

Accident Detection and Alert System for Vehicles

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Abstract— *The development of the transportation system has increased the pace of our life. Road traffic accidents have recently become a global issue on a global scale. One of the main causes of shorter life spans, fatalities, property losses, and loss of time is road traffic accidents. With the sharp rise in traffic accidents, the mortality rate is rising quickly. When it happens on a roadway, an accident acts as a devastating scenario for the victims. This article describes the development of an intelligent accident detection system for spotting traffic collisions. Location tracking and alerting systems that identify accidents instantly using GPS position are both components of intelligent accident detection.*

Index Terms— *GPS, GSM, Arduino, Gyroscope, Road traffic accidents, Location tracking, Vehicle*

I. INTRODUCTION

This introduction explains the safety precautions that should be taken into account while operating a vehicle on the road. The main goal of these precautions is to avoid the accidents that happen most frequently on the road. The primary issue with roads is that drivers do not priorities following safety precautions and directions. When a vehicle is moving at a high rate of speed, it is impossible to manage, which creates hazardous conditions for all motorists using the same route. Therefore, preventing such mishaps is the primary goal. This strategy to prevent auto accidents has been suggested by us. Here, we're employing sensors that are attached to the ATmega328p board, which also features an LCD display, GSM, GPS, a buzzer, and four ultrasonic sensors for the detection of nearby vehicles

The sensor warns the driver when a vehicle is nearby by making a sound, showing the distance and the direction of the vehicle, and when the road is clear, indicating whether there is a risk or not. Additionally, the system advises driving the car. This system is crucial for both older people and children and learners.

The reasons are as follows

1. Over speeding
2. Drunk and drive
3. Distractions during Driving
4. Traffic Signal breaking

1] Over speed:

The majority of accidents occur as a result of vehicles travelling at excessive speeds. Many people drive their cars at fast speeds because they are constantly rushing to get where they are going. As a result, the likelihood of traffic accidents increases. Individuals don't realize that when they are driving, other people are also using the same road. High speed increases the probability of accidents and the severity of injuries sustained in accidents. In order to lessen the likelihood of accidents and the degree of injuries, we must drive the vehicles carefully. High speed vehicles have a tendency to cause more accidents than slower vehicles

2] Drunk and drive:

Alcohol intake is common during all types of celebrations, however driving after drinking can result in unneeded issues. Mental clarity is compromised by alcohol. It quickens the human body's response time. The limbs' reactions to commands from the brain are slower. Vision is impeded by the dizziness. Alcohol lowers anxiety and makes people more willing to accept risks. All these things together while driving cause collisions, many of which are fatal. Every 0.05 increase in blood alcohol level increases the likelihood of an accident by double. Numerous substances and medications can potentially affect the ability and focus needed for driving, in addition to alcohol.

3] Getting distracted when driving:

Even though distracted driving isn't particularly widespread, it can nevertheless cause fatal collisions. These days, using a cell phone while driving is the main distraction. A significant percentage of the brain is used when talking on the phone, yet only a small portion of the brain is required for motor processes. This area of the brain hinders judgement and reaction time. This turns into one of the causes of accidents. It is not advisable to converse on the phone while operating a vehicle. One should pull over next to the road and answer if the call is urgent. Roadside entertainment includes:

1. Animals on the road. 2. Events occurring near road.

4] Traffic Signal breaking:

People on the road are constantly rushing to get where they're going, and as a result, they frequently disregard traffic signals, rules of the road, and regulations established by the RTO office. As a result, this type of behavior of people will result in serious

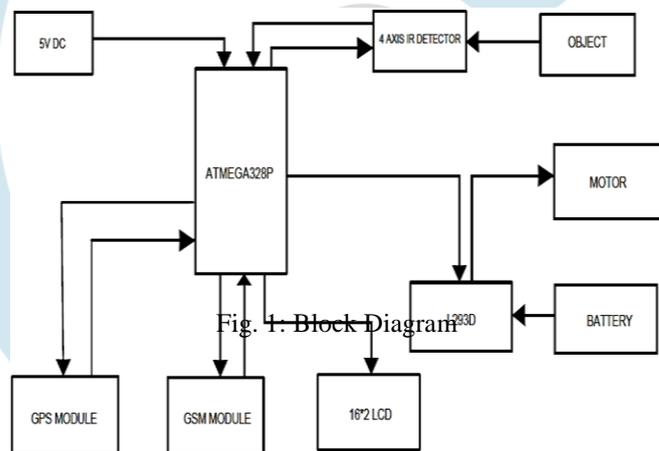
accidents and life-threatening injuries. Only 29,493 traffic accidents are expected to occur in Maharashtra in 2021, resulting in 13,528 fatalities and 25,116 injuries.

