Auto Vehicle Speed Control System

Monali B. Zade[1], Mrs. S. M. Kulkarni [2]
[1] *MIT College of Engineering, Pune*
[2] *MIT College of Engineering, Pune*

Abstract- The term road traffic safety means that how safe an individual user is on some specific road. Road accidents are one of the world's biggest public health and damage prevention action issues. As indicated by the World Health Organization (WHO), in excess of a million people are killed on the world's road every year. Safety is of prime significance, to the users as well as to engineers, organizers and choice markers related with activity, change and advancement of transportation system. The proposed system will deal with major factors which are responsible for road accidents. The long term goal is that no-one shall be killed or seriously injured within the road transportation system. The system focuses on following parameters: collision notification that gives notification about accident to the victim's relative, Red light traffic control makes sure vehicle doesn't break signal, Speed control alters speed in different zones and prevent vehicle from entering no entry zones, Horn control prevents no honking in horn prohibited zone and Alcohol detection detects drunk driving.

Keywords— *Road safety, Collision Notification, horn control, Embedded System, etc.*

Introduction

Road injury is one of those man-made issues that we can solve. Driving on Indian roads is considerably more not quite the same as driving else at some other place. Safe road transport must be a key establishment stone of present day society [1]. As indicated by the WHO, in the years 2008-2011 thirty-five Countries, with an aggregate populace of 680 million, presented new road security laws [2]. Improving road safety is a global concern and increasingly becoming a top priority for societies. Safety studies have discovered that a greater part of accidents happen because to the driver's error. The carelessness of the security standards and in addition driver exhaustion, tipsy driving are some different reasons of the mishaps [3-4]. The activities like dangerous overtaking, path cutting, jumping of signals, erratic parking can be considered real foundations for the catastrophes on the roads.

Usually, accidents are prevalent in urban areas where "Speed" of the vehicles is uncontrollable and where every single individual is in rush. Significant reasons for mechanized accidents are as per the following [5-6]:
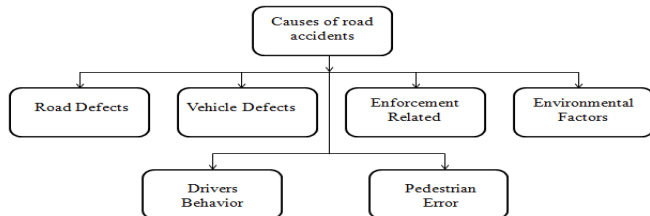

Fig. 1 Causes of Road accidents

The long term goal is that nobody should be killed or truly harmed within the road transportation system. There is a need of application of advanced and developing technologies (computers, sensors, control, communication and electronic gadgets) in transportation to spare lives, time, cash, energy and the environment [7].

There is a need to attempt exploratory examinations on drunk and driving revise appraisal of activity security circumstance on Indian roads. Also Professionalism in driver training and advanced licensing system and some strict law will help to decrease the accidents. Vehicles GPS and GIS facilities with unique user id will help to improve the identification of vehicles involved in road accidents.

Vehicles GPS and GIS facilities with unique user id will help to improve the identification of vehicles involved in road accidents. This points will be use to improve the current situation of road safety and management in India[8]. The aim of the proposed work is an attempt to make a cost effective embedded system to bring the positive difference in the field of road safety.

Module Implementation

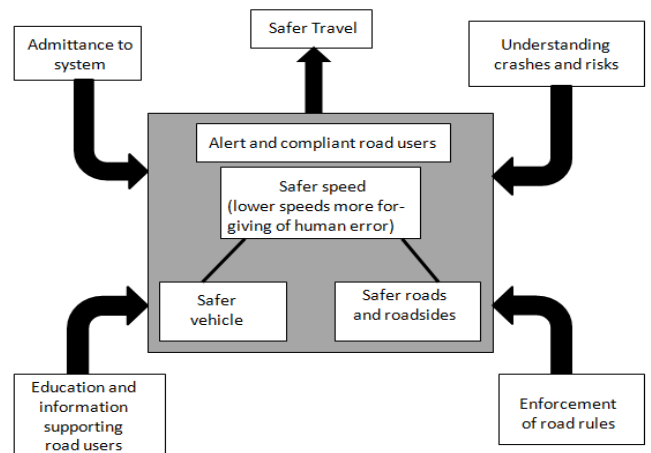The basic architecture of the system to be developed Is presented in Fig.2.

