Smart Highway with Smart Car

Rohan Sharma, Ranjitsingh Rajpurohit, Navneet Singh, Amey Satam
Department of Electronics and Telecommunication Engineering,
K.C. College of Engineering & Management studies & Research,
Kopri,Thane(E)-400 603, India

***Abstract*: For reduction of road accidents, we introduced project based on "Smart Highway with Smart Car". The basic principle of this project is to transmit signals from RFID tags (Radio Frequency) tag to vehicle (Receiver).**

Because of this we can decide the speed limit of the car or show road signals in the car LCD display. There is also collision sensor, alcohol sensor, theft sensor to sense and do the work according to that.

Collision sensor used for collision of car, send a message to the relatives of the driver, a ambulance, nearby police station. When alcohol sensor senses alcohol smell in car, then car will not start.

1.INTRODUCTION

The motor vehicle environment has gone virtually untouched by the technology explosion of the past decade - especially the computer revolution. Except for the use of microprocessors as an adjunct to pollution control and engine management; technology has, for the most part, not effected the roadway environment - automated traffic lights not withstanding.

Each year there are thousands of highway deaths and tens of thousands of serious injuries due to "Run-Off-Road" accidents. Everything from simple driver inattentiveness, to fatigue, to driving-while-impaired are responsible.

The cost to the nation is the thousands of lives lost, and tens of millions of rupees. This is a much more common cause of single vehicle fatalities than is generally thought. The high profile multiple vehicle accidents--including large "eighteen wheelers," capture the headlines. One very effective prevention to this needless carnage, is the installation of so-called, "SPEED SENSOR" along the roadway edge.

SPEED SENSOR are deeply inserted in road, they transmit the maximum speed limit signal by Radio frequency waves .uC compares signal from road speed limit signal with actual speed signal of car ,If vehicle speed is more then speed limit signal generated from sensor embedded in road, then initially alarm is given & then automatic brake is applied. In all but the most impaired driver, the response is imminent and Life Saving! The long dreamed of, "Smart Highway," has not only been technically feasible for sometime, but its time may be now. To enlist the vehicle's existing computer for the added tasks involved in vehicle/highway interface management, will put great computing power at the disposal of the entire IVHS structure. There are two approaches: one would have smart vehicles operating autonomously, with minimal centralized control or supervision; the other approach would be an integrated tightly-coupled vehicle/highway interface. This latter approach is composed of three elements: the "smart" vehicle, the centralized authority or "network" and the communication between them. The resulting homogeneity would strengthen any and all functions taken on by such a system: it would be an entity that is greater than the sum of its parts. Surplus computing power would always be available, improving data access and distribution; and speed in evaluation and decision making (e.g., expert systems).

The various communications methods that might be brought to bear on such a system all have their individual strengths and weaknesses: there seems to be no single technology that has it all. However, among the contenders, the RF-wave, approach appears to have the greatest advantages.

By the time the intelligent vehicle highway system, IVHS, starts to show up in those urban areas where it is most needed, the motoring public - both commercial and private - will not only except it, they will, most likely, welcome it .

2.BASIC BLOCK DIAGRAM

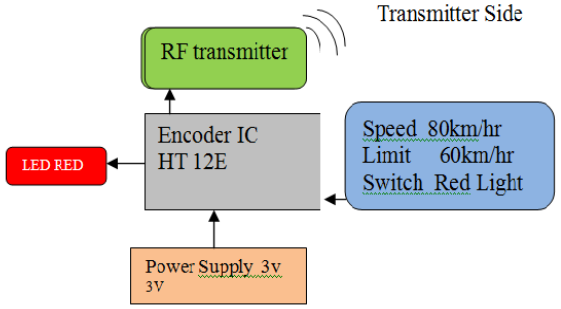

Figure 1.Transmitter section

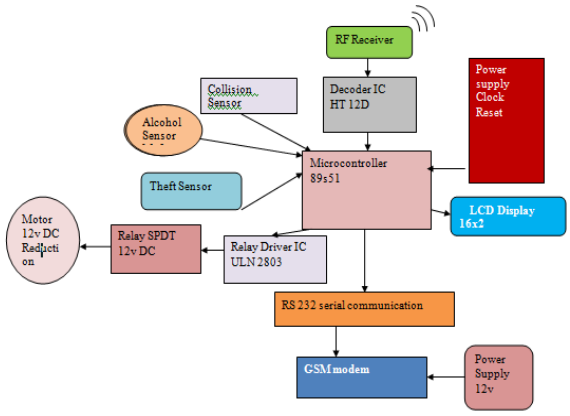

Figure 2. Vehical (receiver) section

Here we can see the block diagram of our project. This is the basic block diagram of our project.

