

# ACCIDENT PREVENTION AND SECURITY SYSTEM FOR VEHICLES USING MULTI SENSORS

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**Abstract:** This paper focuses on to develop a system to keep the vehicle secure and protect it by the occupation of the intruders. The main purpose of this work is to develop a system automatic speed control of vehicle and accident avoidance using heart beat sensor, alcohol sensor and ultrasonic sensor, LPG sensor and LDR. Heart beat sensors are used to monitor drivers pulse rate, if there is abnormal pulse rate variations in driver the vehicle will be stopped immediately. If any obstacle is detected in running vehicle depends on distance automatically control the speed of vehicle using ultrasonic sensor. Vehicle accidents under the influence alcohol are prevented using alcohol sensor. If any accident occurs then a piezoelectric sensor uses the piezoelectric effect to measure changes in pressure, acceleration, temperature, strain or force by converting them to electrical change. And short message service using GSM along with the latitude and longitude location by using GPS will be sent to predefined numbers. LPG Sensor senses any leakages inside the vehicle and it will give the alert by glowing the LED and Buzzer will happen. The one more objective is various intensities of light. i.e., high beam or low beam of head light falling on the opposite vehicles head light and the basic general idea of manual dipping and this same idea is converted in to electronic format with these circuits using LDR.

**Key words:** Key Insertion Sensor, Ultrasonic sensor, Alcohol Sensor, Finger Print Scanner, Heartbeat Sensor, Piezo Sensor, LPG Sensor, LDR

## I. INTRODUCTION

An accident avoidance system is an automobile safety system designed to reduce the severity of an accident. With the enormous advancement in the field of science and technology everyone is enjoying their luxurious life in 21<sup>st</sup> century. Due to this day by day number of vehicles are increasing as well as accidents are increasing [1]. Vehicle accidents are most common if the driving is inadequate. There is an exponential increase in vehicle usage in the modern world with corresponding increase in population. Consequently, Accident rates have therefore also risen due to several factors. Among these, human errors while driving have become a crucial factor. Fatigue driving & drunk and driving are main contribution to road crashes, Up to 40% of traffic accidents due to drunk and drive [2]. In 2017, the latest year for which data is available, 4,776 people – or 13 every day died in 14,071 road accidents due to driving under the influence of alcohol or drugs, according to data from the roads and highways ministry. While driving a vehicle at night many riders do not dip their vehicles head lamps at night as they approach. The several switching operation is used to dip the head light which may distract the concentration. It has become very essential to produce safer cars due to the growing number of traffic accidents and elderly drivers in latest years.

Active safety systems currently applied in vehicles provide stabilization and better control of the vehicle dynamics, by assisting the driver or enhancing the car's dynamic response.

This intelligent system is a semi-autonomous approach developed for monitoring the driver's condition while driving, which mainly deals with providing safety for the driver and for the passengers by continuously auditing the driver conditions like heart beat rate and alcohol content in the breath of the driver. Rescue services upon accidents along with the exact location of occurrence of accident to render immediate aid to the drivers and for the passengers.

To develop a system to keep the vehicle secure and protect it by the occupation of the intruders following sensors are used Alcohol Sensor, Heart Beat Sensor, Key Insertion Sensor, Piezo sensor, LPG Sensor, finger print Scanner, and Ultrasonic Sensor and LDR.

## II. LITERATURE SURVEY

The paper entitled “Automatic Headlight Dipper with Respect to Upcoming Vehicles Response” [1] by G.M. Pushpanjali, P.S. Mali, and R.R. Naman. This paper focuses on Automatic Dipper using Light Dependent Resistor (LDR). While driving a car in the night many drivers do not dip the head lamps of their vehicles in night while approaching. Several switching operation is used to dip the head light which may distract the concentration. One of the essential safety features that need to be installed is automatic upper dipper control of headlight. This feature can mainly use during night drive. Human eyes are very sensitive to light.

The paper entitled “Intelligent Automatic Vehicle Accident Detection and Prevention System” [2] by Prof. Chethana Gosal, Akshay Chadaga P l.et.al. The objective of this paper is to design and implement intelligent safety system to vehicle in order to avoid accidents.

The paper entitled “Accident Prevention System and Security for Vehicles” [3] by D. Haripriya, Puthanial M and Dr. P. C. Kishore Raja. This paper focuses on road accidents occurring due to poor indication of sign boards, drowsy state and drunken state of drivers in both two wheelers and four wheelers. The eye blink sensor detects the drowsy state and alarms the driver using

buzzer .The alcohol sensor detects the alcohol from breath and stops the engine by micro controller immediately. The light sensor detects the intensity of the light and adjusts it accordingly.

