
Accident Prevention Mechanism In Vehicles

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ABSTRACT

The road accidents are recently increasing at a fast rate. Most of them happen because of the carelessness of the driver of the vehicles on the road. THE ACCIDENT PREVENTION MECHANISM IN VEHICLES is an attempt to reduce such road accidents by implementing some extra features on the vehicles which can be controlled by software. This project is developed on the basis of certain assumptions.

1. Most of the accidents are happened due to the carelessness or the drowsiness of the driver.
2. The driver may not detect the obstacle which comes in front of the Vehicles, from a safe distance.
3. The different light systems of the vehicles are not properly used whenever needed.

This project tries to minimize the accidents which may be caused by the inability of the driver to take sudden actions in a panic situation. If the driver does not respond properly within a time slot, then the vehicle automatically steers to a safe space and continues the journey safely. This system automatically switches on the different types of lights in the vehicle such as head light, hazard lights, brake lights and indicators whenever needed. It includes a special wearable spectacle to detect the drowsiness of the driver. It provides the safety mechanism by invoking the buzzer and safe parking, when it identifies that the driver is asleep by analyzing the eye blink.

This paper relates to the system for preventing accidents which contains IR sensors, Ultrasound sensors, LDR sensors and works according to a logically developed safe program which is imprinted on the microcontroller using Arduino IDE. This system is developed to overcome the inability of the vehicles to detect the obstacle from the front side and the drowsiness of the driver and do the necessary safe actions thus, reducing the road accidents.

Keywords—Road accidents, Microcontroller, Sensors, Safety

INTRODUCTION

Recent surveys prove that the increase in speed of vehicles is one of the major constraints for the cause of major road accidents. Road accidents lead to loss of life. Car accidents are considered as one of the most evident threats to life in the modern world. Though there are many different reasons behind car accidents, most accidents occur due to driver's carelessness and overspeeding which can be solved to an extent. Majority of the accidents happen as the driver may not be aware of the upcoming obstacle or the inability for the quick reflexes of the driver. These problems can be solved by our proposed solution which can save many innocent lives. Problems faced by the people affected directly or indirectly due to accidents in the roadway can be avoided by our solution.

Here, we focus on the systems implemented to avoid collisions. In this system collision can be avoided by designing an automatic horn and brake system. These both can be made possible by monitoring the surroundings with the help of ultrasonic sensors and an eye detection sensor. The distance between the obstacle and the vehicle is determined by the ultrasonic sensor. Similarly the

drowsy state of the driver is determined by the eye detection sensor and it warns the driver if any unfavorable conditions are met. Our idea will help the driver and safeguard the passengers including the driver during night drives.

LITERATURE SURVEY

Several conditions such as drunken driving, careless driving, drowsiness during the drive, etc., are the major causes for accidents. Accidents due to careless driving and drowsiness are more severe and must be controlled. To control these accidents, monitoring the surroundings must be done mainly. Several literature papers have been studied and analyzed for the design and implementation of the project.

A. Drowsiness warning and automatic parking system.

The development of technologies to check the real time status of the driver is a big challenge in the field of the project. Sleep and drowsy detection systems are used to monitor the driver's eyes and alert them to wake the driver from sleep in order to the safety of people inside and outside the vehicle by the prevention of a possible upcoming collision. The method we used in this system to detect the drowsy state of the driver is by fixing an infrared sensor in a wearable spectacle which monitors the driver's eye. This system alerts the driver that his current state is not aptable for driving and he must be refreshed before he can drive again.

If the eye of the driver is closed for a particular time which is pre-set in the program. i.e:- For example, if the received signal takes more than 2.5 seconds then the infrared sensor identifies that the eye is closed thus the driver is sleepy then the signal is sent to the buzzer. Then the buzzer gets on by producing enough sound to wake up the driver. In addition to that the vehicle automatically parks the car to the sides of the road in a free and safe space. This is done by another group of sensors which includes the ultrasonic sensor and an infrared sensor placed at different places on the vehicle which senses the white lines on the side of the road along with the obstacles to be avoided and parks the vehicle in the safest manner by giving the appropriate signals (brake lights and turn indicators) to the other vehicles on the road.

B. Object identified collision avoidance system

In highways there is a chance for accidents every time because of the comparatively increased number of vehicles and pedestrians. Our project is included with a fully loaded object identifier driver assistance system. This apparatus consists of ultrasonic sensors which are used to identify the surroundings and take necessary actions according to the situation. This system assists the driver by automatically identifying the object in front followed by the warning to the driver and even self drives the vehicle to the safe path by giving the necessary indications to the other vehicles using brake lights and indicators. This is very helpful in the modern day road situation. The vehicle also breaks in certain situations where a safe path cannot be found in the road. Quick and ideal decisions made by the computer provide a seamless journey with full safety by assisting the driver. Our projects give importance not only to the safety of the passengers but the safety of the others in the surroundings too.

Accident Prevention Mechanism in Vehicles safest driving

The combined working of the above mentioned systems makes the Accident Prevention Mechanism in Vehicles a complete safety package. The vehicle automatically drives with the help of machines (like servo motors to steer the vehicle and auto brakes to stop the car etc:-) which works according to the program logic. Certain indications to the surrounding vehicles are also given using the automatic brake lights and turn indicators. The combined actions of the sensors placed at several parts of the vehicle collect the data and prepares the vehicle to make correct decisions in the matter of milliseconds, definitely ten or hundred times faster than a normal human brain thus avoiding accidents and providing safety.

