INTELLIGENT ACCIDENT AVOIDANCE SYSTEM

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ABSTRACT:

One of the main purposes of this project is to build an intelligent vehicle with safety measures to Prevent Accidents of vehicles. This study discusses about designing a Smart Display and Control (SDC) which will monitor the zone and maintain the specified speed in the zone levels, which runs on an Arduino system. This system includes three modules; automatic fuzzy based speed control module, accident prevention by various sensors and information sending module. Automatic speed control module includes a fuzzy controlled speed controller alongside a light sensor to detect the activities on the road/zone. Information sending module includes GSM and GPS technology. Accident prevention module includes sensory units which ensure the condition of seat belt and the driver. This module includes alcohol sensor and light sensor used alongside speed controller.

KEYWORDS: Sensor, GPS, GSM, Arduino, Fuzzy speed control

INTRODUCTION:

As per the saying, SPEED THRILLS BUT KILLS, over speed of the vehicle can lead to very severe accidents. Safety is of prime importance. This project basically focuses on controlling speed intelligently and effective measures taken to avoid accident and quick recovery on occurrence of one such. Increasing of speed increases the chances of occurrence of accidents. There is more number of accidents that are caused by uncontrollable speeding than due to other reasons. Severe accidents are caused due to this which can be life threatening. Safety of the car, there are other solutions like Automatic Braking Systems which can be useful.

Automatic braking technologies combine sensors and speed controls to help prevent high speed collisions. Some automatic braking systems can prevent collisions altogether, but most of them are designed to simply reduce the speed of a vehicle before it hits something. Since high speed crashes are more likely to be fatal than low speed collisions, automatic braking systems can save lives and reduce the amount of property damage that occurs during an accident. Some of these systems use lasers, others use radar, and some even use video data. This sensor input is then used to determine if there are any objects present in the path of the vehicle. If an object is detected, the system can then determine if the speed of the vehicle is greater than the speed of the object in front of it. A significant speed differential may indicate that a collision is likely to occur, in which case the system is capable of automatically slowing down.

Prime reasons behind such accidents are either by negligence of the driver, or by failure of braking system to stop the vehicle in time. Here comes the role of safety of the vehicle which reduces severe mishaps. Nowadays Manufacturers of Cars as well as Motor cycles count on such technologies and equipment's which assures safety at high speed. The use of proper braking system and by controlled speed reduction techniques is the key to solve such problems.

I. OVERVIEW OF PROPOSED SYSTEM:

This system includes three modules:

1) Automatic speed control module. 2) Accident prevention module by various sensors 3) information sending module.

This project will helps us meet industry challenge with its market leading designs that encompass a wide range of products, body electronics, networking and access systems, to engine, lighting and entertainment components.

ARDUINO: The arduino board is the central unit of the system. All the components are interfaced to the board and programmed as per their functionality to operate in synchronization.

ALCOHOL DETECTOR: It is used to sense the alcohol. The analog output of which is applied to the arduino board.

SEAT BELT SENSOR: It is used to detect if user is wearing a Seat belt or not and displays accordingly.

GSM (GLOBAL SYSTEM FOR MOBILE): It is used to send an SMS to the contacts of the user about the location of the vehicle. It is beneficial in emergency situations.

SPEED CONTROLLER: It is used to control the speed of vehicle at school or public area.

GPS (GLOBAL POSITIONING SYSTEM): It is used to track the location of the user which is send via SMS through GSM module.

LCD (LIQUID CRYSTAL DISPLAY): If alcohol is detected it displays the message indicating ALCOHOL DETECTED.

Light sensor: used to detect the current ambient light level - i.e. how bright/dark it is.

II. PROTOTYPE DESIGN:
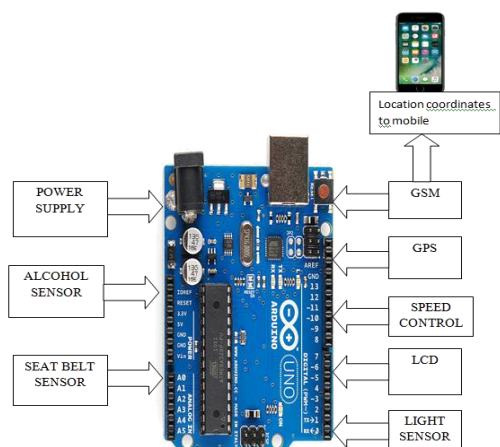
1. Fig.1. Block Diagarm

In zones like school zone, college zone, U turns. When the vehicle reaches such zones, it will automatically reduce the speed to 20 KM. When the vehicle leaves the zone it will regain its speed. The GPS gives information on reaching these zones which is connected to the arduino to reduce or limit the speed of the vehicle which in turn transmit the message to the hospitals and police stations through GSM technology. The message will contain the details of vehicle number, place of accident which was gathered using GPS. The function of Global Positioning System (GPS) is the most promising technology to acquire the position information in outdoor environments. In recent days most of the accident occurs due to drunken driver and improper use of seat belt. Before the vehicle starts the driver will be checked by the alcohol Sensor. Also if the driver is not wearing the seat belt it will also indicate it and also will not allow the driver to move the vehicle.