The paper entitled “Automatic Speed Control and Accident Avoidance of vehicle using Multi Sensors” [4] by S Nagakishore Bhavanam and Vasujadevi M. This paper focuses on develop a system to keep the vehicle secure and protect it by the occupation of the intruders. The main aim of the project to develop a system automatic speed control of vehicle and accident avoidance using eye blink sensor and ultrasonic sensor .whenever any obstacle is detected in running vehicle depends on distance automatically control the speed of vehicle.

The paper entitled “Advanced Accident Avoidance System for Automobile” [5] by T.U.Anand Santhosh Kumar and J. Mrudula. This paper focuses on efficiently avoid the collision of automobile vehicles and to provide a greatest security to the users in adverse or in bad weather conditions by using Collision Avoidance System (CAS).

The paper entitled “Vehicle Accident Prevention Using Sensors” [6] by R. Saranya and R. Arun Kumar. This paper mainly focuses on road accidents that happen in sleepy and lethargic / half sleep or otherwise intoxicated persons while in driving mode. The eye blink sensor detects the half sleep persons and alert the alarm by using buzzer.

The paper entitled “Vehicle Accident Prevention Using Sensors” [7] by G.Keerthi Bhavani and Shailaja Reddy. This paper mainly focuses on road accidents. Vehicle accidents are most common if the driving is inadequate. These happen on most factors if the driver is drowsy. This idea is designed based on Arduino Microcontroller board and helps in controlling accidents due to unconsciousness through different sensors. Here one eye blink sensor, alcohol sensor, temperature sensor, MEMS sensor are fixed in vehicle where if driver loses consciousness, then it is indicated through Alarm and displays on LCD .Using GPS, vehicle is tracked & message will be sent through GSM modem. So that police can trace the location through the GPS modem and necessary action will be taken.

The paper entitled “Intelligent In-Car Health Monitoring System for Elderly Drivers in Connected Car” [8] by Se Jin Park, Seunghee Hong, Damee Kim, Iqram Hussain and Young Seo. This paper mainly focuses on road accidents due to heart attack.Some health complexity happens during driving like heart problem, stroke etc. Driver’s health abnormality may also affect safety of other vehicles. So, automotive manufacturers and users are interested to include real-time health monitoring in car system.

### III. OBJECTIVES

1. To develop a system to keep the vehicle secure and protect it by the occupation of the intruders.
2. To develop a system automatic speed control of vehicle and accident avoidance using alcohol sensor, heartbeat sensor
3. To reduce the number of accidents using ultrasonic sensor. Whenever any obstacle is detected in running vehicle depends on distance automatically control the speed of vehicle.
4. To protect the human eyes from high intensity light, and to reduce the number of accidents during night time using automatic upper dipper.
5. To protect the car from theft using finger print scanner and key insertion sensor.
6. To get notification of location whenever any obstacle hits the parked vehicle using piezo sensor.

