

# Advanced Safety System in Four Wheelers - 3rd EYE

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**Abstract:** Traffic accidents are a major cause of death and injuries worldwide, but while they are declining in many parts of the developed world, fatalities are still on the rise in many developing countries including India. Reduction of the number of accidents and mitigation of their consequences are a big concern for traffic authorities, the automotive industry and transport research groups. The '3<sup>rd</sup> EYE' detects the school zone and other restricted speed zones using a permanent RF Transmitter and a RF receiver that is placed in the vehicle and slows down automatically by controlling the fuel supply using relay in the vehicle. This will persist as long as the vehicle is in the particular zone. This idea can be widely implemented for colleges, schools, hospitals to control rash driving and prevent accidents.

**Keywords:** 3<sup>rd</sup> EYE, Traffic accidents, traffic authorities.

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## 1. INTRODUCTION

In our state more than half of the road accident victims are in the age group of 20 to 55, the key wage earning and child raising age group. The loss of the main bread winner and head of household due to death or disability can be catastrophic, leading to lower living standards and poverty. Reduction of the number of accidents and mitigation of their consequences are a big concern for traffic authorities, the automotive industry and transport research groups. One important line of action consists in the use of advanced driver assistance systems (ADAS), which are acoustic hectic or visual signals produced by the vehicle itself to communicate to the driver the possibility of a collision. These systems are somewhat available in commercial vehicles today, and future trends indicate that higher safety will be achieved by automatic driving controls and a growing number of sensors both on the road infrastructure and the vehicle itself. A prime example of driver assistance systems is cruise control (CC), which has the capability of maintaining a constant user preset speed and its evolution, the adaptive cruise control (ACC), which adds to CC the capability of keeping a safe distance from the preceding vehicle.

The main causes of the increasing death rates in the Road Accidents are:

- Not knowing or not adopting correct driving habits.
- Drivers sleeping while driving especially of Heavy vehicles & light motor vehicles after midnight due to fatigue and other reasons.
- Over speeding.
- Bad condition of Roads and absence of different lanes.
- Driver /Rider's ignorance of Road conditions, Road signs and the Environmental factors.

All road users should remember that road is to be shared amongst all. Requirements of different road users may differ according to circumstances and observance of traffic rules and consideration for the fellow users can reduce congestions, traffic jams and accidents. All road users must ensure that they

- Obey traffic rules at all times
- Obey all traffic signals and road signs
- Mandatory use signals when turning, stopping, overtaking, slowing down and parking
- Park only in designated areas.

### **1.1 Existing System:**

Vertical deflection traffic calming devices are engineering measures designed to slow motor-vehicle traffic in order to improve the security system. These include the speed plunk, speed bulge, speed bumper, and speed pulpit. The use of vertical curvature devices is widespread all over the world, and they are most probably found where the vehicle speeds are statutorily mandated to be low, usually 40 km/h (25 mph), or 8 to 16 km/h (5 to 10 mph) in car parks. Although speed plunks are very efficient in keeping the vehicle in low speed, their use is sometimes questionable as they can cause noise and possibly vehicle damage if taken at too great a speed. Poorly manufactured speed plunks often found in private car parks (too tall, too sharp an angle for the expected speed), and can be hard to arrange in vehicles with low ground clearance, sometimes in sports cars, even at a minimum speed.. Speed plunks can also cause severe damage to the motorcyclists and bicyclists if not clearly visible, though in some requirements it causes a small cut across the plunk allows those vehicles to pass through without impediment. Public places such as school, hospital, and work or accident zone have warning sign and messages displayed on a pillar or road sign poles. It has to be followed by the vehicle driver according to the traffic rules.

### **1.2 Draw Backs of Existing System:**

- The response is slower in the emergency vehicles;
- This system may divert the traffic to resident parallel streets;
- This may increase the possibility of noise and pollution for the residents living immediately adjacent to the speed bumps.
- The driver might not be aware about the sign or intentionally doesn't follow.
- It results in violation of the rule and occasionally in accident.

