

A SMART VEHICLE FOR ACCIDENT PREVENTION USING WIRELESS BLACKBOX AND EYEBLINK SENSING TECHNOLOGY ALONG WITH SEAT BELT CONTROLLED IGNITION SYSTEM

C.Mohamedaslam,Ajmal Roshan.T, Mohamed sahal.M.T,
Najeeb.N.A
Students, Department of ECE
Cochin College of Engineering and Technology
Valanchery, India
aslamc007@gmail.com

Nisi. K
Assistant Professor, Department of ECE
Cochin College of Engineering and Technology
Valanchery, India
nisi13290@gmail.com

Abstract— The main aim of this project is to construct an smart vehicle system with minimizing the limitations of existing methods and also enhancing the security of vehicles and human beings and also reduces the accidental injuries. smart vehicle system will entail a speed and other parameters of vehicle sensing mechanism which automatically messages to traffic police with the details of vehicle position when a accident occurs using the GSM/GPRS system. The system also contains seat belt sensor ,vehicle black box, and a eye blink sensor. This method is an advanced version of speed detection, seat belt alarms system and it is placed in vehicles. A speed sensor, seat belt sensor and various sensors which senses various parameters of the vehicle is connected to a microcontroller which detects when the abnormal conditions occur or any accidents occur then sends text message, using GSM technology, to a police ambulance services and the drivers relatives. The text send to various authorities contains the details of the vehicle and its position.

Keywords—vehicle black box; eye blink sensor;

I. INTRODUCTION

The accidents and the accident injuries in the world is increasing in our day today life so there must be good and efficient control for the safety of human life violation of traffic rules drunk driving, careless driving are some causes of road accidents as we know we cannot stop the accidents but we can reduce the accidents by some precautionary measures. Road accident is most unwanted thing to happen to a road user, though they happen quite often. The most unfortunate thing is that we don't learn from our mistakes on road. Most of the road users are quite well aware of the general rules and safety measures while using roads but it is only the laxity on part of road users, which cause accidents and crashes. Most of the fatal accidents occur due to over speeding. It is a natural psyche of humans to excel. But when we are sharing the road with other users we will always want to take a control. Increase in speed multiplies the risk of accident and severity of injury during accident. A vehicle moving on high speed will have greater impact during the crash and hence will cause

more injuries. some deaths also happen due to the lack of immediate first aid. Another problem is that the lack of information about the vehicle position.

To solve the major problem several methods have been adopted but most of them are largely ineffective or manually operated and depend on the user's ability to be alert when using them. As such, an smart security to humans and alert and reporting system is needed which can inform a driver if any parameters are going wrong and also to the police to inform about the violation of laws occur.

The smart vehicle system consisting of mainly 3 parts ,black box, eye blink sensor, seatbelt controlled ignition system .These system provides a good and securable driving for the driver .In this project we are controlling the speed, seat belt, door, obstacle detection , whole security of the vehicle. Proposed method resolve the problems faced by the existing systems. In this project the vehicle is partially controlled by various sensors .There is a vehicle black box it will store the data of various sensors which measure various performance of the vehicle and also sends information to various authorities about the vehicle position to get immediate first aid.

When any abnormalities from the threshold value occurs the microcontroller sends message to the desired positions and immediate first aid and other facilities are available .

This system is well suitable in all type of vehicles .which contain a black box system which will store the values of the various parameters of the vehicles

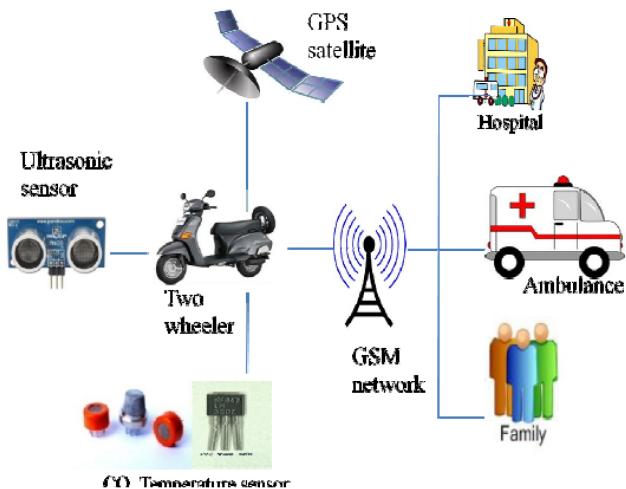
A. Literature review

A literature survey is done to know the existing techniques their significance and limitations. It also includes various proposed technique and their advantages.

