Speed Control and Automatic Accident Avoidance of Vehicle Using Multi Sensors

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ABSTRACT

The main aim and objective of this is to develop a system to safeguard the people in the vehicle from getting into accidents, to develop a system automatically controls the speed of vehicle and avoids accident using eye blink sensor and ultrasonic sensor. Whenever any obstacle is detected close to the vehicle, system automatically controls the speed of vehicle. The driver in sleeping or drowsy position the eye blink sensor detects the eye, if the driver's eyes are not blinking for 10sec, gives alert alarm to driver and vehicle is stopped automatically, if it is not done manually. The ultrasonic sensor system continuously sends signals and monitors any car or other obstacles are in front of car. The distance up to which ultrasonic sensor can work may be up to 4 meters. When any obstacle or vehicle detected by ultrasonic sensor system it will send signal to the embedded board. After receiving this signal embedded board sends a signal to the motor to reduce the car speed automatically which can control car speed immediately. Vehicle is controlled automatically without any manual operation when the vehicle is at 4-meter distance away from the front vehicle. Also gives alarm to alert the driver. Many accidents at High-ways are taking place due to the close running ofvehicles, all of sudden, if the driver in front vehicle reduces the speed or applies brakes, then it is quite difficult to the following vehicle driver to control his vehicle, resulting accident. To avoid this kind of accident, the warning system, which contains alarm and display system can arrange at rear side of each and every vehicle. If any short circuit occurs in engine part or the driver is smoking smoke sensor detects it and gives alert to driver and stops the vehicle.

Keywords: Eye Blink Sensor, Embedded Board, Smoke Sensor, Ultrasonic Sensor

I. INTRODUCTION

An Embedded System is a combination of computer hardware and software, additional mechanical or other parts, designed to perform a specific function. good example is the microwave oven. If an embedded system is designed well, the existence of the processor and software could be completely unnoticed by the user of the device. Such is the case for a microwave oven, VCR, or alarm clock. In some cases, it would even be possible to build an equivalent device that does not contain the processor and software. This could be done by replacing the combination with a custom integrated circuit that performs the same functions in hardware. However, a lot of flexibility is lost when a design is hard-cooled in this way. The embedded system marketis one of the highest growth areas as these systems are used in very market segment- consumer electronics, office automation, industrial automation, biomedical engineering, wireless communication, telecommunication, security, finance, transportation, military and so on. Powerful and carefully chosen electronics embedded in the microcontrollers can independently or via input/output devices (switches, push buttons, sensors, LCD displays, relays etc.), control various processesand devices such as industrial automation, electric current, temperature, engine performance etc. Very low prices enable them to be embedded in such devices in which, until recent time it was not worthwhile to embed anything. The world is overwhelmed today with cheap automatic devices and various "smart" appliances.

II. LITERATURE SURVEY

[1] proposed method the relative speed and distance of all the vehicles around a particular vehicle is estimated using RF sensors and Ultrasonic sensors andbased on those results the speed of that particular vehicle is controlled to avoid early collisions. Proposed collision avoidance system is operating in the following way: Initially the temperature sensor and humidity sensor are used to sense the weather

conditions. If the weather conditions are adverse or bad then a warn signal will alerts the driver. Similarly,RF sensors and ultrasonic sensors are placed in all directions of the vehicle except in back side and these sensors are regularly scans the road ahead for obstacles or vehicles and if any obstacle or vehicle find, then warning is given to the driver.[2] Intelligent Automobile Accident-Avoidance System The aim of this system is to prevent accidents occurring on highways because of drowsiness or over consumption of alcohol. The main working of this system is to park the vehicle safely at the side of road by changing the lanes, for this they use IR Sensors and ultrasonic sensors to detect surrounding vehicles. If objects detected then system will alert the driver, such systemuseful to get judgement over vehicle driving.[3] This paper Advanced Accident-Avoidance System for Automobile discussed the most important factors of accident due to the intersection accident and the bad weather and this whether to some extent either the heavy rain, huge ice or high darkness. Indeed, this badweather conditions the driver feel very harsh to drive the vehicle and can't controlling the car. In this paper there are four types of sensors such as lm35 temperaturesensor and humidity sensor and those sensors are used to check the weather states and alert the driver if any thinks happen in the weather. And there are a substation number of ultrasonic sensors to detect the near car and infrared sensors used to detect the forwardcars by using burst of light to measure the cars speed, distance and position those sensors were fixed in the both car sides and in the forward of the vehicle to avoidall the cars and any barrier and alert the driver. This system was provided by Global System for Mobilecommunications (GSM) and Global Positioning System (GPS) module. If the accidents were happened then thesystem automatically takes position of the car and sends it to the police office and the driver family to savethe driver and passenger's health. [4] This system proposed to detect objects and stop vehicle accordingly. It is implemented with IR and Ultrasonic Sensors which detect object and measure

distance and control braking system automatically when object detected. The advantage of this system is it uses ultrasonic sensor to detect object and controls vehicle braking system automatically. The only disadvantage is no traffic signal is detected by system.[5] addressed the issue of road traffic accidents and proposed the use of a vehicular accident detection and avoidance system as a solution. Ultrasonic sensors are installed in the front end of the vehicle and an automatic brake system is incorporated in the design of the accident detection and avoidance system. Two parameters time of arrival of the reflected signal and angle of arrival of the reflected signal—are used to determine the position of the receivers, thereby providing optimal system performance. Thus, a warning alarm is sounded and the automatic brake system is activated when the distance of an obstacle to the vehicle is less than 7 m. The advantages of this approach are a low implementation cost, reliability of accidental detection, and collision avoidance. Applications, Advantages and Disadvantages