III. DESIGN PROCESS:

On providing power supply to the arduino, the system initially checks for alcohol using the alcohol sensor MQ3 and on detecting the presence it doesn't allow the vehicle to start. Similarly we place a Light sensor in the seat belt socket which detects the presence or absence of seat belt and displays a message on LCD screen. The LCD is interfaced with arduino. These are the accident prevention modules.

Speed control module includes a speed controller which is interfaced with arduino and programmed using basic C codes so as to control speed of a vehicle especially in specified zones found through GPS.

Accident information sending module which includes GSM and GPS will in turn transmit the message to the hospitals and police stations through GSM technology. The message will contain the details of vehicle number, place of accident which was gathered using GPS. The function of Global Positioning System (GPS) is the most promising technology to acquire the position information in outdoor environments. The GSM will communicate via the UART communication through RS232 standard. The GPS suits best for vehicle location or tracking. To know the location of vehicle GIS software can be used. Refer the following flow diagram.
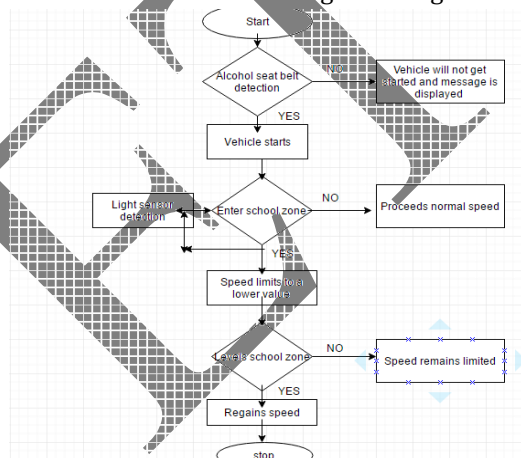

Fig.2 .Flow chart.

First step in that process is alcohol detection and seat belt detection. Next step after successful validation of the status of driver, the speed control module will get initiated. When the vehicle enters the school zone or any public zones where the vehicle has to maintain a particular speed, The GPS sends the signal indicating that there is a school or college in that zone and alert the controller immediately, which will in turn reduce or limit the vehicle speed to 20 Kmph in that particular zone. After the vehicle leaves the particular speed limit zone it will automatically regain its speed. If the moving vehicle meets with an accident the information sending module comes into play.
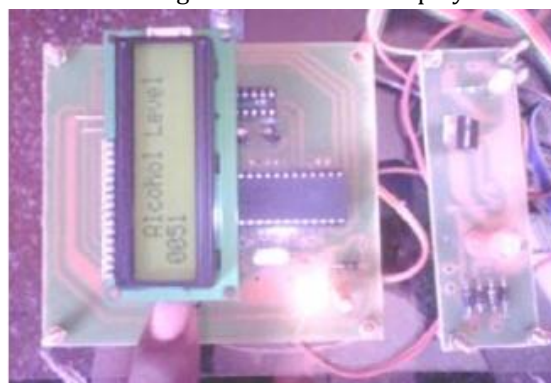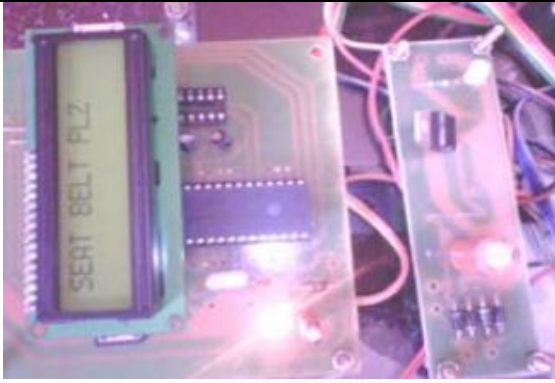

Fig.3. Alcohol sensor

Fig.4.Sensory unit.

Fig.5.Use of GSM and GPS .

IV.   PREVIOUS SYSTEMS:

A New Algorithm for Pedestrian-Vehicular Collision Avoidance Support System [1] (P-VCASS).It was based on Inter –Vehicle Communications (IVC).But VCASS cannot avoid collisions between vehicles and pedestrians, but avoid just between vehicles.

Vehicular Ad-Hoc Networks (VANETs).They is vehicle to vehicle and vehicle to road side infrastructure networks [2].VANETs are subject to attacks due to their vulnerabilities, one of the most compromising attacks is called Sybil nodes attack.

Proposed collision avoidance system can prevent traffic crashes. However it's not feasible to change the traffic signal setting in real-time.

V.   CONCLUSION:

This study solves the issues like automatic speed control mechanism, accident detection and information sending.. From this we conclude that this system will reduce the accidents and save the human lives. On the whole this system proves to be very cost effective and efficient The experimentations and results prove that the system is easily implementable in real time. This system can also be extended by inducing automation concepts like automatic driverless vehicle system, inter vehicular communication etc.

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