1.Wireless black box report for tracking of accidental monitoring in vehicles- shaik khadar basha1, p.sireesh babu

The following paper is to develop a wireless black box using MEMS accelerometer and GPS tracking system for accidental monitoring. MEMS is a Micro electro mechanical sensor which is a high sensitive sensor and capable of detecting the tilt. This device can perform all the tilt functions like forward, reverse, left and right directions. The system consists of cooperative components of an accelerometer, microcontroller unit, GPS device and GSM module. If any accident occurs, this wireless device will send mobile phone a short message indicating the position of vehicle by tracing the location of the vehicle through GPS system to family member, emergency medical service (EMS) and nearest hospital. . The threshold algorithm and speed of motorcycle are used to determine fall or accident in real-time. In this project we are also using temperature sensor and CO sensor which are interfaced to the micro controller. With the help of temperature sensor we can measure amount of temperature exhausted from the vehicle. CO sensor will sense the amount of CO gas emitted from the vehicle. Whenever the CO gas level exceeds the threshold limit then the motor of the vehicle is stopped. Ultrasonic sensor in the module is used to detect any obstacle in the surroundings of the vehicle and intimates the microcontroller and the controller calculates the distance between the vehicles and if the distance is very less, then

vehicle stops automatically.



2. Design & Implementattuion of Vehicle Black Box For Driver Assistance And Alert- Rajashri R. Lokhande1, Sachin P. Gawate2

In this paper we proposed the GPS (Global Positioning System)/ GSM (Global System for Mobile Communication) for driver assistance and car surveillance. Wireless black box using MEMS accelerometer and GPS tracking system is developed for monitor the accident. The system consists of cooperative components GPS device and GSM module. In the event of accident ,if any injury happened

to the car driver or passengers so maybe there will be loss of lives due to delay in medical help. Keeping this idea in our mind, we are proposing a system where car itself intimates the concern emergency service for immediate reaction in case of accident or any emergency situation. After the accident, this wireless device will send mobile phone short message indicating the position of vehicle by GPS system to family members, nearest police station and hospitals. The emergency medical service (EMS) is provided to the driver. The threshold algorithm is used to determine speed of motorcycle and fall or accident in real-time

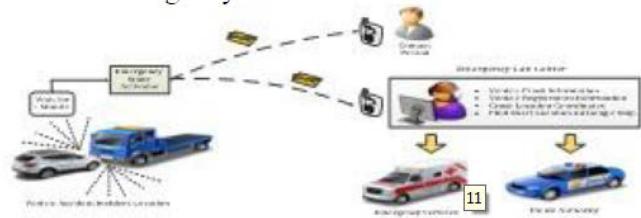


Fig1. First System Flow Diagram

3. Accident Prevention Using Eye Blinking and Head Movement- Chetna Bharti, Seema V. Arote, Chetna Bharti

This paper describes a real-time online prototype driver-fatigue monitor. It uses remotely located charge-coupled-device cameras equipped with active infrared illuminators to acquire video images of the driver. Various visual cues that typically characterize the level of alertness of a person are extracted in real time and systematically combined to infer the fatigue level of the driver. The visual cues employed characterize eyelid movement, gaze movement, head movement, and facial expression. A probabilistic model is developed to model human fatigue and to predict fatigue based on the visual cues obtained. The simultaneous use of multiple visual cues and their systematic combination yields a much more robust and accurate fatigue characterization than using a single visual cue. This system was validated under real-life fatigue conditions with human subjects of different ethnic backgrounds, genders, and ages; with/without glasses; and under different illumination conditions. It was found to be reasonably robust, reliable, and accurate in fatigue characterization.

Sleep related accidents tend to be more severe, possibly because of the higher speeds involved and because the driver is unable to take any avoiding action, or even brake, prior to the collision. Horne describes typical sleep related accidents as ones where the driver runs off the road or collides with another vehicle or an object, without any sign of hard braking before the impact. In 2002, the National Highway Traffic Safety Administration (NHTSA) estimated that 35 percent of all traffic deaths occurred in crashes in which at least one driver or no occupant had a BAC(Blood Alcohol Content) of 0.08 percent or more and that any alcohol was present in 41 percent of all fatal crashes in 2002.Such statistics are sometimes cited as proof that a third to half of all fatal crashes