The advantages of automatic speed control andaccident avoidance of vehicles using multi sensors are,it has less complexity, Low cost, reliable and easy to implement. The only disadvantage of this system is it can operate on certain distance only. Goggles are mustfor operating of eye blink sensor. This system applications are used to avoid accidents and are also used in transportation system.

III. REQUIREMENTS TO BUILD AUTOMATIC SPEED CONTROL AND ACCIDENT AVOIDANCE OF VEHICLE USING MULTI SENSORS

Hardware Implementation
Figure 1 illustrates the block diagram of automatic speed control and accident avoidance of vehicle using multi sensors components which are required to build up the system.
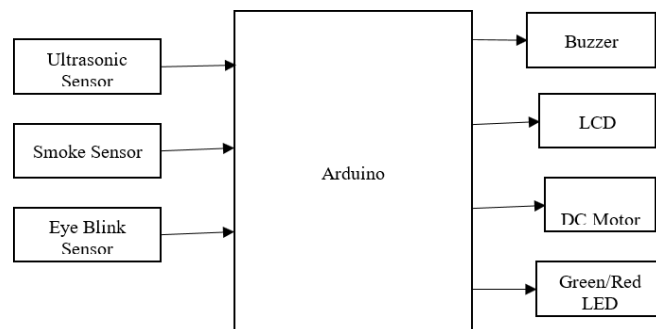

Fig 1: Block diagram of automatic speed control and accident avoidance of vehicle using multi sensors

2.1.1 Arduino Uno: Arduino/Genuino Uno is a microcontroller board based on the ATmega328P.It has 14 digital input/output pins a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started.

Fig 2: Arduino Uno

The figure 2 shows the image of Arduino Uno which plays the key role in this present system.

2.1.2 Ultrasonic sensor: Ultrasonic sensor mainly used to determine the distance of the target object. When the signal is sent to the ultrasonic sensor using the trigger pin, the transmitter of the ultrasonic sensor emits ultrasonic sound waves. These sound waves travel through space and get reflected after striking a hard surface. When this reflected sound weighs reaches the receiver, its sensor signals back to

Arduino using echo pin. The accurate measurements and high sensitivity are the features of ultrasonic sensor.

Fig 3: Ultrasonic sensor

The figure 3 shows the ultrasonic sensor which measures the distance between the vehicles.

2.1.3 LCD Module: Liquid Crystal Display also called as LCD is very helpful in providing user interface as well as for debugging purpose. The display takes varying amounts of time to accomplish the functions as listed These LCDs are very simple to interface with the controller as well as are cost effective.

2.1.4 Eye Blink Sensor: This Eye Blink sensor is IR based, The Variation Across the eye will vary as per eye blink. If the eye is closed means the output is high otherwise output is low. This to know the eye is closing or opening position.

Fig 4: Eye blink sensor

The figure 4 shows the eyeblink sensor which helps in detecting the position of a person whether in state of sleepiness or in drowsiness.

2.1.5 Smoke Sensor: MQ-5 gas sensor is highly sensitive to LPG, natural gas, town gas. This sensor

helps in detecting any occurrence of smoke in a vehicle.

2.1.6 Relay: A relay is an electrically operated switch used to isolate one electrical circuit from another. In its simplest form, a relay consists of a coil used as electromagnets to open and close switch contacts. Since the two circuits are isolated from one another, a lower voltage circuit can be used to trip a relay, which will control a separate circuit that requires a higher voltage. This allows you to switch devices such as headlights, parking lights, horns, etc., with low amperage outputs such as those found on keyless entry and alarm systems, and other components.

2.1.7 Buzzer: A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or electronic. Typical uses of buzzers and beepers include alarms, timers and confirmation of user input such as a mouse click or keystroke.

2.2. Software development:

Arduino IDE: It is an Arduino integrated development environment where the Arduinoprogramming can be done directly in it.

