Automatic Security System for Smart Vehicle using Micro controller

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ABSTRACT: Vehicle safety and safety for passengers in vehicle is an important parameter. Most of the vehicles get accident because no proper safety measures are taken especially at curves and hair pin bends humps, drinking alcohol, not wearing seat belts, drowsiness and any obstacles in front of the vehicle. This system can be used for the prevention of such a problem by indicating a pre indication and also reducing or stop the speed of vehicles by reducing the fuel rate of vehicle. As the action is in terms of fuel rate so the vehicle automatically goes to control and avoids the accidents. At curves and hair pin bends, drinking alcohol, not wearing seat belts, drowsiness the line of sight is not possible for the drivers so the special kind of transmitter which is tuned at a frequency are mounted as these transmitters continuously radiate a RF signal for some particular area. As the vehicle come within this radiation the receiver in the vehicle gets activate. Once the alcohol sensor detected person has drunked the vehicle will stop automatically, if the person detected drowsiness and not wearing the seat belt will get intimation to the driver automatically.

KEYWORDS: Speed Control, RF, Embedded System, Accident prevention, alcohol sensor.

I. INTRODUCTION

Intelligent instruments are used in every part of our lives. It won't take much time to realize that most of our tasks are being done by electronics. They will perform one of the most complicated tasks that a person does in a day, that of driving a vehicle. As the days of man driving are getting extremely numbered, so are those of traffic jams, dangerous and rough drivers and more importantly, accidents. According to Mr. Willie D. Jones in the IEEE SPECTRUM magazine (September 2001), a person dies in a car crash every second. Automation of the driving control of Two-wheelers is one of the most vital needs of the hour.

Fig1: Prototype of the proposed model

Road facilities are a major concern in the developed world. According to Mr. Willie D. Jones in the IEEE SPECTRUM magazine (September 2001), a person dies in a car crash every second .If we study the accident cases then behind every accident there are four main reasons for driver Injury or death.

• Over speeding
 • Driver is drunk
• Driver suffers from Drowsiness
 • Seat belt is not wired
 • Tyre flattened

Reduction of the number of accidents and mitigation available in commercial vehicles today, and future of their consequences are a big concern for traffic authorities, the automotive industry and transport research groups. Road accidents are human tragedy. They involve high human suffering and monetary cost in terms of untimely deaths injuries and loss of potential income. Here we are going to design a dynamic system which avoids all the four reasons of accident. In case of over speeding in a speed limit zone area we are going to limit a speed to a certain cutoff value. If a driver is drunk then vehicle won't start until he or she is not able to drive, the system restrict driving without seatbelt also alarm a buzzer if driver suffer drowsiness. Vehicle tyre is sometimes the cause of accident we are going to avoid it by putting a tyre pressure sensor which indicate tyre pressure continuously on the LCD display provided on a dashboard which indicates the driver the pressure at any instant of time and helps to maintain pressure to the constant value.

II.RELATED WORK

Lorate Shiny1 , A.Rajakumaran2 , S.Vijay are proposed "Vehicle Control System with Accident Prevention by Using IR Transceiver" The project presented here is an approach towards vehicle navigation & safety implementation. As the title suggests, the project is aimed at automatically sensing the areas / zones like "School zone", "Work zone" or "Curve zone". As an example, near school zone, the sign board displays "School Zone Ahead, Drive Slowly", or near construction area, "Drive slowly, Work under construction". Drivers go at very high speed usually near school zone, or indulge in speeding causing inconvenience to the other vehicle users and pedestrians. Even though these are meant for the safety of the vehicles traveling and also for the general public, it is not usually practiced and ignored by the vehicle drivers. The main objective is to design a Vehicle controller meant for vehicle"s speed control and monitors the zones, which can run on an embedded system. Vehicle Controller can be custom designed to fit into a vehicle"s dashboard, and displays information on the vehicle. The project is composed of two separate units: zone status transmitter unit and receiver (speed display and control) unit. Once the information is received from the zones, the vehicle"s embedded unit automatically alerts the driver, to reduce the speed according to the zone, it waits for few seconds, and otherwise vehicle"s controller unit automatically reduces the speed.

Ahmed Zuhair, Mansoor Ali ,Oman Ali Al-Humairi are proposed "Intelligent Car Security System Microcontroller based" Theft attempts and crashing of cars due to careless parking are common issues in unattended public parking lots. This paper presents an intelligent car security system that provides security to the car against theft and crashing in parking lots. The main parts of the system are GSM and GPS modems, Camera, XYZ sensor and Microcontroller. The design focus is to make a highly secure, flexible, reliable and cost effective system. Any crash that happens to the car in the parking lots is immediately communicated to the owner through SMS. Motion sensors detect any vibration such as theft or crash and instantly capture the picture of the incident. The system also saves the picture of any damage caused to the vehicle rendering it as an evidence for further investigation in future. A prototype of the proposed system has been implemented. The test results prove that the system can monitor the parking area of the vehicle, inform the car owner about the status and the location of the car in case of any crash and helps in identifying who is responsible for such an incident by detecting the vibration and taking pictures around the parking area.