are caused by "drunk driving" and that none of the crashes that involve alcohol would occur if the alcohol were not present. But this is incorrect and misleading because alcohol is only one of several factors that contribute to crashes involving drinking drivers. Furthermore, some fatally injured people in alcohol-related crashes are pedestrians with positive BACs, and these fatalities still would occur even if every driver were sober. Distracted driving is a top danger behind the wheel. In fact, about eight out of 10 crashes involve some sort of driver inattention within three seconds of that crash. We've all seen it and likely even done it, driving distracted includes anything from talking on the phone, to messing with your music, to attending to your children or even pets. All of these actions can lead to serious consequences. Martha Meade with AAA Mid-Atlantic says, "People are dying because of a simple missed phone call, a dropped toy or some other event that is completely not important." Possible techniques for detecting drowsiness in drivers can be generally divided into the following categories: sensing of physiological characteristics, sensing of driver operation, sensing of vehicle response, monitoring the response of driver

4.. Design and Implementation of Car Black Box Based on Embedded System- Liewei Jiang , Chunxuan YuT

This paper discusses the composition and function of an advanced controller system of Car Black Box. The system can not only record the main driving data of the car comprehensively and accurately in real-time, but also reconstruct the accident with data process software, which can help people analyze the accident rapidly and legitimately after a collision. A review of recent researches on Car Black Box is first presented in this paper. The author then analyzes the main problems and development direction of Car Black Box and put forward the necessity of developing Car Black Box with high performance. The author also proposes an integrated design solution for Car Black Box. The design selects the Samsung's S3C2410, which includes CAN controller, pulse counter module, A/D convert module and GPIO interface, audio-out, RS232 interface and USB port. The Car Black Box can receive real-time data including driving speed, rev, light, car door, tire pressure, brake, lay-up and life belt, and also process the data and store it in RAM. Based on the experiment, it is proved that the designed hardware circuit can work accurately and reliably.

B.Conclusion of literature review

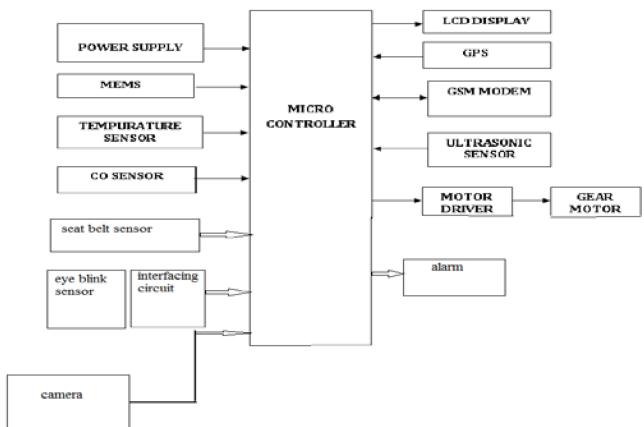
The proposed system is a advancement of these 5 papers the papers just giving the software knowledge about storing the data's and not specifying the implementation and hardware components are not specifying how to implement and how it can be modeled, the system specified for the motor cycle only they just giving the idea not specifying which sensors can be used.3rd paper is limited to only the drivers movement only. All 5 papers are giving an idea about alarming system after accidents but in our system we design it to met

the precautionary measures to prevent the accidental injuries we focus on immediate aid after accidents and safety to driver before accidents. The proposed system contains camera recording for further and correct investigation all .All the 5 papers focus on the aid after the accident not concerning about to reduce the injuries or death

II. PROPOSED METHOD

The brain of the system is a microcontroller. Microcontroller receives input from various sensors. The seat belt sensor measures whether the seat belt is clipped or not, co2 sensor senses the carbon dioxide coming out from the vehicle, temperature sensor sense the temperature of the vehicle, eye blink sensor senses the eye blink of the driver . This system has four outputs. Alarm and LCD are the primary outputs. LCD displays speed in kilometers. Alarm produces sound when driver sleeps. The secondary outputs are GSM module and gear driver motor.

Arduino Mega 2560 is a microcontroller board and it is the brain of the system. Arduino is a tool for making computers that can sense and control more of the physical world than your desktop computer. It's an open-source physical computing platform based on a simple microcontroller board, and a development environment for writing software for the board. Arduino can be used to develop interactive objects, taking inputs from a variety of switches or sensors, and controlling a variety of lights, motors, and other physical outputs.



Working:

- Senses the various parameters of the vehicle.
- Store the values
- If any abnormalities inform the driver
- Sends message to the desired authorities when an accident occurs.