Fig.2. Implemented System Architecture

Basic components used for the implemented System:

Sr. No.	Component	Specification/ Details
1	Encoder/ Decoder	IC- HT12E
2	Transmitter/ Receiver	F= 433 MHz, Rate =1Kbps - 10Kbps *Max 232*
3	Microcontroller	PIC16
4	Buzzer	Digital

5	Horn	Normal
6	Sensors	*MQ135(Alcohol)*
		Limit Switch (Speed)
		Bumper Switch(Collision)
7	GSM Modem	*GSM 300*
8	GPS	*RLZMMOPA9 GPS*

A. Hardware Details

The model consists of two sections - Transmitter and Receiver Section.

Transmitter Circuit : Transmitter module can be fitted on the roadside sign board. To transmit the information, RX /TX module is needed which will work on some particular frequency range. On the Data Lines of the Encoder, 4 switches will be connected which will create the information data for project and then it will get decoded on the receiver side.
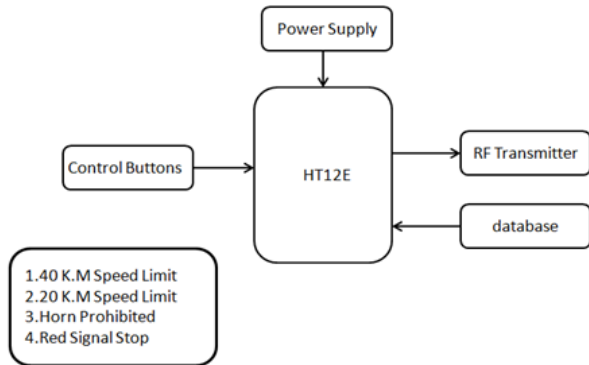

Fig.3: Schematic of the model for Transmitter Circuit

Receiver Circuit: Receiver module will be present in the car. When the car in a motion comes in that particular range of frequency automatically the circuitry start working.
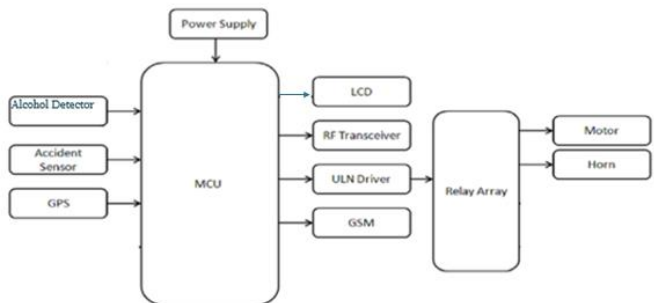

Fig.4: Schematic of the model for Receiver Circuit

These are the parameters which will be controlled automatically to reduce the risk of accident:

1.   Vehicle speed control in Various Places:
Here, the speed of vehicle gets controlled in various areas for example near schools, highways, bridges, flyovers etc. Once the vehicle comes in that particular range of frequency of RF module then whatever the speed limit is given for that particular road, the system present in vehicle automatically sense it and follow that speed limit.

2.   Horn control at no honking zone:
Here, when vehicle passes through horn prohibited zones for example public libraries, hospitals, schools ,courts, etc., the system will keep the horn from making sound.

3.   Red light traffic control:

Here, when signal is red the speed of vehicle get reduced and after that consequently get stopped.

4.   Automatic collision Notification:
Here, the SMS message will be send to the registered mobile number via GSM modem when accident has been happened.

5.   Alcohol detection:
The alcohol sensor keeps the ignition key from working if the driver inhales into it and a critical amount of alcohol is identified.

Results

A.   Simulation Results

Result showing simulation part of project circuit includes temperature and alcohol sensors reading along with accident detection circuitry which alert the system using buzzer alarm. Temperature threshold value is set to be 40 deg, Alcohol threshold value is set to at 13% concentration and for accident detection is limit switch is used.
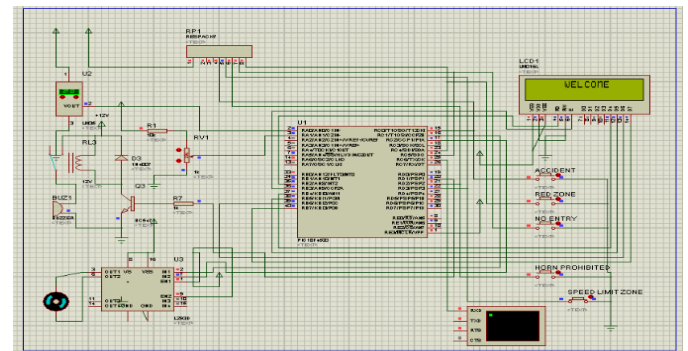