P.Aravind , V.Kishore are proposed "E-Vehicle- Automatic Speed Control Using Android Mobile Application" : In the rapidly changing world, the speed has become an important factor in humans' life .Everyone wants to get fast as much as possible. In the fast speed world, there are two perspectives, one is maintaining the speed and the other is to maintain the safety medium as well. In the smart speed world the technologies plays a major role. Smart phones are the key part of the growing technologies in the globe. Android application is a one which is ruling almost 75% of the crowd .So our objective is to ensure maximum safety to the person who is driving the vehicle and to

the people on the road in all parameters through a mobile app. Nowadays accidents rates are increasing linearly causing demise of many people by making modest mistakes while driving in zones like school, college, hospital, market, highways and hill station. This paper is going to be a smart way of controlling the speed of the vehicles in all these zones. A mobile application is being created integrating with google map. The latitude and longitude position of the speed restricting zones like school, college, markets is being stored in the cloud. When the destination place is entered in the goggle map, it actually starts indicating the driver 100m before the speed restricting zone and if the driver doesn't reduces the speed of the vehicle according to the zone in 50m, the speed of the vehicle is automatically arrested using ARM processor. The next objective of this paper is to slow down the speed of the vehicle in speed breaker. The image of the speed breaker is being stored in the arm processor and there is a camera attached to the car at its top roof. when the image captured by the camera and the image stored in the processor matches , the processor alerts the driver by an alarm caution before 100m and if the driver fails to reduce the speed in 50 m, the speed is reduced by using ARM processor. Further this project can be enhance by fixing a strip sensor at the edge of the doors, such that it senses vehicle movement .When the door is opened and if the sensor senses the movement of vehicle before 5m from the door of the vehicle, door gets locked at that particular angle. i.e., when there is a movement of vehicles, sensor turns on and the door is locked at that particular angle. Implementation of this can avoid accidents in opening the doors. The number of vehicles registered in India is shown in Table 1. These data show that the total number of vehicles are increasing per year the annual increasing rate of vehicles are 10%, however, these numbers are probably overestimates as personal vehicle owners register their vehicles and pay the road tax once when they buy the vehicle and are not required to pay an annual tax. Because of this, a large number of vehicles remain on the official record even when they are not in use any more. Recent estimates suggest that the actual number of vehicles in use may be about 60-70% of the official number thus the accident rates also increases.

Year	Total Vehicle
2014	189491
2015	208562
Growth/Year%	10

Table 1: Growth in vehicle per year

The number of road traffic fatalities and the population of India from 2005 to 2015. The total number of fatalities increased at an average rate of about 4% per year in the period 2005-2015and the rate has increased to 8% per year since then. The number of fatalities per million populations remained around 79-83 in the period 2005- 2015 and has since increased to 101. Traffic fatalities per unit population has been taken as an indicator of the health burden of road traffic crashes on society at the city, regional, or national level. At the individual level, what is of consequence is the risk of injury per trip, and the total number of trips is proportionate to the population. Therefore, traffic fatalities per unit population can be taken as a rough indicator of risk faced by individuals. The risk of being involved in a fatal road traffic crash has obviously been increasing for Indian citizens over the past few years. While some of this increase can be attributed to increase in the number of motor vehicles per capita in India, however, increasing vehicle ownership need not result in increased fatality rates if adequate safety measures are implemented.

Year	Fatalities	Fatalities/million persons
2005	77,000	81
2006	79,900	82
2007	82,000	83
2008	78,900	79
2009	80,900	79
2010	84,059	80
2011	84,430	79
2012	91,376	84
2013	98,254	89
2014	105,725	94
2015	114,590	101

Table 2:Road traffic fatalities in India

III.PROPOSED METHOD

BLOCK DIAGRAM:

The block diagram representation of system consist of two parts

- Road side module
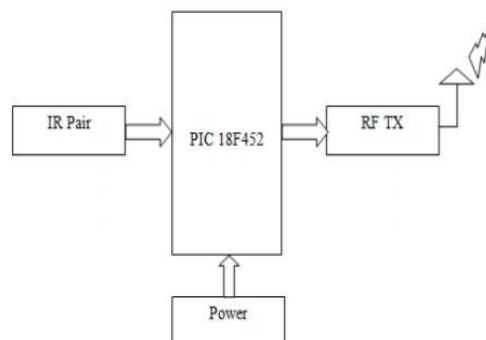- Vehicle side module.

