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# Accident Prevention with Emergency Alert Using Arduino Uno

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**ABSTRACT:** In contemporary street wellbeing the board, opportune location and reaction to potential mishaps are pivotal for limiting wounds and harms. An Arduino Uno-based proactive accident prevention system that incorporates an IR sensor, ultrasonic sensors, an LCD with an I2C interface, a GSM module, and a motor is presented in this project. To continuously monitor vehicle proximity, the system makes use of two ultrasonic sensors that are positioned on opposite sides of a curve in the road. An alert mechanism is triggered by the sensors when a vehicle approaches the curve too closely. By monitoring movement patterns and the presence of vehicles, the IR sensor improves detection accuracy.

## I. INTRODUCTION

Mitigating the effects of accidents are critical aspects of road safety. The Mishap Counteraction Framework with Crisis Alert planned utilizing Arduino Uno offers a refined answer for upgrade street security. This framework incorporates different parts to distinguish potential impact situations and issue opportune alarms to forestall mishaps. The Arduino Uno, which is the system's central microcontroller and orchestrates the entire operation, is at its center. The framework uses two ultrasonic sensors decisively put on one or the other side of a street bend. These sensors measure the distance between vehicles, distinguishing any potential impact perils. An IR sensor acts as a complement to these ones and improves the system's accuracy by providing additional data for detecting vehicles or obstacles in critical areas.

## II. EXISTING SYSTEM

The mishap counteraction framework use an Arduino Uno alongside various sensors and modules to improve street wellbeing and give crisis alarms. The framework uses two ultrasonic sensors set decisively to gauge the distance of moving toward vehicles. The time it takes for the echoes to return is used to calculate the distance by these sensors, which continuously emit ultrasonic pulses. The deliberate distances are shown progressively on a LCD with I2C, permitting administrators to actually screen what is going on.

### 2.1 DISADVANTAGES

- Limited Processing Power
- Limited GSM Module Range
- Noise and Interference
- Accurate Calibration

## III. PROPOSED SYSTEM

The framework is intended to persistently screen street conditions and distinguish expected mishaps. On either side of the road, two ultrasonic sensors are strategically placed to measure the distance between approaching vehicles and obstacles. These sensors help in distinguishing any unavoidable crashes or risky circumstances by working out the distance and recognizing any closeness. The IR sensor adds an additional layer of monitoring by assisting in the detection of nearby sudden stops or obstacles.

### 3.1 ADVANTAGES

- Improved Security
- Real-Time Alerts
- Simple Integration
- Friendly User Interface

## IV. LITERATURE SURVEY

[4.1] Vehicle Accident Automatic Detection and Remote Alarm Device, Varsha Goud, IJRES, Vol. 1, No. 2, pp. 49-54, July 2012.

### ABSTRACT

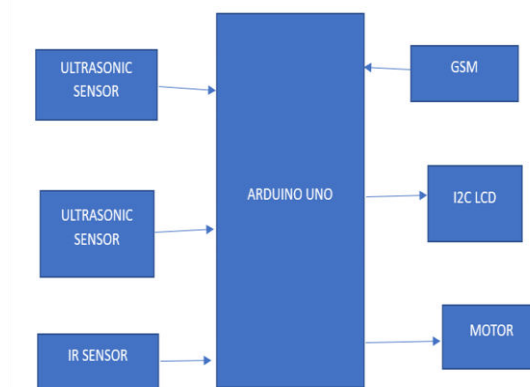
Through real-time accident detection and alerting mechanisms, the vehicle accident automatic detection and remote alarm device developed in this project is intended to improve road safety. Using an Arduino Uno as the focal regulator, the framework incorporates two ultrasonic sensors to screen vehicle closeness and distinguish possible crashes. The system continuously measures distances and identifies critical scenarios indicative of an accident, is supplemented by an IR sensor to improve detection accuracy.

[4.2] Dr. K.S.Tamilselvan, Volume 7, issue 6, June 2018, pp.639-644 Android Based Vehicle Speed Control Framework In Basic Zone Utilizing GPS Innovation.

### ABSTRACT

This paper presents an imaginative Android-based vehicle speed control framework intended to upgrade security in basic zones through the coordination of GPS innovation. The framework means to address the difficulties of speed guideline in high-risk regions, for example, school zones, building locales, and clumsy areas. By utilizing GPS information, the framework distinguishes basic zones where speed limitations are fundamental.

