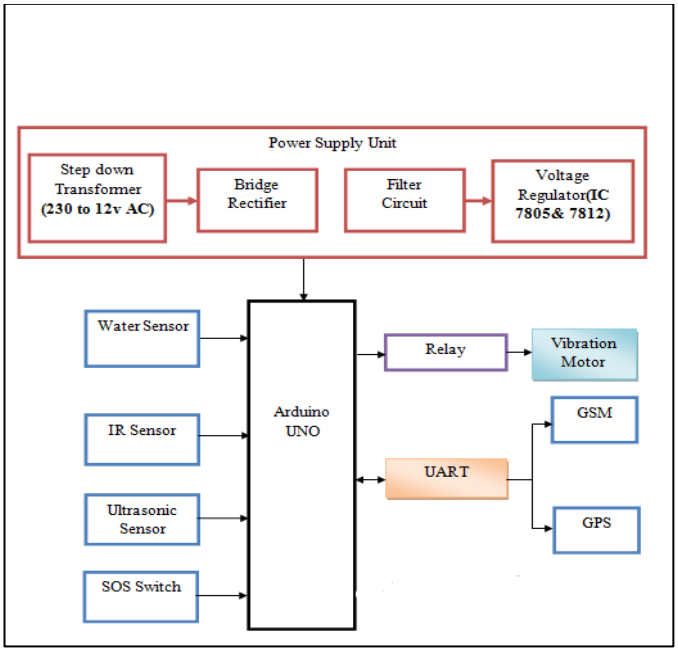

Fig -1: Block diagram

The block diagram consists of step down transformer, bridge rectifier, filter circuit, voltage regulator, ultrasonic sensor, IR sensor, relay, vibration motor, UART, GSM and GPS.

5. HARDWARE DESCRIPTION

All the physical devices used in any system are hardware.

5.1 ARDUINO UNO

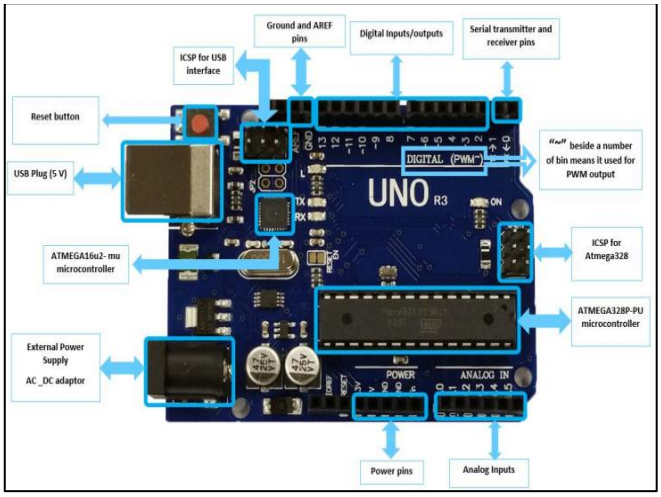

Fig-2: Arduino UNO

Arduino is used for building different types of electronic circuits easily using of both a physical programmable circuit board usually microcontroller and piece of code running on computer with USB connection between the computer and Arduino. Programming language used in Arduino is just a simplified version of C++ that can easily replace thousands of wires with words.

5.2 SIM 900A GSM MODULE

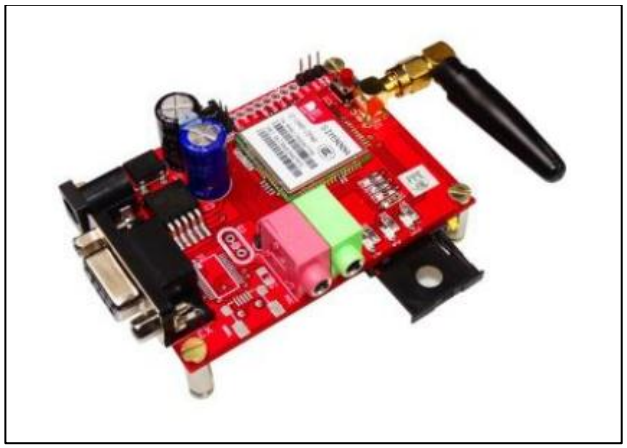

Fig-3: Sim 900A GSM Module

The Modem is coming with RS232 interface, which allows you connect PC as well as microcontroller with RS232 Chip (MAX232). The baud rate is configurable from 9600-115200 through AT command. The GSM/GPRS Modem is having internal TCP/IP stack to enable you to connect with internet via GPRS. It is suitable for SMS, Voice as well as DATA transfer application in M2M interface.

5.3 VIBRATION SENSORS INFORMATION

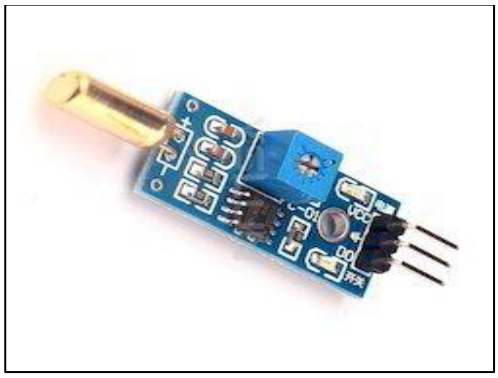

Fig-4: Vibration sensor

Vibration sensors are sensors for measuring, displaying, and analyzing linear velocity, displacement and proximity, or acceleration.

