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# ACCIDENT PREVENTION SYSTEM IN HILLY AREAS

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## Abstract:

In hilly regions, there will be a number of curves and hairpin bends. Roads are one of the most frequently used means of transportation in these areas. Accident rates and death rates in hilly regions are increasing day by day. The roads in this region will certainly have curves and sharp turns, so it is hard to see the vehicle coming from the opposite side. The proposed system aims at reducing the risk of driving vehicles in the field area with hairpin turns and stiff curves. The deployed controller with an ultrasonic sensor detects vehicles approaching a curve and signals the curve or the other side of the curve. There are three levels of LED alerts to the driver driving the vehicle coming from the opposite side of the hairpin bend or curve. It also senses the speed of the vehicle, if the vehicle speed is high, it will alert the driver through the buzzer. These alerts will indirectly convey to the drivers to slow down the speed of the vehicle. The foremost focus of the proposed system is to prevent accidents for the drivers and passengers in order to decrease the death rates in hilly regions. This system also provides a way for analyzing the number of uphill and downhill vehicles in the hill stations by storing the data in the cloud. The analyzed data is viewed over the internet through a web application. The web application serves as a traffic analyzer for those who want to travel by this route.

*Keywords* — **Accident-prevention, Downhill, Hilly regions, Internet of Things-IoT, Traffic pattern, Uphill.**

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## I. INTRODUCTION

There are many dangerous roads in the world, such as mountain roads and sharp curve roads. In these, few mountain routes will be very small and contain so many curves. As per the statistics, researchers envision that by 2023 the world's motor vehicle fleets will surpass 2 million in numbers. India's automobile fleets grow at an annual rate of around 7 to 8%. Road accidents contribute to over 1.2 million mortalities worldwide and demand for a safe vehicular country is very high. The privation of medical facilities during the emergency and the increased number of accidents is a major concern to consider in the Modern-day world. In mountainous areas, accidents are primarily caused by the design of the curve roads and hairpin turns, as well as a lack of tracking or monitoring facilities makes the accident situation worse in terrain regions.

## II. RELATED WORK

As of previous carried projects have some insignificant output. So, we have given clear-cut

  

information of that difficulties, that the materials which are used in the project are also of low cost with high benefits.

Driving is one of the most difficult tasks on hills. Drivers have to be alert all the time while driving in these regions. Research for hilly regions has proposed several accident prevention systems. Among the causes of accidents in hilly regions, the driver does not know whether the main cause is a vehicle approaching from the other direction. To avoid these problems in curves or hairpin bends a piezoelectric sensor-based system is implemented.

In this system, we are using Ultrasonic sensors for detecting vehicles and alerting the opposite side of vehicles by indicating Red LED and Green LED. We're using MQ2 Sensor and DTH11 Sensors which detect the climatic monitoring and will upload it to the cloud server by using GSM/GPRS Module.

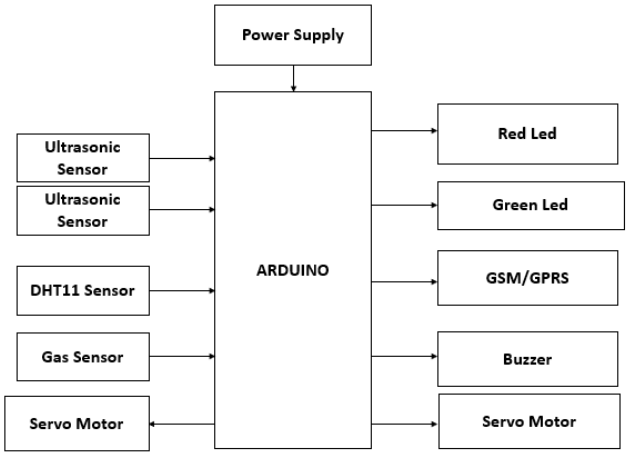


**Fig 1: Proposed block diagram**

However, to simplify our system we are using Arduino which can combine hardware and software easily. Thus, we are using the Arduino for communicating hardware with c language and the system should be low cost and high given output such a system can be only at high ranges.

C is used in Arduino and the entire coding part is implemented in Arduino. Compilation of the entire code is an easy part of the system.

Here comes main point is the sim with phone number induced in the GSM and number that is resisted in the RFID tag cannot be the same because the message must be sent from one communication service to another communication service, If they are the same then it will be like a one-way traffic the message cannot be sent or neither revises. So, the number should be varied.