### IV. PROPOSED SYSTEM

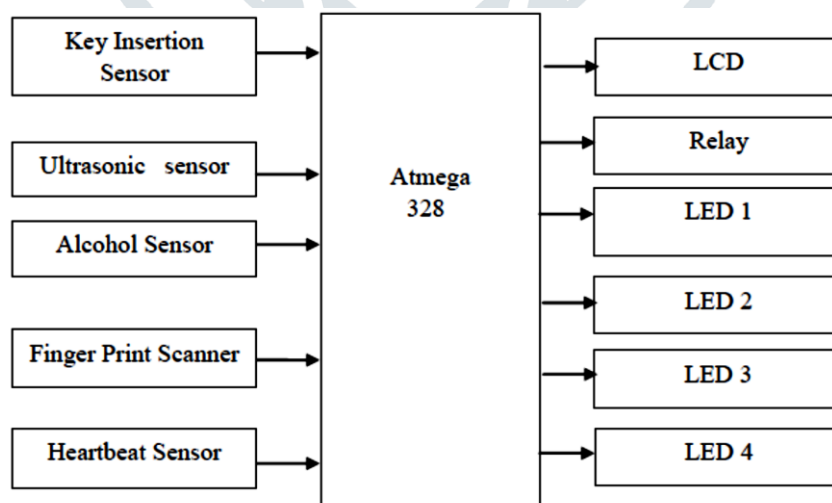


Figure 4.1: Block Diagram of ARDUINO 1

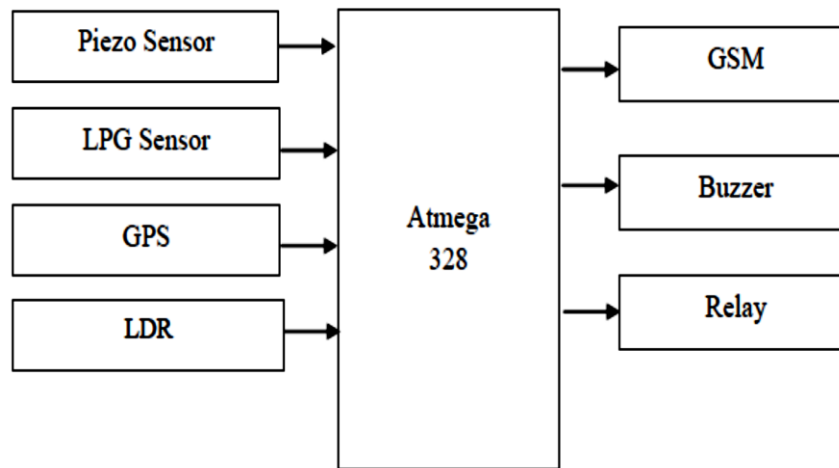


Figure 4.2: Block Diagram of ARDUINO 2

## V. METHODOLOGY

The Arduino microcontroller is selected as the main controller of the system. Arduino is one of the energy friendly products. Arduino ATmega328 is used for this purpose. ATmega 328 is basically an Advanced Virtual RISC (AVR) micro-controller. It supports the data up to eight (8) bits. ATmega-328 has 32KB internal builtin memory. ATmega 328 has 1KB Electrically Erasable Programmable Read Only Memory (EEPROM).

After the key insertion, Finger print is verified at starting process of the vehicle. Auto Ignition off on alcoholic detection that is Alcohol consumption is verified, if the driver is drunk above the limit then vehicle doesn't allow the driver to start the vehicle. LPG Sensor senses any leakages inside the vehicle and it will give the alert by glowing the LED and Buzzer will happen. Ultrasonic sensor will sense the any obstacle or a vehicle comes near in the range of 2cm to 12cm, it will alert the driver by glowing the LED by using Relay. The LDR will automatically dim the head light of the vehicle when the light of the Oncoming vehicle falls on it and by using the relay it will automatically up the head light once the vehicle passes. If any accident occurs then a piezoelectric sensor uses the piezoelectric effect to measure changes in pressure, acceleration, temperature, strain or force by converting them to electrical change. And short message service using GSM along with the latitude and longitude location by using GPS will be sent to predefined numbers. Pulse rates sensors are used to constantly monitor the driver's pulse rate and if driver's pulse is found to have abnormal rate then automatically the vehicle will stop.

**5.1 Key insertion sensor:** Firstly user will insert the key; the system will automatically detect the key insertion.

**5.2 Finger Print Scanner:** User will be asked to keep thumb on the fingerprint scanner. System will scan the finger and will verify with already stored-enrolled one. User can enroll as much number of fingers as he/she wants. After verification ignition will activate automatically. If the finger is invalid then automatically one SMS will be transferred to the registered mobile number. If the car is parked then the system will monitor the body of the car for any vibration. If found then the system will send SMS to the owner and buzzer will start.

**5.3 Alcohol Sensor:** Alcohol Detector, a device that senses a change in the alcoholic gas content of the surrounding air. The sensor will then analyze the amount of alcoholic vapors and indicates amount of alcohol present and sense the drivers drunken state and alerts the driver. Auto ignition off on alcoholic detection that is Alcohol consumption is verified at starting process of the vehicle, if driver is drunk then the vehicle doesn't allow the driver to start the vehicle.

**5.4 Piezo Sensor:** A piezoelectric sensor is a device that uses the piezoelectric effect, to measure changes in pressure, acceleration, temperature, strain or force by converting them to an electrical charge.

**5.5 LPG Sensor:** LPG Sensor senses any leakages inside the vehicle and it will give the alert by glowing the LED and Buzzer will happen.

**5.6 Heartbeat sensor:** A Heartbeat sensor is a monitoring device that allows one to measure his or her heart rate in real time or record the heart rate for later study. It provides a simple way to study the heart function. When the sensor is working, the beat LED flashes in units on with each heartbeat. This digital output can be connected to the microcontroller directly to measure the Beats per Minute (BPM) rate. As heart rate decreases or increases beyond the limit automatically microcontroller will control the speed of vehicle and buzzer will on.

**5.7 LDR-Upper dipper(low bright/ high bright):** Automatic headlight dipping automatically switches the headlight from high beam to low beams when light from oncoming vehicle strikes the LDR or phototube (photo amplifier) of the vehicle.

**5.8 Ultrasonic Sensor :**The ultrasonic sensor / obstacle sensing module is used to sense such that, accidents due to unwanted parking of the vehicles and collision with trees and other objects especially during the night time could be avoided. These obstacles could be detected using various methods such as ultrasonic sensors.