II. PROPOSED WORK

The GPS Module, GSM Module, and Power Supply have all been utilized in the proposed system. The open-source Arduino platform is a well-designed platform. The programmed boards use the Arduino programming language (APL). Currently, Arduino is used by businesses in addition to hobbyists who are hired by professionals to develop commercial goods. The Arduino Uno microcontroller board uses the ATmega328P datasheet. It has 14 digital input/output pins, including 6 pins for analogue inputs and 6 pins for PWM output, a 16 MHz ceramic resonator, and a USM.

Let's start with the first system where the accident is not happened in this case the 4ultrasonic sensors will acts as an object detector as well as the distance from the nearby object is measured by the system so that this measured distance can be displayed on the screen and also alerts the rider for nearby objects by giving the signal like object is near please check direction Now, Let's start with the situation where the accident has happened the system used will also detect it and it will send the alert message to the relatives and to the hospital directly with the help of the GSM and the GPS module

III. WORKING



To function properly, the ATmega328p requires a 5-volt direct current supply. This supply is provided by stepping down the voltage, and the Arduino Uno board is connected to various inputs and outputs. The Arduino board is connected to a variety of gadgets.

A four-axis detector-In this setup, the ATmega328p is coupled to four ultrasonic sensors. The programming specifies the minimum distance values, and the ultrasonic sensors are used to measure the distance from our car, bike, or other vehicle to the closest thing or other car. All of this information is displayed on the display, and the speaker will start to make noise.

16*2 LCD display: The LCD display is used to show various parameters sensed by the ultrasonic sensor as well as the system's actual current state of operation;

Battery: The battery powers the system and the L293D chipset, as well as the Arduino board.

Motor: With the help of the L293D chipset, the motor is utilized to regulate the direction and speed of the motor.

GSM Module: This module is used to deliver the message to a mobile number that is specified in the program.

GPS Module: This module provides the precise location of the bike at the time of the accident.

IV. SIMULATION

This is the diagram of the Simulation where we have Connected the different components like GPS module GSM module lcd display motor and the L293D controlling chip for the speed control of the bike also we have connected one button when accident happens then the switch is pressed due to the accident jerks and the signal is given to the Arduino. There is another system also developed this will be as follows

Here in the above figure the all four sensors are used for the detection of the Objects near to the vehicle when the system detects the objects near to the vehicle after set certain limit the system alerts the rider about the objects in front of vehicle and well as back side of the vehicle.