METHODOLOGY

The proposed project is carried out by integrating the object identifying collision avoidance system

with drowsiness warning and automatic parking. We have developed an Accident Prevention Mechanism in Vehicles for safest driving.

The working of the ultrasonic sensors along with the infrared sensors placed at different parts of the vehicle and the driver's spectacles collects the correct data from the surroundings and the whole system works according to the status of the driver.

Software

The software that helped us in our project is Arduino Integrated Development Environment (IDE). The brain of our project is the Arduino microcontroller which is programmed with the help of Arduino IDE. In the Arduino IDE embedded c ++ is used to develop the project. The Arduino IDE is helpful in many ways for the innovators in creating projects with much ease. There are even examples or formats in the application from which we can refer our needs and make them work in our own program.

C. Hardware

The hardware is designed such that the ultrasonic sensors and infrared sensors act as input to the Arduino board. The version of Arduino here is Arduino ATmega-328. Determining the distance between the obstacle and the vehicle by converting the time taken to emit and receive ultrasonic waves into distance using some equations mentioned in the program is the main objective of the ultrasonic sensor. Similarly the Eyeblink sensor which consists of the infrared sensor used to detect whether the driver is in drowsy state or not and takes the necessary actions. A buzzer, brake lights and turn indicators of the vehicle, two servo motors are attached to the output pins of the arduino board. For detecting the real time status of the driver, the infrared sensor is placed on a wearable spectacle separately which the driver is supposed to wear. The object detection system and the drowsy detection system are interconnected. Both of the apparatus are connected to a single microcontroller which allows the whole system to work faster and interconnected. The combined working of these two systems enables the safety of the passengers. This setup will help the driver when he pays less attention to the driving during night time thus ensuring safety for everyone.

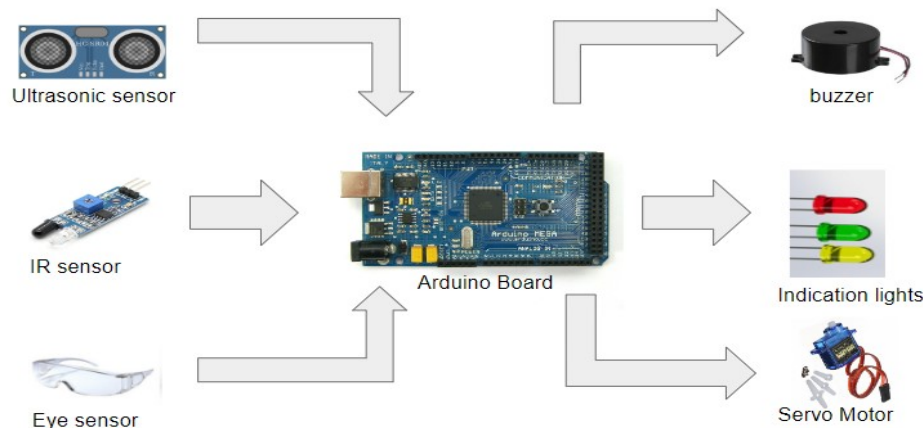


Figure 1. Block diagram of the proposed method

The working of our project is explained below, We can always start and drive our vehicle as normal. But if any emergency situation occurs for example, if another vehicle approaches from the wrong side out of nowhere making the driver panic and forcing him to make the wrong decision in the panic state itself leads to an accident. This is where the automatic collision avoidance system kicks in. The microcontroller analyzes the situation correctly with the help of the sensors and takes the necessary safe actions according to the program imprinted on the Arduino board which is, steer

the vehicle to a safe space ahead by giving proper warnings to the nearby vehicles. An apparatus which consists of servo motors attached to the mechanical parts of the vehicle like the steering column and the tyres makes the actions preferred by the arduino board (to park, steer, brake etc:-). This happens within a flight of milliseconds which is the biggest advantage of the proposed project. The vehicle also consists of an automatic headlights which turns on at night and controls its intensity automatically.

The next is the real time driver's state detection system. In this system an infrared sensor is integrated to a wearable spectacle. The driver is supposed to wear the spectacle while driving mainly at night. This spectacle prevents the driver from sleeping while driving during night time. The infrared sensor connected to the specs senses the movement of the eye while driving. If the eye is closed for more than 2.5 seconds then the infrared sensor sends a signal to the buzzer which gets on. This sound of the buzzer alerts the driver by waking him up. Along with that the automatic parking system initiates the vehicle to park it at a safe space on the roadside. Our working prototype is the combination of the object identified collision avoidance system and drowsiness warning and automatic parking system.



Figure 3. Hardware of the proposed method

CONCLUSION

The purpose of this project is to decrease the road accidents caused due to the driver's carelessness. Using this system we are sure that we can achieve the above mentioned needs. The project is done in such a way that many additions for safety can be included in the system in future and we hope to do so. This prototype is massively upgradable. In future anyone with the concept can upgrade the prototype and take it to the next level of safety.

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