Fig.5. Simulation results

B.   Hardware Results

1.   Detection of Accident

The switch called Bumper is used here. The purpose of this switch is to detect the collision of the vehicle. The action is controlled by microcontroller in order to generate the signal for controlling the speed of the motor once collision occurred. It also helps in identifying the location of the vehicle to provide the help.
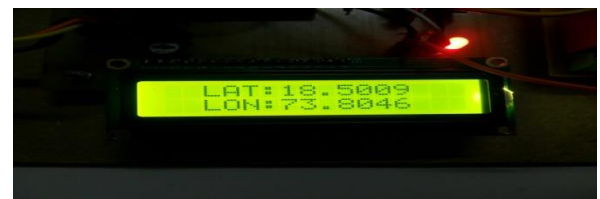

Fig.6. GPS co-ordinates

2.   Red Light Traffic Control

The red colored LED is used for demonstration of the traffic signal. The color of the signal is detected and hence the system does not allow moving the vehicle. The transmitter and receivers plays the vital role here also. This system is useful at traffic signals as many times people are not following the traffic signals.

Fig.7. Red signal condition

3. *Control of Speed*

Speed of the car is several times a reason for the accidents . The speed is controlled by using the relays thereby controlling the motor speed. Depending upon the data of the conditions of the road, traffic, timing of the travel the signals is generated in order to turn the motor on or off and hence control is achieved.
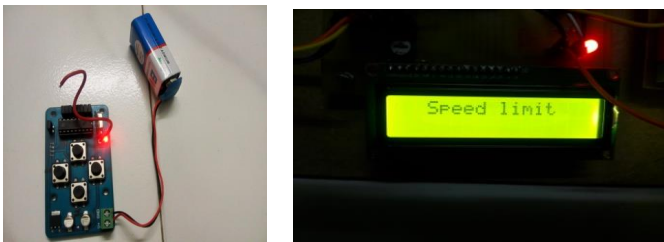

Fig.8. Speed Limit Control

4. *Detection of Alcohol*

The sensor for detection of the alcohol used in the system is MQ135. The sensed value of the alcohol in the human body is detected and if the detected value is more than the pre-set value, then the vehicle will not start.

Fig.9. Alcohol Detection

5. *Horn Prohibition:*

The board of the horn prohibition is displayed on every street. The sensor will detect this board and once it is detected the signal is generated in the system. With microcontroller and trans-receiver a control is provided to the engine and it avoids the horn to be in ON condition.
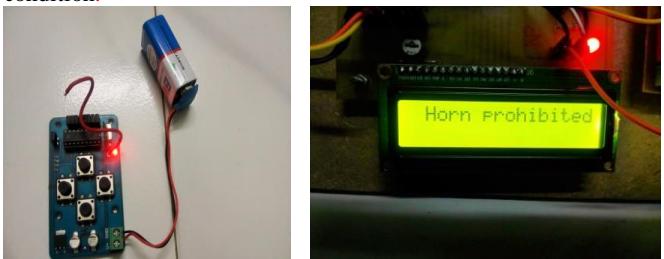

Fig.10. Horn Prohibition control

6. *No Entry Zone*

In No entry zone the speed of vehicle will get reduced as well as the indication of No Entry Zone will be displayed.

Fig.11. No Entry Zone indication

6. *Final prototype*

Fig.12 gives final prototype of the model. We can implement the receiver circuitry in vehicle and transmitter circuitry beside the roadside like on sign boards or on traffic signals.
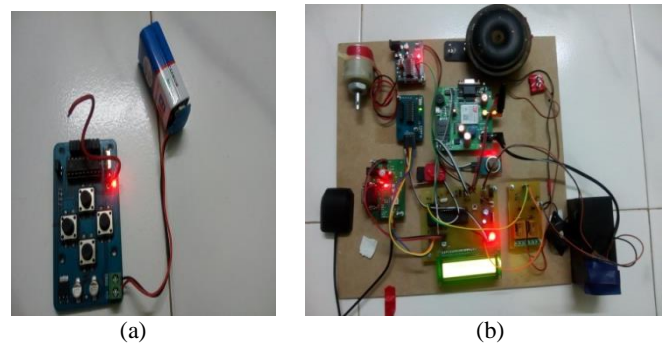

(a)   (b)

Fig.12. Final Model(a)Transmitter (b) Receiver

Conclusion

The module is found suitable to be implemented for the vehicles in order to avoid the road accidents. Road accidents have become one of the severe issues to be addressed as many people have lost their lives in the world due to this. The results achieved with software and hardware modules are found suitable for practical implementation.

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