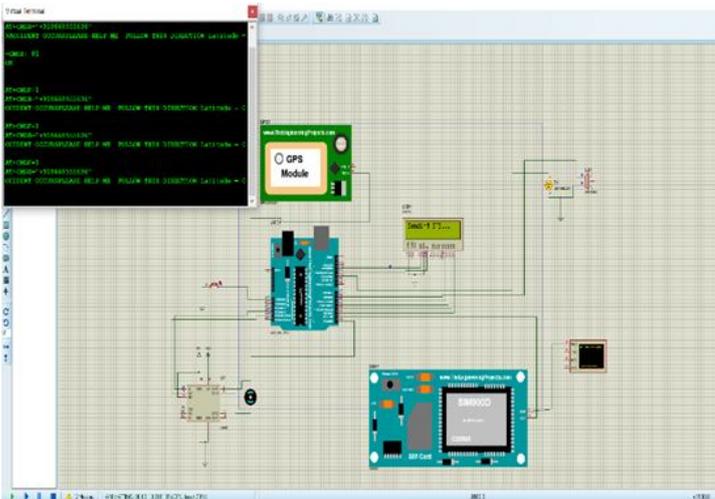


Fig. 2 Simulation

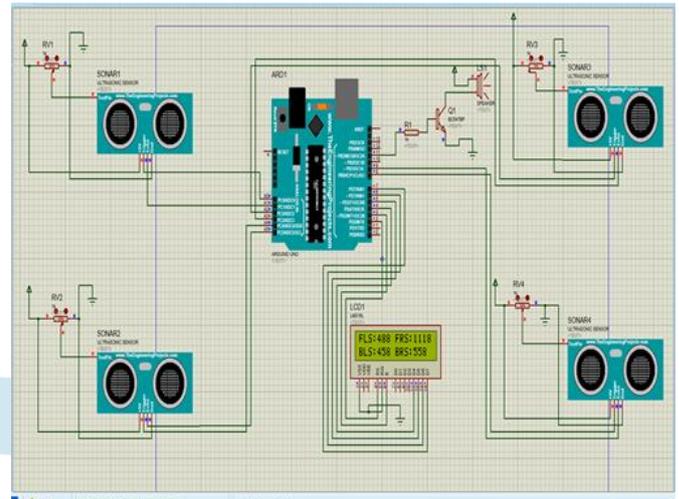


Fig. 3 Simulation

V. HARDWARE

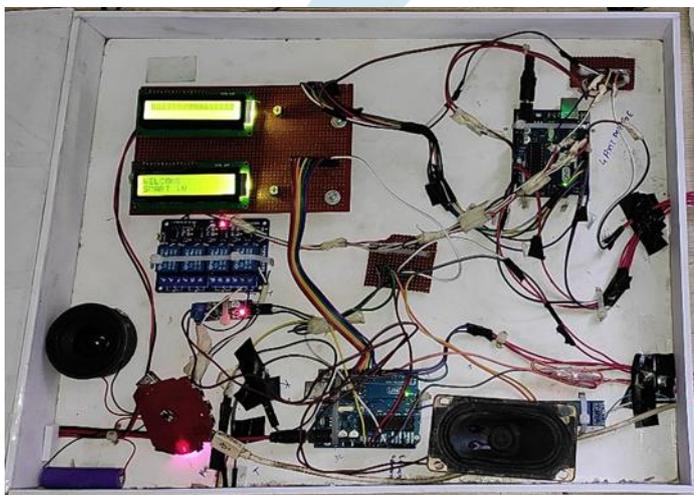


Fig.4 Actual System with Arduino

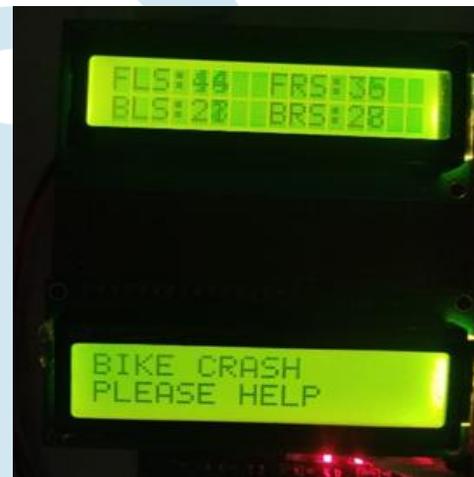


Fig.5 LCD Displays

The figure 4 shows that the 4 ultrasonic sensors are connected to our different directions there this will measure the distance and with the help of this the system will advise the driver for changing the directions this LCD display the measured distance will be shown and if accident happens and any one or more of four switches will be pressed and accident signal will be given on LCD display and also by a speaker

VI. RESULTS

Here the Message will be sent to the registered mobile number in the Arduino code with its GPS location and alert message set by the created smart system for accident identification and preventive system and also the message in text format will be displayed on the LCD screen

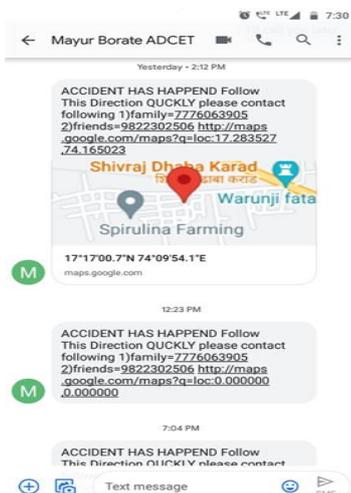


Fig.6 Alert Message Sent by System

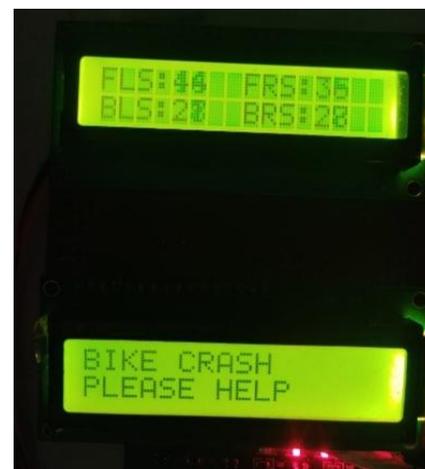


Fig.6 Distance Measure and Bike Crash Message Displayed on LCD

In the above figure, the real-time results of the project have been shown. Once the accident occurs to the vehicle, immediately the emergency phone call was successfully made to the pre-programmed number, nearby hospital, and police station.

VII. CONCLUSION

An automatic accident detection system prototype is put forth in this article. Future vehicle thefts might be avoided with the help of this technology. This prototype could be utilized to find people responsible for the terrible atrocities thanks to the highly accurate tracking technology. This prototype can also work with emergency services and local governments to promptly send a rescue crew to the scene of the accident. The mechanism needs to be put into action right away. The main goal of this proposed accident detection and alert system is to decrease the number of people who pass away in preventable car accidents. To improve the chances of survival, paramedics are always called to the scene of an accident.

This device is far more useful for accidents that happen at night or in deserted areas. Future generations will be far more reliant on this efficient, low-cost technology for tracking cars and alerting drivers of accidents.

VIII. REFERENCES

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