The system is a assembly of 3main circuits that are

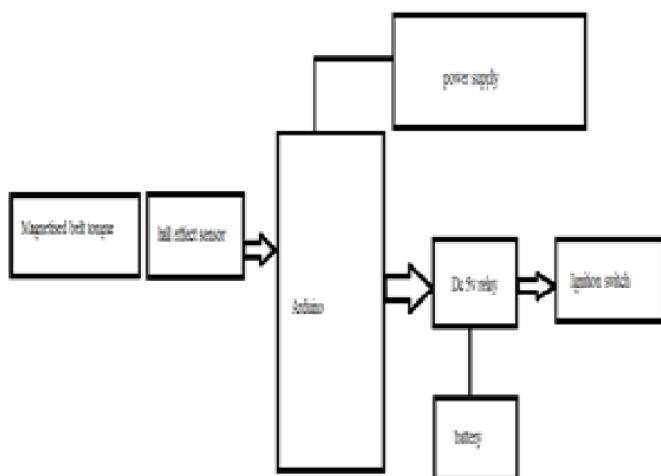
1. seat belt controlled ignition system

2. wireless black box and gps tracking for accidental monitoring of vehicles

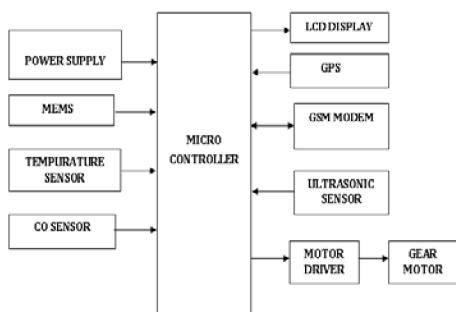
3. vehicle accident prevention using eye blink sensor

A. seat belt controlled ignition system

The goal of our project is to sensing a system that controls the ignition system of vehicles, the vehicle must only starts when the seat belt of the vehicle is clipped. We use the principle of hall effect to do the project “The seat belt controlled ignition system”. The working model illustrates a hall effect sensor which is mounted on the belt clipping module of the seatbelt. The belt tongue is magnetized, when the tongue comes near to the sensor, that is when the seat belt is clipped the seat belt is near at the sensor and the sensor generates a pulse and the pulse is the input to the microcontroller and the microcontroller controls the ignition switch of the vehicle. This simple concept leads to many more applications in automotive field and for the safety systems. The advantage of this system is that the contactless sensing the sensor and the magnet are not in direct contact so that any electrical disturbances occur



B. wireless black box and GPS tracking for accidental monitoring of vehicles



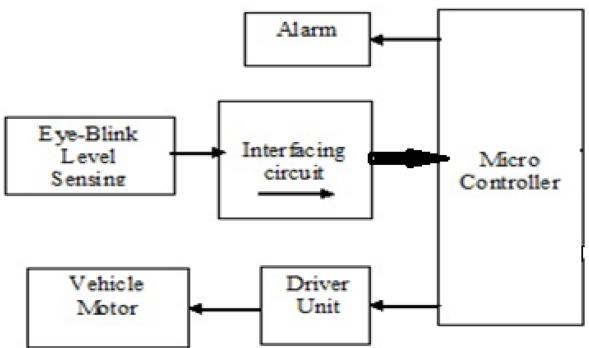
The main aim of this project is to implement a wireless box system which uses MEMS to monitor the vehicle movements and track the vehicle using GPS when an accident occurs to the vehicle.

The purpose of the project is to monitor vehicle parameters. To detect and track the vehicle when an accident occurs and intimate about this using GSM.. Main advantage of this project is it will automatically send a message to the ambulance service for immediate first aid

C. Vehicle Accident Prevention Using eye Blink Sensor

In this project In the the eye blink sensor is placed near the eye to sense the blink count and this information is transmitted in the form of pulses and is given to the Microcontroller.

The Microcontroller uses this information to compare with the normal eye blink programmed in the chip and if any abnormal situation arises the vehicle is stopped with an alarm is enabled by means of the driver circuit connected to the vehicle motor indication, this operation



D. Hardware description

1. Arduino Mega 2560

The Arduino Mega 2560 is a microcontroller board based on the ATmega2560. It has 54 digital input/output pins (of which 14 can be used as PWM outputs), 16 analog inputs, 4 USARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button.

Feature:

- Schematic design of the open source development interface free download, and also according to the needs of their own changes
- Download the program is simple and convenient.
- Simply with the sensor, a wide range of electronic components connection (such as: LED light, buzzer, keypad, photo-resistor, etc.), make all sorts of interesting things.
- Using the high-speed micro-processing controller (ATMEGA2560).

