A Review on Vehicle Alerter and Accident Prevention

R Vaishnavi[1], Sneha Sanjeev Yalamalli[2], Thanush Gowda R[3], Subbaiah I M[4],

Dr. Nagaraja B G

Department of Electronics and Communication Engineering, Vidyavardhaka College of Engineering, Mysuru, India[1-5]

Abstract: The goal of this project is to create an accident prevention system for hilly regions to alert and prevent accidents by making use of the Arduino Uno as the primary design component. The current leading cause of death in developing nations is vehicle accident. Some of the world's dangerous routes include mountainous and winding. Every year more than 1.5% increase in road accident and it is approximately more than 6 lakh road accidents in India, for every one minute one road accident and for every 4 minutes one death due to road accident. India is losing very huge youth as the maximum death age group are from 16 to 30 years European countries. There will be curvy, narrow roads in the mountainous areas. The person driving most of the times cannot see the vehicle approaching from other side in such circumstances also the opposite side may lead to a cliff. Each year, thousands of lives are lost as a result of this issue.

Keywords: Curve roads, Accident Prevention, GPS and GSM Module, Arduino UNO and Nano

I.   INTRODUCTION

The 21st century, where we are currently living, population is growing exponentially. Hence the likelihood of an accident to occur also rises. So, it's a major concern to develop a method to control these accidents. All of these accidents are mostly the result of negligence, waiver of safety precautions, etc. Safety precautions are being adjusted as technology advances more quickly, but mishaps are still occurring. Although earlier measures to prevent those mishaps had been made, accidents continue to happen more oftenly.

Global Positioning System (GPS) and Globalization Management System (GSM) were both developed, but only after accidents had already occurred. GPS is used to provide information about the location, and GSM is useful for sending messages from the user's mobile device to notify the appropriate authorities that an accident had occurred. Our suggested model is an exception to all of this because it works to prevent the accident from happening, saving lives in the process. Accidents are often reported using GPS and GSM. Our suggested model is a warning system that alerts us to potential mishaps so we may take the required precautions to prevent them. Therefore, this is a first step in saving lives, and it is also up to us as humans to ensure our own safety because safety goes along with us. Use of mobile phones while driving, sending messages, handling of mobiles, loss of focus while driving, intoxication, lack of sleep, and other factors are some of the leading causes of road accidents in India. It entails a significant cost that cannot be covered by money or any other resource because it may result in death, lifelong pain for the injured party, a loss of income for the family, and even death.

Fig.1. Accidental Spots

Mountain roads can have very sharp turns and are quite narrow. Examples include the Fairy Meadows Road in Pakistan, the Road of Death in Bolivia, the Himalayan Zoji La Pass, and the Kinnaur Road in Himachal Pradesh [1]. Some

highways have sharp curves and steep ascents. When this occurs, the driver of the car may not be able to notice the vehicle coming from the opposite direction, which may result in an accident on mountain or hill roads. [2]. The major goal of this project is to use the GPS and GSM networks to locate any accident site and notify family members in case there be a occurrence of any accidents. An ultrasonic sensor is part of an accident detection and prevention system that detects objects and transmits data to an Arduino nano. The driver of the car approaching from the other side will be alerted by the LED connected to the Arduino nano, which will signal red light whenever a vehicle is detected [3]. The GSM and GPS modules that are attached to the Arduino Uno are part of the GPS-based vehicle accident recognition module. GPS is utilised to track the position of the vehicle, while GSM is used to create cellular connections. Nowadays, it can be difficult to identify an accident's location and determine its cause. There is no technology on the market for identifying and alerting about an accident in the past. This project shows a GPS and GSM-SMS-based auto location locating system for unintentional spots.

II. SYSTEM DESIGN

This system is divided into two parts:

- Accident detection and prevention.
- Vehicle accident identification module.

A system for detecting accidents is made up of an Arduino Nano, a red and green LED light, and an ultrasonic sensor (HCSR 04). Vehicle accident identification system components include an Arduino Uno, a Sim 900 GSM module, a Neo 6M GPS module, and a button. The +5V DC supply used by ultrasonic sensors. Its range is between 2 and 100 cm. The open-source Arduino 1.0.10 IDE tool is used in the detection and prevention design in order to detect the vehicle or obstruction and control the LED. Embedded C or C++ can be used to programme. Windows 10 was the operating system that we employed. Green LEDs were used as the light source here. And Windows 10 is red li. Green LEDs were used as the light source here.