## V. BLOCK DIAGRAM



## VI. HARDWARE REQUIREMENTS

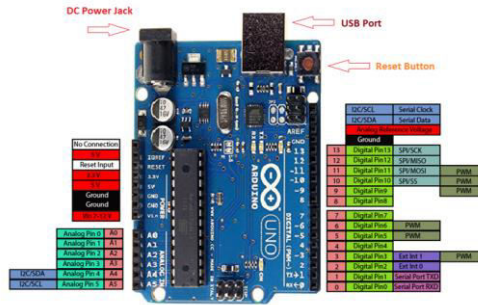
- ARDUINO UNO
- ULTRASONIC SENSOR
- IR SENSOR
- GSM
- I2C LCD
- MOTOR

## VII. SOFTWARE REQUIREMENTS

- ARDUINO IDE

### VIII. HARDWARE DESCRIPTION

#### 8.1 ARDUINO UNO



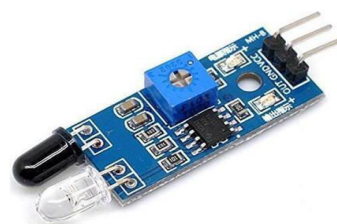
Based on the Microchip ATmega328P microcontroller, Arduino.cc developed the open-source microcontroller board known as the Arduino Uno. Sets of digital and analog input/output (I/O) pins are provided on the board, allowing it to interface with various expansion boards (shields) and other circuits. The board is programmable using the Arduino IDE (Integrated Development Environment) via a type B USB cable and has 14 digital and 6 analog pins. It accepts voltages between 7 and 20 volts and can be powered by the USB cable or an external 9-volt battery. Additionally, it is comparable to the Leonardo and Arduino Nano. By sending a set of instructions to the board's microcontroller, you can instruct your board on what to do. The Arduino Software (IDE), which is based on Processing, and the Arduino programming language are used to accomplish this.

#### 8.2 ULTRASONIC SENSOR



Ultrasonic sensors serve the market by offering a low-cost method of sensing that also possesses unique characteristics that no other sensing technology possesses. By utilizing a wide assortment of ultrasonic transducers and a few different recurrence runs, an ultrasonic sensor can be intended to take care of numerous application issues that are cost restrictive or basically can't be tackled by different sensors. Long reach discovery More and more applications in industrial sensing require distance detection. Limit switches and inductive sensors cannot detect over long distances of up to forty feet.

#### 8.3 IR SENSOR



An electronic device that emits in order to detect some aspects of the environment is known as an infrared sensor. In addition to detecting motion, an IR sensor can also measure an object's heat. A passive IR sensor, on the other hand, measures only infrared radiation rather than emitting it. In most cases, all objects emit some kind of thermal radiation in the infrared spectrum. An infrared sensor can pick up these kinds of radiations, which aren't visible to our eyes but can be detected. The detector is merely an IR photodiode that is sensitive to IR light of the same wavelength as the IR LED. The emitter is merely an IR LED (Light Emitting Diode). The photodiode's resistances and output voltages will change in proportion to the magnitude of the received IR light when IR light hits

#### **8.4 GSM**



GSM is a modem for mobile communication; GSM is the acronym for the global system for mobile communication. In 1970, Bell Laboratories developed the concept of GSM. It is a global standard for mobile communication. GSM is an open and advanced cell innovation utilized for sending versatile voice and information administrations works at the 850MHz, 900MHz, 1800MHz and 1900MHz recurrence groups.

#### **8.5 I2C LCD**



This is an extremely short model. How to use i2c communication to connect an 16x2 LCD to the Arduino, then display text, numbers, special characters, and custom icons byte by byte. The necessary schematic and an example of the code are provided below. Make sure to introduce the i2c liquid precious stone library. For more information, read the code's comments or ask a question down below. First, ensure that you solder an i2c module like the one shown here to the LCD's pins. This module had some control over the 16x2 LCD

#### **8.5 MOTOR**



Direct Current motors are machines that convert DC electrical power into mechanical power. The working of DC motors is based on the idea that a conductor that carries current experiences a mechanical force when placed in a magnetic field. An electrical device that converts electrical energy into mechanical energy is known as an electric motor. The fundamental working standard of a DC engine is: " A mechanical force is applied to a current-carrying conductor when it is placed in a magnetic field. Fleming's left-hand rule indicates this force's direction and magnitude by formula  $F = BIL$ . Where, B = attractive motion thickness, I = current and L = length of the guide inside the attractive field.

## IX. SOFTWARE DESCRIPTION

### 9.1 ARDUINO IDE

Programs composed utilizing Arduino Programming (IDE) are called draws. The file extension.ino is used to save these sketches, which were written in the text editor. The editor has tools for searching and replacing text as well as cutting and pasting. The message region gives input while saving and trading and furthermore shows blunders. The Arduino Software (IDE) outputs text to the console, which includes all of the information, including complete error messages. The base righthand corner of the window shows the designed board and sequential port. You can open the serial monitor, create, open, and verify programs, and upload and upload programs using the toolbar buttons.

ArduinoSoftware(IDE)



## X. CONCLUSION

The accident prevention system that was made with an Arduino Uno, ultrasonic sensors, an LCD-I2C, a GSM module, an IR sensor, and a motor works well to show how embedded systems can improve road safety. The early detection of potential collisions is made possible by the ultrasonic sensors' efficient monitoring of the distance between approaching vehicles. At the point when a vehicle is identified inside a hazardous nearness, the framework sets off the engine to initiate wellbeing measures, like raising a boundary or motioning through cautions.

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