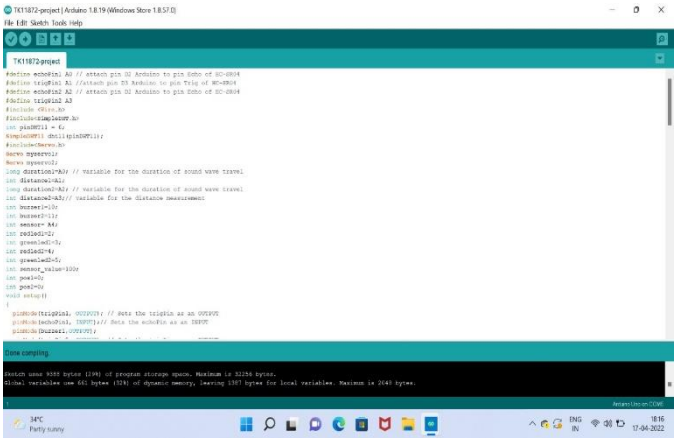

**Fig 2: Coding Output**

The above coding figure is the screenshot of the progress coding is induced in the Arduino.

## III. METHODOLOGY

The total sign of progress of the process is done in this methodology by using the materials which are used in their process also explained clearly.

### A. ARDUINO UNO:

The Arduino Uno is an open-source microcontroller board developed by Arduino. cc based on the Microchip ATmega328P microcontroller. The board is equipped with sets of digital and analog input/output pins that may be interfaced to various expansion boards and others carried.

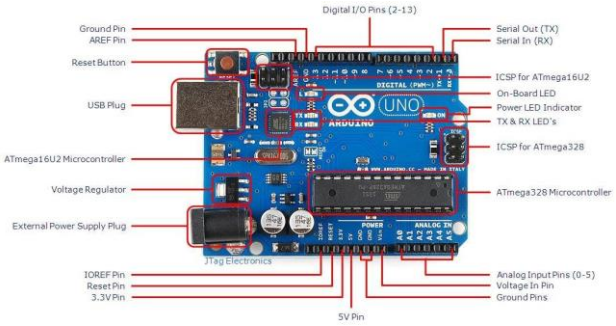


**Fig 3: Arduino Uno**

### B. POWER SUPPLY:

  

The power supply board is basic essential interfacing for regulating and supplying power to connected components. The female barrel jack connector on the power supply board acts as the input terminal and the terminal blocks of the board enable you to connect to the components using the male breadboard wires.

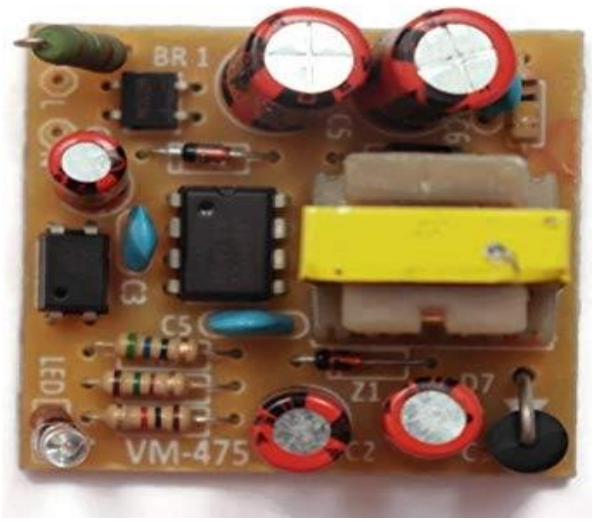


**Fig 4: Power Supply**

### C. ULTRASONIC SENSOR:

An ultrasonic sensor is an electronic device that uses ultrasonic sound waves to detect the distance between a target item and converts the reflected sound into an electrical signal. Ultrasonic waves travel faster than the speed of audible sound (that is, the sound that humans can hear).


**Fig 5: Ultrasonic sensor**

### D. BUZZER:

A buzzer or beeper is a mechanical, electromechanical, or piezoelectric audio signaling device (piezo for short). Typical uses of buzzers and beepers encompass alarm devices, timers, and affirmation of user.

**Fig 6: BUZZER**

### E. Red LED and Green LED:

Red mild is the conventional sign of attention, so it's miles a notable factor to have in emergencies for signaling and safety.

**Fig 7: Red LED**

Green LEDs are useful for night vision.

**Fig 8: Green LED**

### F. GSM/GPRS MODULE:

GSM/GPRS modules are one of the normally utilizes correspondence modules in implanted gadgets. A GSM/GPRS module is utilized by a

  

microcontroller (or coordinated circuits). GSM is the Global Mobile Communication System and GPRS would be the General Packet Radio Service. A GSM/GPRS MODEM consolidates a GSM GPRS similarly to various fragments, for instance, correspondence interface, (for instance, Serial Communication-RS-232), control supply, and a couple of pointers.

