

Intelligent Security System for Smart Vehicle

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Abstract: Nowadays people are driving very fast; accidents are occurring frequently, we lost our valuable life by making small mistake while driving (school zone, hills area, and highways). So in order to avoid such kind of accidents and to alert the drivers and to control their vehicle speed in such kind of places the highway department have placed the signboards. But sometimes it may be possible to view that kind of signboards and there is a chance for accident. This paper presents smart zone based vehicle speed control using RF and Accident Prevention system. Whenever the vehicle is within the zone, the vehicle speed is controlled by receiving the signal, i.e., every time the vehicle speed is decreased to some cutoff and kept constant until the vehicle moves out of the zone, and then the vehicle can get accelerated by itself.

Keywords: Speed Control, RF, Embedded System, Accident prevention.

I. INTRODUCTION

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. LITERATURE SURVEY

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.

Table1 Growth in vehicle per year

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

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 2005-2015 and 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.

Table 2 Road traffic fatalities in India

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

III. BLOCK DIAGRAM

The block diagram representation of system consist of two parts

- Road side module
- Vehicle side module

Road Side module

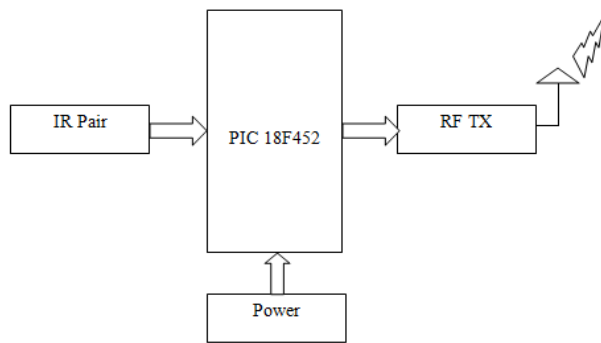


Fig. 1 .Block dia. of road side module

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

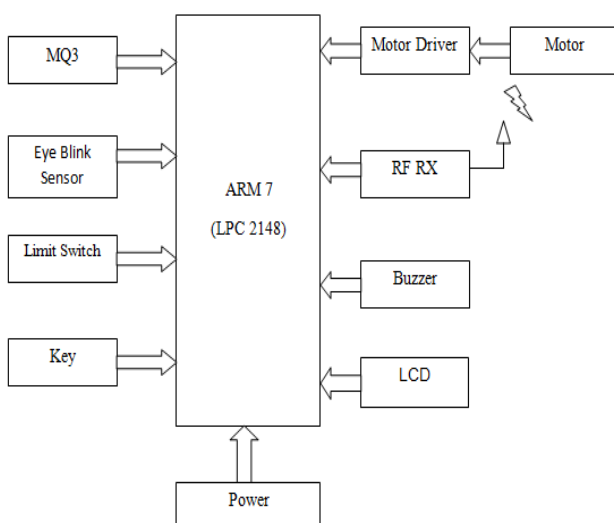


Fig.2. Block dia. of vehicle side module

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

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 SnO₂ 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 wearred by a person and start the vehicle.

Drowsiness Detection

This project involves measure and controls the eye blink using IR sensor. The IR transmitter is used to transmit the infrared rays in our eye. The IR receiver is used to receive the reflected infrared rays of eye. If the eye is closed means the output of IR receiver is high otherwise the IR receiver output is low, if continuous high output is getting for five to six times then controller is going to know the driver suffers from drowsiness. This to know the eye is closing or opening position. This output is give to logic circuit to indicate the 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. ADVANTAGES

- This project decreases the rate of accidents in the highways and Ghats areas
- Traffic management can be maintained by reducing accidents and traffic jams can be avoided.
- Low cost and easy to implement.
- Can cover maximum area in a zone.
- This can be implemented with other wireless technologies for adding more stuff.
- This can be uses in driving guidance systems and automatic navigation system

VI. APPLICATIONS

- Real time traffic control
- It can be implemented in automated systems for wireless control.
- Controlling the horn of the vehicles across schools, hospitals etc

VII. CONCLUSION

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. Thus the data to be sent is encoded within the transmitted signal so that a well designed receiver can separate the data from the signal upon reception of this signal. The decoded data can then be used to perform specified tasks.

Secondly, using highly advanced IC"s and with the help of growing technology the project has been successfully implemented

A low-cost and simple system to ensure the safety of passengers and pedestrians. It certainly provides a hope for bringing down the alarming rate of road accidents

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