- The development of language and development environment is very simple, easy to understand, very suitable for beginners to learn.

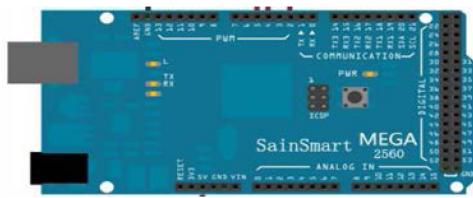


Fig 9. Arduino Mega 2560

2. Speed sensors

A sensor is essential to sense vehicle speed. Typically, devices used for this purpose are shaft (rotary type) encoders, photoelectric (optical type) sensors and magnetic rotational speed (proximity type) sensors. All of these sensors send speed data in the form of electrical pulses. Shaft encoders offer a high resolution of typically 1-5000 pulses per revolution (PPR) and clearly defined, symmetrical pulses. Proximity sensors provide medium (or low) resolution sensing, depending on the number of pulses measured per revolution.

Photoelectric sensors usually sense a reflective target on the rotating shaft. Magnetic rotational speed sensors use various magnetic proximity measuring principles to monitor the speed of vehicle. In principle, RPM sensors convert mechanical motion into electric pulses with or without direct contact when positioned near a turning rotor, gear, shaft or other regularly moving device. The measured rpm can be converted into kilometer per hour as

$$\text{Speed} = 2\pi r \times \text{RPM} \times (60/1000) \text{ km/hr}$$

3. GSM/GPRS Module

GSM/GPRS module is used to establish communication between a computer and a GSM-GPRS system. Global System for Mobile communication (GSM) is an architecture used for mobile communication in most of the countries. Global Packet Radio Service (GPRS) is an extension of GSM that enables higher data transmission rate. GSM/GPRS module consists of a GSM/GPRS modem assembled together with power supply circuit and communication interfaces (like RS-232, USB, etc) for computer.

A GSM/GPRS MODEM can perform the following operations:

- Receive, send or delete SMS messages in a SIM.
- Read, add, search phonebook entries of the SIM.

Make, Receive, or reject a voice call.

4. Temperature sensor

Temperature sensor is used to sense the temperature of a medium. Most of the temperature sensors having temperature-

dependent properties which can be measured electrically include resistors, semiconductor devices such as diodes, and thermocouples. A resistance thermometer has a sensing resistor having an electrical resistance vary with temperature

5. LCD Display

LCD (Liquid Crystal Display) screen is an electronic display module. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being a 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD.

6. CO₂ sensor

They are used in gas leakage detecting equipments in family and industry, are suitable for detecting of LPG, propane, methane, alcohol, Hydrogen, smoke. Gas detection is important for controlling industrial and vehicle emissions, household security and environmental monitoring

7.GPS

The **Global Positioning System (GPS)** is a spacebased satellite navigation system that provides location and time information in all weather conditions, anywhere on or near the earth where there is an unobstructed line of sight to four or more GPS satellites. The system provides capabilities to military, civil and commercial users around the world. It is maintained by the United States government and is freely accessible to anyone with a GPS receiver.

III. CONCLUSION

An efficient smart vehicle system has been proposed which gives good security to driving. We have done a detailed survey among the existing systems for vehicles. On the basis our analysis we are proposing smart vehicle method. The advantages of the proposed system over other methods include prevention of accidental injuries, to Improve safety of driving to Discourages careless driving, Helps to control traffic violation by an Adaptable simple Method which is of Low cost .

IV. FUTURE WORK

Future enhancements of this paper include analysis of the proposed scheme with GSM modem which will message to police control room when seat belt is not clipped.The system

can be adopted in bikes trucks ships etc.Eye blink sensor can be adopted in trucks which travel long distance

References

1.*Emerging Trends in Computer Science and Information Technology - 2012(ETCSIT2012) Proceedings published in International Journal of Computer Applications® (IJCA)*

2.*IOSR Journal of Computer Science (IOSR-JCE) e-ISSN: 2278-0661, p-ISSN: 2278-8727 PP 39-42 www.iosrjournals.org*

3.*INTERNATIONAL JOURNAL OF PROFESSIONAL ENGINEERING STUDIES* 4.978-0-7695-5146-3/13 \$26.00 © 2013 IEEE
DOI 10.1109/TIIEC.2013.1