Road Side module

Fig 2:Block Diagram of road side module

1. PIC 18F452-PIC 18F452 acts as a controller unit for road side section which takes a data from IR pair if it is true then sends data by RF transmitter, it require 5v supply for working. 2. IR Pair- IR pair is acting as a sensing device for a vehicle which detects s vehicle when it cuts a IR rays 3. RF TX-The data of a speed limit zone is not directly transmitted to the vehicle it is first encoded in analog format by a IC HT12E then it is transmitted using amplitude shift keying (ASK).
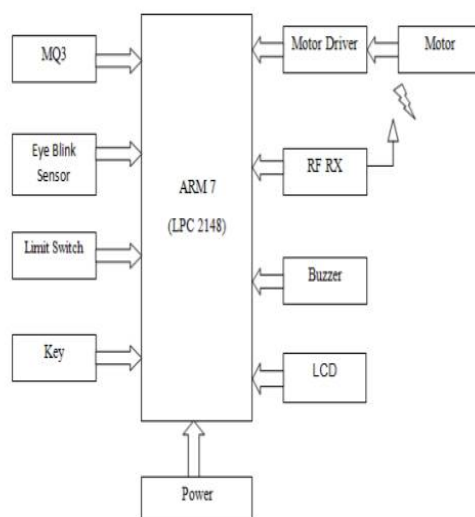
Vehicle side module

Fig 3:Block diagram of vehicle side module

This work is aimed at producing a cost effective smart, secured and safe vehicle system. We have built a prototype model which as shown in above block diagram. Following is the hardware description

1. ARM-7 module - In our system we are using LPC2148. It acts as the major controller unit of the system. Input from various sensors like IR, alcohol sensor, drowsiness sensor, seatbelt key is given to this unit on which it process according to the programming and gives output. It needs 3.3V to drive the ARM7 module.

2. MQ3-MQ3 is a alcohol sensor which is place near a staring wheel of a vehicle which can easily sense the alcohol in vicinity of it.

3. Drowsiness sensor-Eye blink sensor is nothing but a simple IR pair which tracks the motion of eye regularly and detects the drowsiness.

4. Motor Driver (L293D)-it is motor driver IC which permits the motor direction control in various directions.

5. Key-key is a simple sensor for seatbelt detection.

6. Limit Switch- Limit switch is like a controller of a vehicle which controls the movement of prototype vehicle.

7. Motors-Motors are act as a wheel of a prototype vehicle.

8. Buzzer-Buzzer is a acoustic indication device which informs the driver in emergency

9. RF RX –Radio frequency receiver receives the command signals from the road side module, which is then decoded to original format by a IC called as HT12D.

IV.WORKING MODULE

Speed Control :

The IR pairs are placed in the speed limit zones like school, colleges, Hospitals or a dangerous point on a highway whenever the vehicle enters in the speed limit zone a IR pair cut of then it sense that the vehicle is entered in speed limit zone and controls the speed according to the zone speed limit

Alcohol Sensor :

The projects involve the alcohol detection using a alcohol sensor MQ3, Sensitive material of MQ-3 gas sensor is SnO_2 which with lower conductivity in clean air. When the target alcohol gas exist, the sensor's conductivity gets higher along with the gas concentration rising. Users can convert the change of conductivity to correspond output signal of gas concentration through a simple circuit. When a driver is drunk and tries to sit on a driver seat then the alcohol sensor MQ3 detects the presence of alcohol and blow the buzzer and unless and until the alcoholic person is replace by a normal person the car wouldn't ignite.

Seat Belt Detection:

Normally we wear seatbelt over chest and there is physical contact in human body and seatbelt when seatbelt is wear the key mounted on a seatbelt got pressed which sends a control command signal to a controller and the microcontroller understand the seatbelt is weared by a person and start the vehicle.

Drowsiness Detection :

The IR Sensor is used to detect eye blink. The infrared rays generated by the IR transmitter are focused towards the eye. The reflected rays from the eye received at IR receiver. When the eye is closed the strength of reflected IR rays is high and conversely low when eye is open. The drowsiness is detected if the high is longer than the predefined time indicates the driver would fallen to the drowsiness. The output of the IR receiver is given to a logic circuit to actuate alarm.