1) As seen the block diagram show the system on the vehicle side. It is our receiver. The itself our receiver as we will fit the system to it.

2) The receiver has various blocks as seen in the figure, such as RF receiver, decoder IC, various sensors, DC motor, relay driver IC, RS 232 serial communication, LCD display, microcontroller, power supply.

3)The RF receiver receives the signals from the RFID tags that are fitted on the sign boards on the highway. It catches the signal as soon as the vehicle comes within the transmitting range of the tags.

4)The received signal is given to the decoder IC. The decoder decodes the signal received from the tags. We have used HT 12D decoder as it operates at a very high speed.

5)As the signal is decoded, it is given to the microcontroller. The microcontroller is the main and most important part of the receiver. All the blocks are connected to it as shown in the diagram.

6)Various sensors are also connected to the microcontroller. Depending upon the signal received from the decoder the microcontroller sends the commands. The command is then displayed on the LCD is the car. It shows the driver about the necessary he needs to take.

7)Even the sensors that are in the car are connected to the microcontroller. These sensors are collision sensor, alcohol sensor, theft sensor. As soon as any of these sensors are active the microcontroller receives the signal.

8)The microcontroller depending upon the sensor that is active take the necessary action. For example: If the driver is drunk, the alcohol sensor will get active because of his breath and the signal will be given to the microcontroller. The microcontroller will thus not allow the car to start and will display warning signal on the LCD display.

9)DC Motor will control the speed of the vehicle depending upon the speed limit transmitted by the RFID tags on the roadside.

10)The horn sensor when senses the horn prohibited area by the signal transmitted from the tags of area turns off the horn of the horn of the vehicle. The won't be able to do hawking in these areas.

11)A GSM modem can also be used in this system incase of collision or accidents. In this case we have a collision sensor in car.

3.FEATURE USE

1.Vehicle Speed control in variable Zone

In this Feature we can control the speed of vehicle in different type location , such as Flyover bridge , school area , collage –campus , courts, highway , cities internal area

2. Horn control of vehicle

In this feature we can control the unwanted horn Disturbances in horn prohibited area like School , collage ,Court area, all type hospitals, kids nursery's, Public libraries, Offices, public places .

3.Alcohol Control

In this feature we can control all accidents of vehicle by happing because of "Drink and drive" When Driver Start the vehicle then the System check the alcohol level of driver, if it sensed then the car engine not started that time. If its sense nothing then the system allows the to start engine.

4.Red Light Traffic control

In this feature we can control the vehicle on traffic signal, when traffic signal is red then the vehicle automatic stopped by this feature.

5.Automatic Collision notifications to control room

In this feature when unfortunately accident happen of vehicle the system of this project send (SMS) massages via GSM Modem to control room and one to relative of the person. So instant we got the information of accident and help the injured person.

6.Vehicle Security

In this feature if the vehicle was theft or stolen then theft sensor activated an sent the theft massage to owner and police control room via gsm modem.

4.ADVANTAGES

- Current project can reduce large number of accidents .
- It can save life of many people.
- It can bring discipline to driving habit.

5.APPLICATION

- This project can be used for all types of vehicles such as car, tempo ,truck, taxi, rickshaw, City buses etc .
- It can be used in traffic control system for clearing the roadblocks quickly.
- It will prevent noise pollution.

6.FUTURE SCOPE

- This technology will help to reduce the road accidents.
- It will be easier to follow the traffic rules.
- Drink and drive cases will be reduced.
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7.CONCLUSION

By the realization of the above proposed system we can make the Traffic system more efficient and can reduce the traffic logging on the highways. This system will save a lot of precious time of the driver, passengers as well as will be more safer for their lives.

By the realization of the above proposed system one can learn many aspects of a digital electronics circuit. This will give the complete knowledge of designing microcontroller based system and developing embedded software

We will also learn the software development strategies and various programming techniques for PC based applications.

8.REFERENCE

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