1.   Accident detection and prevention:
A.   Ultrasonic sensor:

Fig.2. Ultrasonic Sensor

This sensor sends out ultrasonic sound waves, and then it turns the reflected sound into an electrical signal to calculate the distance to a target item. Audible sound cannot match the speed of ultrasonic waves. HCSR 04 makes use of a +5V DC supply. Its range is between 2 and 100 cm. A 4-pin ultrasonic sensor is used. They are the Trig pin, Echo pin, +5V, VCC, and GND. Trigger pin is an output pin in this instance, while Echo pin is an input pin. It uses the trigger pin to convey the signal as pulses. This signal will be reflected back when it strikes the item, reaching the echo pin in the process.
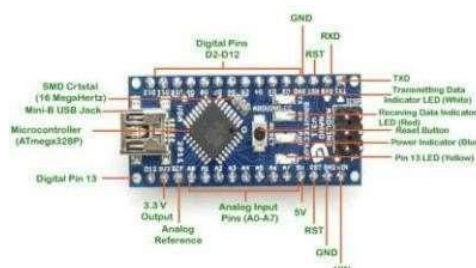
B.   Arduino Nano:

Fig.3. Arduino Nano

Based on the ATmega328P, the Arduino Nano is a compact, comprehensive, and breadboard-friendly board. The ultrasonic sensor's trig pin and echo pin are linked to the Arduino nano's digital pins 7 and 8, respectively. VCC is connected to the Arduino nano's +5V, and GND is connected to the GND. The Arduino Nano's pins 12 and 13 are each connected to a red and a green LED. The Arduino Nano receives a signal from the sensor when it detects an object. This signal is processed by Arduino, who then sends it to a red LED to indicate a signal.
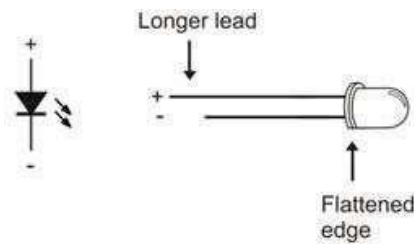
C.LED:

Fig.4. LED

When an electric current flows through a Light Emitting Diode (LED), a semiconductor device, it can emit light. Green LED initially blinks, signalling that there are no obstacles on the other side of the bend. Red LEDs flash for 30 seconds to indicate objects on the other side if there is an obstruction between the mountain and the ultrasonic sensor. Green LED initially blinks, signalling that there are no obstacles on the other side of the bend. Red LEDs flash for 30 seconds to indicate objects on the other side if there is an obstruction between the mountain and the ultrasonic sensor.
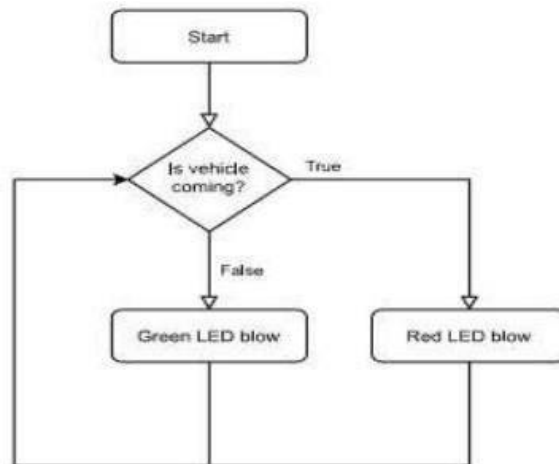

Fig.5. Flowchart for working principle of Accident Prevention System

When a vehicle is present and the sensor detects it, the light at the other end of the curve will glow red for 30 seconds. The sensor won't detect a car when it's not there, therefore the indicator will remain green. Continuous repetition of this procedure.

2.   Vehicle accident identification:

A.   Button:

We operate a single button on the car's bonnet side. In the event of an accident, this button will be depressed, sending a signal to Arduino Uno.

B.   Arduino Uno:

A microcontroller board called Arduino UNO is based on the ATmega328P. It contains 6 analogue inputs, a 16 MHz ceramic resonator, 14 digital input/output pins (six of which can be used as PWM outputs), a USB port, a power jack, an ICSP header, and a reset button. This signal will be processed by Arduino, which will then send a signal to the

Fig 6. Arduino UNO

GSM and GPS module informing them that an accident has occurred.