Embedded c: It is a programming language and it is used to develop the application according to user requirement.
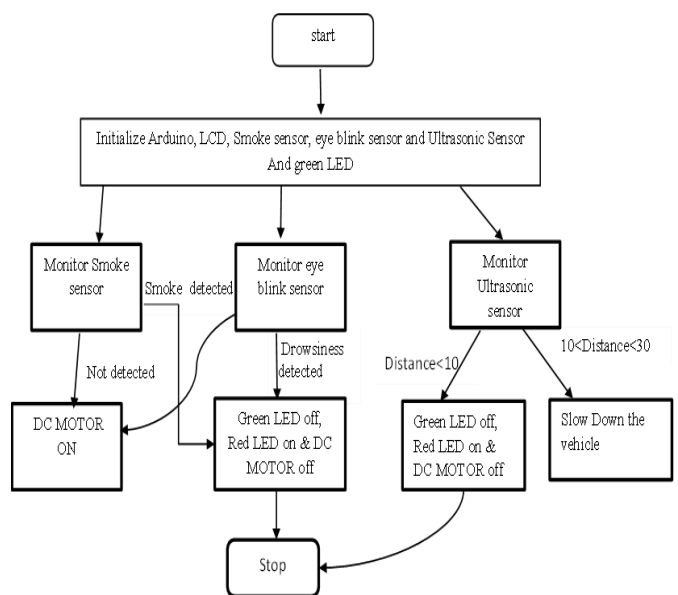
Fig 5: Flow chart

The figure 5 illustrates how the automatic speed control and accident avoidance of vehicle using multisensors works in the form of flow chart. When we press the start button, it will initialize Arduino, LCD, smoke sensor, eyeblink sensor, ultrasonic sensor and green LED. Sensors will be monitoring continuously. When everything is alright in the system it will always keep green LED in on state.When any smoke has been detected in the vehicle then smoke sensor detects thesmoke and makes the red LEDto glow and also makes the vehicle to stop automatically by displaying alert messages on LCD. When there is no eye blink of a person for a certain time, eyeblink sensor detects and gives alert messages on LCD and makes the vehicle to stop. Ultrasonic sensor which detects the distance in between the vehicles, when the distance is in between the 10 to 30 its slowdowns the vehicle speed. When the distance isless than 10, the system makes red LED on, displays alert messages on LCD and makes the vehicle (DC motor) to stop.

IV. EXPERIMENTAL RESULTS

The automatic speed control and accident avoidance of vehicle using multi sensors system was tested and the resultant output was once the system is tested it can be integrated in all the road transportation vehicles. The first part was to test all the sensors working and make green LED on indicating that system is in good condition. If anyone of the sensors (smoke sensor, ultrasonic sensor, eye blink sensor)have been detected in the system, it gives buzzer, makes red LED on, displays alert messages on the LCD and makes the vehicle to stop automatically.
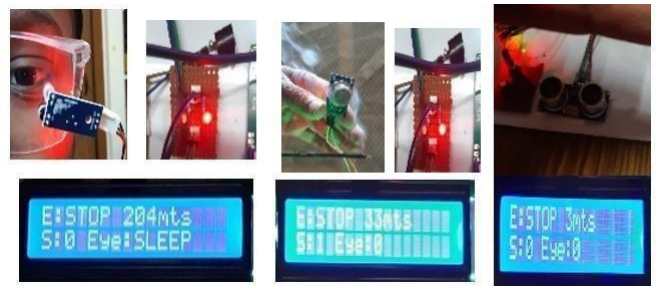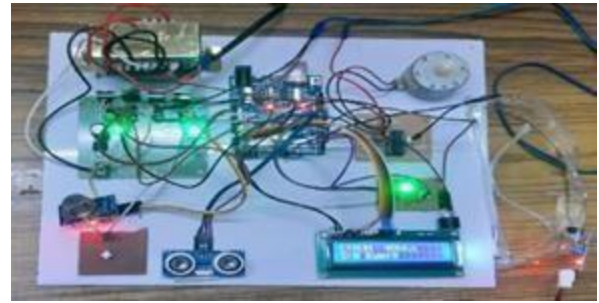

Fig 6 : The experimental results of the automatic speed control and accident avoidance of vehicle using multi sensors when eye blink sensor, smoke sensor and ultrasonic sensors are detected.

The Figure 6 describes practical working of eye blink sensor, ultrasonic sensor and smoke sensor are being tested. The experimental results show that when person is closing eyes or in state of drowsiness, the eye blink sensor detects, the system displays amessage sleep on LCD screen and makes the vehicle to stop. Similarly, when the smoke is detected bysmoke sensorit gives message on LCD makes red LEDon and stops the vehicle. When ultrasonic sensor detects the distance is less than 10 then it gives messages on LCD and makes to stop automatically.

V. CONCLUSION

The project "automatic speed control and accident avoidance of vehicle using multi sensors" has been successfully designed and tested. It has been developed by integrating features of all the hardware components used. Presence of every module has been reasoned out and placed carefully thus contributing to the best working of the unit. The designed system ensures the safety to the vehicle drivers. This paper represents an automatic speed control system that limits the speed of the vehicle depending on the front obstacle distance. This approach is very much useful,

as it will reduce the probability of road accidents and also the death due to accidents. As majority of road accidents are due to rash driving or negligence of driver, drowsiness of the driver and the smoke from the vehicle.

VI. FUTURE SCOPE

Usage of this system in all kind of road Transportation. We can implement various sensors to measure various activities. We can use open cv process for eyeblink sensor working by placing small camera for the recording of the driver's activity. Thereby, the position of the person can be known.

VII.   REFERENCES

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