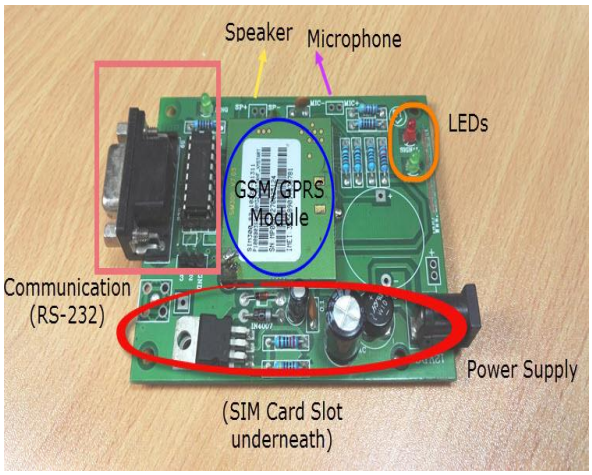


**Fig 9: GSM/GPRS Module**

### G. DTH11 SENSOR:

A temperature sensor is a device used to measure temperature. It can be air temperature, liquid temperature, or solid temperature. These devices are used to measure temperature readings through electric signals. The DTH11 is a basic digital temperature and humidity sensor at a cheap cost. It uses a capacitive humidity sensor and a thermistor to measure the surrounding air and spits out a digital signal on the data pin (no analog input pins are needed).

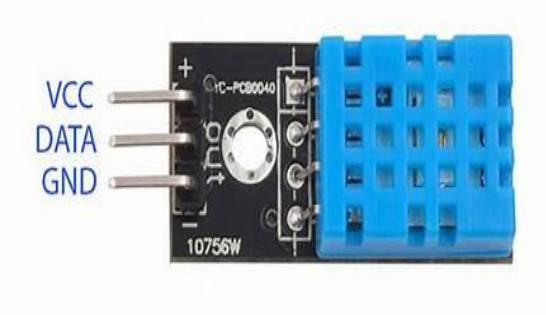


**Fig 10: DTH11 Sensor**

### H. GAS SENSOR:

This gas sensor uses an MQ2 gas sensor to indicate if there is gas in the area. So, the sensor has a threshold value is around the amount of smoke if there is a fire, and if begins to alarm those nearby. The alarm will display a red led and starts beeping. This concept is quite useful, as it is implemented on a daily basis is very helpful and is used on a daily basis with the smoke alarms that many people have in their homes.


**Fig 11: Gas Sensor**

### I. SERVO MOTOR:

A Servomotor (or servo motor) is an easy electric powered motor, managed with the assistance the servomechanism. If the motor as a controlled device, associated with servomechanism is a DC motor, then it is commonly known as a DC Servo motor. If AC operates the controlled motor, it is known as an AC servo motor. We can control the servo motor by connecting the servomotor's signal pin to an Arduino's pin, and programming to generate PWM on the Arduino's pin.

**Fig 12: Servo Motor**

  

## IV. OVERVIEW OF PROPOSED WORK:

This accident prevention system using sensors is powered by an Arduino board, it consists of Ultrasonic sensors, LED, and a buzzer by observes some environmental parameters. When two cars pass from the opposite side of a mountain curve the Ultrasonic sensor senses the car and the LED color turns green. In this way, able to avoid the mischances of bend roads. Here we are monitoring environmental parameters by using Gas and DHT11 sensors. The data will be exchanged to the cloud server. If any of the sensors cross then the message will be sent to concerned authorities by using GSM/GPRS Module.

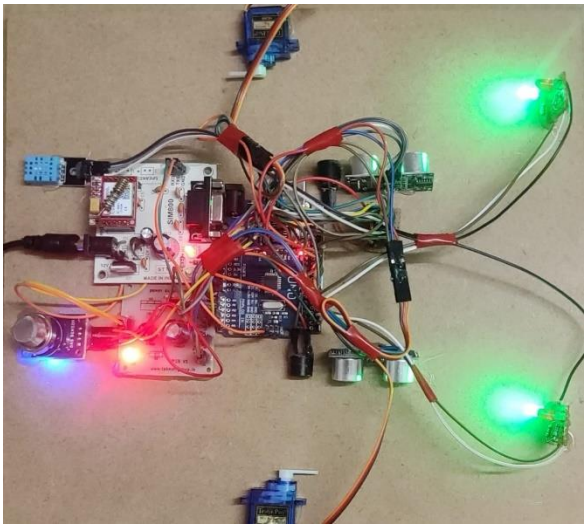

**Fig 13: Final Hardware Output**

The framework is introduced at the bends and twists. The Ultrasonic sensor senses the distance of a vehicle approaching or moving away from it. Based on its input from the Ultrasonic sensor, the signal will change their respective color to indicate the driver. Now, for instance, we consider that a vehicle is coming on one curve. The Ultrasonic sensor at the curve while going senses that a vehicle is approaching. Based on that the buzzer also starts buzzing continuously. Here in this, we are monitoring environmental parameters like Temperature, Humidity, and Gas sensors. Based on parameters, message alerts will be sent and the values will be uploaded to the cloud server.

## V. CONCLUSIONS

The main aim of the project is to prevent accidents in hilly regions. We are providing the accident prevention system by using Ultrasonic sensors.

The accident prevention system was developed and tested. The system was able to alert the vehicle approaching in the opposite direction of the curve, hairpin bend, or blind spots to reduce the accident rate in hilly regions.

This system will decrease the rate of accidents in hilly regions. Mainly, It requires LED lights that detect the vehicles to stop and gets the prevention.

This is how Ultrasonic sensor used and helped to prevent the accidents in hilly regions.

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