Tyre Pressure:

A piezo electric sensor is placed on tyre which detects the pressure of tyre when it reduced below threshold then it plays a buzzer.
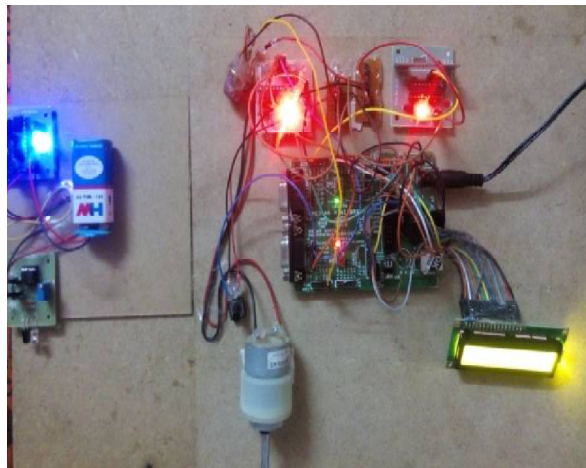
V.RESULT

Fig 4: Hardware implementation of the module

System prototype is constructed. The IR transmitter and receiver module is used to detect whether the driver suffers from drowsiness. Alcohol sensor is used to sense the concentration of the alcohol. Simple switch is used as a key for seat belt detection.

VI.FUTURE WORK

At present, we have excluded geared two wheelers from the scope of this project because it complicates the control mechanism. In future the work can be applied to geared two-wheelers.

VII.CONCLUSION

A prototype model of controller is built on the speed mixing capability. Signals from The sign board of various zones (school zone, highway zone, "U" turn zone etc) is Intelligently treated individually & generates input signals for driving actuators – car engine and additional DC motor. They, in turn, jointly control the speed of vehicle wheels. This design successfully utilizes a new idea of hybrid vehicle recently immerged in automotive industry. The system does not require a physical braking subsystem which will reduce the overall cost of a car.

REFERENCES

[1] Telaprolu,m.k, sarma,V.V.; ratankanth, E.K.;Rao, S.N.; Banda,v., vehicular Electronics and safety (ICVES), IEEE international conference pune (2009).

[2] Gangadhar, S.; R N shetty Inst. Of Technol, An Intelligent road traffic control system, IEEE conference publication kahargpur (2010).

[3] Berndt, Don, Real-Time Embedded Technology and Applications Symposium (RTAS), IEEE Education & Learning (2005).

[4] Kassem, N. Microsoft Corp., Redmond, WA, USAKosba, A.E.; Youssef, M.;VRFBased Vehicle Detection and Speed Estimation vehicular Technology Conference (VTC Spring), IEEE (2012).

[5] Murthy, C.; Manimaran, G.; Resource Management in Real-Time Systems and Networks2001.

[6] Nishiyama, Y. ISUZU Advanced Engineering Center LTD., Kanagawa, JapanKondoh, A.; Hirado, A.; Akiyama, H. The system and the function of position regulated speed control device, Vehicle Navigation and Information Systems Conference, 1996. VNIS '96

[7] Ankita Mishra, Jyoti Solanki, Harshala Bakshi, Priyanka Saxena,Pranav Paranjpe: Design of RF based speed control system for Vehicles International Journal of Advanced Research in Computer and Communication Engineering Vol. 1, Issue 8, October 2012

[8] Based In-Vehicle Alert System for Road Oddities Proceedings of the IEEE International Conference on Advances in Intelligent Computational Systems, Trivandrum, India, Sept 22 -24, 2011

[9] Hasan Zoghi, Morteza Tolouei, Kianoush Siamardi, Pegah Araghi: Usage of ITS in the In-vehicle Signing System With RFID tags and Vehicle Routing and Road Traffic Simulation- Proceedings of the 11th International IEEE Conference on Intelligent Transport Systems, Beijing, China, October 12-15, 2008.

[10] "Autonomous Speed Control of Over Speeding Vehicles Using Radio Frequency" International Journal of Engineering and Innovative Technology (IJEIT) Volume 4, Issue 4, April 2015

[11] "Prevention of Accident Due To Drowsy By Using Eye Blink" Journal of Engineering and Innovative Technology (IJEIT) Volume 3, Issue 5, May 2014.

[12] "Automatic Vehicle Speed Control with Wireless In-Vehicle Road Sign Delivery System Using ARM 7" International Journal of Engineering and Innovative Technology (IJEIT) Volume 2, Issue 8, April 2015.

[13] "Embedded Based Vehicle Speed Control System Using Wireless Technology" International Journal of Engineering and Innovative Technology (IJEIT) Volume 2, Issue 8, May 2014

[14] "Smart Zone Based Vehicle Speed Control Using RF and Obstacle Detection and Accident Prevention" International Journal of Engineering and Innovative Technology (IJEIT) Volume 4, Issue 3, May 2014

[15] "Automatic Vehicle Speed Reduction System Using RF Technology" International Journal of Engineering and Innovative Technology (IJEIT) Volume 4, Issue 4, April 2014

[16] "Design of RF based speed control system for vehicles" International Journal of Engineering and Innovative Technology (IJEIT) Volume 1, Issue 8, May 2012.