C. GSM module:

As shown in Fig. 5, we used an Arduino Uno microcontroller, a SIM 900 GSM module, and a button. The GSM module has four pins. VCC, GND, TX, and RX are the four. The output pin (TX) and the input pin (RX) are present. The TX and RX pins of the GSM module are connected to pins 7 and 8, respectively, of the Arduino Uno, and the respective VCC and GND pins. A button on the car's bonnet side will be depressed in the event of an accident. This will communicate the signal to the Arduino Uno microcontroller. The signal will be processed by the microcontroller, which will then send the warning message ("Accident has happened") to the appropriate saved number in coding.
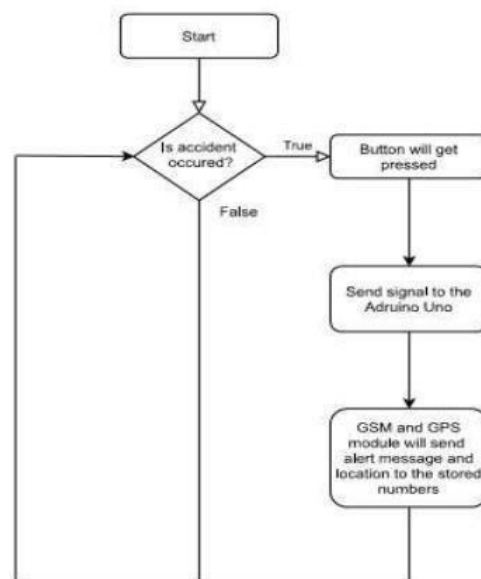

Fig .7. Flowchart Vehicle accident identification module.

In the event of an accident, the button will be pressed, sending a signal to the Arduino Uno. After processing this signal, Arduino will send an alert message and position to the appropriate saved numbers using a GSM and GPS module.

III.   LITERATURE SURVEY

•   **V.Aravind Sai, V.Sampath kumar, R.Prema**: By automatically sending the precise location of the accident site to registered cell numbers and an ambulance when an accident happens, this paper shortens the travel time to the scene.

•   **Bhumika R, Harshitha SA, Meena D, Asha M**: This study examines the Mishop avoidance framework inbending using ultrasonic sensors. The outcome was a reduction in accidents on bendy streets by influencing the driver with LED lights that twinkle as a car approaches from the other side.

•   **Ichita Mhatre, Ashwini Mahajan, Tanmay Krishna**: This paper analyses sensors and LEDs that are installed on either side of the road to signal the presence of approaching vehicles from the opposite direction.

•   **Kailas Shinde, Pranjal Shinde, Shivani Valhvankar, Swapnil Narkhede**: For the purpose of accident prevention and to demonstrate how it functions as well as the advancement of technology, this article makes use of Arduino, GSM, GPS, and LCD vibration sensors.

• **Surya Prakash Singh, Deependra Godara, Maheshwar Sambyal, Ms.Harpreet Kaur Channi**: In this study, buzzers and sensors that switch on when a vehicle is approaching from the other direction were used.

• **Igor Radun , Jenni E. Radun**This essay discusses severe problems brought on by fatigued driving, which make it challenging to apply traffic or criminal law. This study demonstrates the clear criteria for identifying the role of driver sleepiness in accident causation, which leads to the annual punishment of a sizable number of drivers by law enforcement and courts.

• **Manthan P. Rathod**: This study examines collision sensors, which can gauge an accident's severity and give us crucial information. sensors, GSM, and GPS that identify the collision and communicate with Arduino. This article provides a practical solution to road hazards, maintaining vehicle security, and minimising the loss of life and property.

• **Mr. A. J. Reuben Thomas Raj, E. Jahnavi et.al.**: At this project, two ultrasonic sensors that will be installed in the previously described locations are connected to two led lights. It is primarily used in hill stations to prevent accidents because the driver cannot see the other side of the car, known as the blind spot.

• **Deepthi Jha, Harshit Sharma, Priyanshu**: The vehicle's driver is warned by an LED when they approach a hairpin turn or curve. Additionally, it detects the vehicle's speed and alerts the driver. These will subtly remind the drivers to reduce the vehicle's speed. The primary goal of the suggested approach is to lessen the number of fatalities in hilly areas by preventing accidents for both drivers and passengers.

Nazir Ahmme, Nusrat Jahan Jenny c , et.al.: The fundamental message of this essay is to identify accidents as soon as they happen, act quickly after doing so, and avoid situations where people die because there are no emergency resources available.

IV.   CONCLUSION

The goal of this paper is to make curve road accidents less common. To do this, an LED light that illuminates as a vehicle approaches from the opposite side of the bend alerts the driver. The Ultrasonic sensor, which is connected to the Arduino Nano microcontroller, is used to detect the car. If an accident occurs, the GSM module, GPS module, and Arduino Uno are used to send a message to warn family members of the location of the accident. By doing this, we can prevent thousands of fatalities on winding routes.

Significantly in plain areas, this can be erected at the intersection of two or more roads, but we only used it where there were mountainous curves, which are even riskier than typical intersections and more likely to cause accidents. Future implementation of this idea, which can be deployed in road intersections and has a broad future reach, can be successful.

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