5.4 ULTRASONIC SENSOR

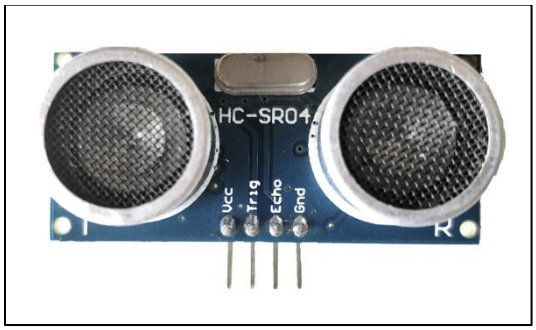

Fig-5: Ultrasonic sensor

As shown above the **HC-SR04 Ultrasonic (US) sensor** is a 4 pin module, whose pin names are VCC, Trigger, Echo and Ground respectively. This sensor is a very popular sensor used in many applications where measuring distance or sensing objects are required. The module has two eyes like projects in the front which forms the Ultrasonic transmitter and Receiver. The sensor works with the simple high school formula that

Distance = Speed × Time

The Ultrasonic transmitter transmits an ultrasonic wave, this wave travels in air and when it gets objected by any material it gets reflected back toward the sensor this reflected wave is observed by the Ultrasonic receiver module as shown in the picture below

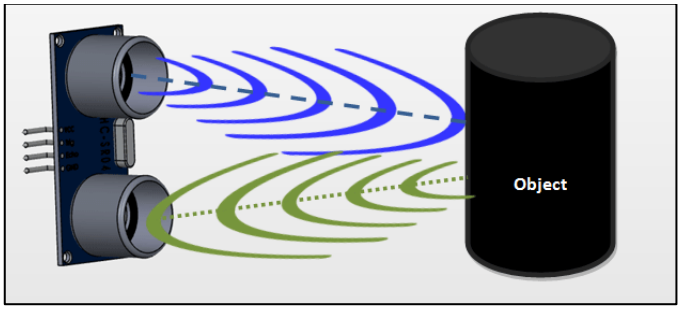

Fig-6: Ultrasonic receiver Module

5.5 SERIAL PERIPHERAL INTERFACE (SPI)

The SPI interface allows for the connection of external devices with a serial interface, e.g. serial flash to save configuration and Assist Now Offline A-GPS data or to interface to a host CPU. The interface can be operated in master or slave mode. In master mode, one chip select signal is available to select external slaves. In slave mode a single chip select signal enables communication with the host. The maximum bandwidth is 100kbit/s.

5.6 DISPLAY DATA CHANNEL (DDC)

The I2C compatible DDC interface can be used either to access external devices with a serial interface EEPROM or to interface with a host CPU. It is capable of master and slave operation. The DDC interface is I²C standard mode compliant.For timing parameters consult the I²C standard. The maximum bandwidth is 100kbit/s.

6. SOFTWARE DESCRIPTION

Software is a term used to refer application, scripts and programs that can run on device.

6.1 EMBEDDED C

Embedded C is a set of language extensions for the C programming language by the C Standards Committee to address commonality issues that exist between C extensions for different embedded systems. Embedded C programming typically requires nonstandard extensions to the C language in order to support enhanced microprocessor features such as fixed-point arithmetic, multiple distinct memory banks, and basic I/O operations.

6.2 ARDUINO IDE

The Arduino Integrated Development Environment (IDE) is a cross-platform application (for Windows, mac OS, Linux) that is written in functions from C and C++. It is used to write and upload programs to Arduino compatible boards, but also, with the help of 3rd party cores, other vendor development boards.

The top menu bar has the standard options, including "File" (new, load save, etc.), "Edit" (font, copy, paste, etc.), "Sketch" (for compiling and programming), "Tools" (useful options for testing projects), and "Help". The middle section of the IDE is a simple text editor that where you can enter the program code. The bottom section of the IDE is dedicated to an output window that is used to see the status of the compilation.

7. RESULTS

7.1 HARDWARE

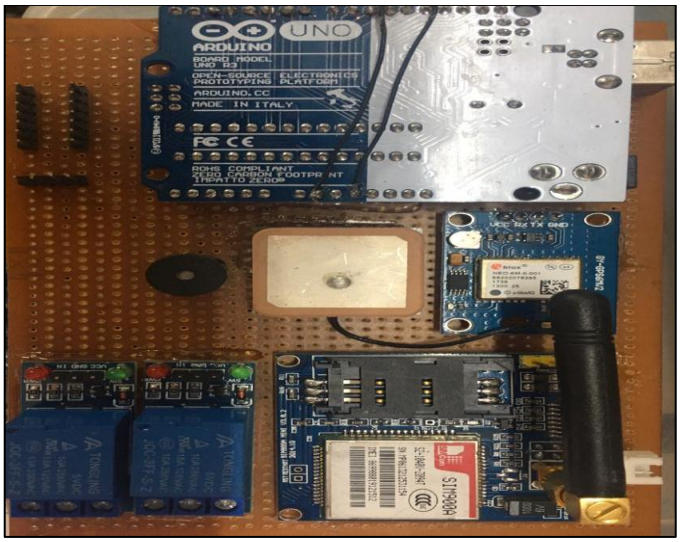

Fig-7 Hardware

Fig-8 Working Model

8. CONCLUSION

By the implementation of pedestrian tracking with the ultrasonic sensor and data sharing using GSM and GPS, the number of accidents caused will be reduced when compared to the existing system.

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