## **2. LITERATURE REVIEW**

In 2013, Karim El-Basyouny, Mohamed Yahia El-Bassiouni did a modeling and analyzing on the traffic safety perceptions. Here an application to the speed limit reduction was done by creating public awareness and possible techniques were suggested to improve safety.

In 2013, Han Ding, Xiaohua Zhao, JianRong, Jianming Ma done an experimental research on the effectiveness of speed reduction markings. This research found that most of the drivers are not obeying any of the speed reduction markings. This paper suggested a system to be installed in the vehicle to give alert to the driver when the vehicle enters the speed marking zone. In 2006, Z. Bebis, G. Miller, R. made an effort to on-road vehicle detection. This paper suggested an on-board automotive driver assistance systems aiming to alert drivers about driving environments, and possible collision with other vehicles has attracted a lot of attention lately. In 2005, Bahlmann, C., Zhu, Y., Ramesh, Pellkofer, Koehler, suggested a system for traffic sign detection, tracking, and recognition using color, shape, and motion information. This gives the driver a good assistance in an intelligent automotive environment. This helps the driver to be informed through which the vehicle is being passed presently and avoids the accidents due to carelessness of the driver.

In 2008, The Auto Channel developed a system for lane-Change Warning From Hella for the new BMW 7 Series. Together with BMW, Hella has developed lane-change warning for the new BMW 7 Series. When changing lanes, it considerably reduces the danger of overlooking vehicles approaching from the rear.

## **3. OVERVIEW OF THE PROJECT**

The '3<sup>rd</sup> EYE' detects the school zone and other restricted speed zones using a permanent RF Transmitter and a RF receiver that is placed in the vehicle and slows down automatically by cutting off the fuel supply using relay in the vehicle. This will be deactivated using a timer and persists as long as the vehicle is in the particular zone. This idea can be widely implemented for colleges, schools, hospitals to control rash driving and prevent accidents.

Automatically working clutch and brake is another eye catching point of the project. Human have less response than a sensor and sensor can react in micro seconds. While driving behind a car and if that car stops suddenly the sensor placed in front of the vehicle sense the distance and if the distance between the vehicle is equal to or less than 1 meter the sensor activates the actuator and then it make the brake and clutch to stop the vehicle. After the obstacle has been moved, actuator releases its force on brake and then the clutch slowly .Hence this idea can also be used in Bumper to Bumper drive in heavy traffics.

### 3.1 Advantages of the Project:

- Speed of the vehicle is controlled and accident is prevented.
- Features that are integrated with this system are Auto-Breaking with Anti-collision, Auto Speed Limit control, Curve detection.
- High sensitivity
- Automatic systems will prevent accidents
- In future, many speed levels can be added easily.
- Cost is comparatively less.
- Special Microcontroller Features:
- Data EEPROM Retention > 40 years
- Serial Programming™ (ICSP™) has two pins
- Single-supply 5V Serial Programming

## 4. SCHOOL ZONE SPEED REDUCTION

Automatic Speed Control in Speed Limit Zone project which automatically controls the speed of the vehicles at speed restricted areas such as school and hospital zone etc. The main reason behind developing this project is to avoid accident of vehicles at speed limit zones and also to help the passengers to cross the road safely without facing any danger from high speed vehicles. Normally, the vehicle drivers not consider the passengers who crosses road in speed limited areas and drive their vehicles at high speed. So, now accidents are increasing in these areas. The traffic police control the traffic, but they are not able to avoid the accidents completely. Because he can't keep an eye on the speed of every vehicles at all time in these speed restricted areas. To solve this problem we developed the proposed project, which not interrupts the vehicle drivers and controls the speed of the vehicles up to certain limit in these speed restricted zones.

The key idea offered by this paper is to use Radio Frequency Identification (RFID) technology to tag the warning signals placed in the dangerous portions of the road. While artificial vision-based recognition of traffic signals might fail if visibility is poor (insufficient light, difficult weather conditions or blocking of the line of sight by preceding vehicles), RF signals might still be transmitted reliably. A well-known example is the REID-based highway toll collection systems which are now routinely employed in many countries, like the Tele pass system in Italy or the Auto pass system in Norway.

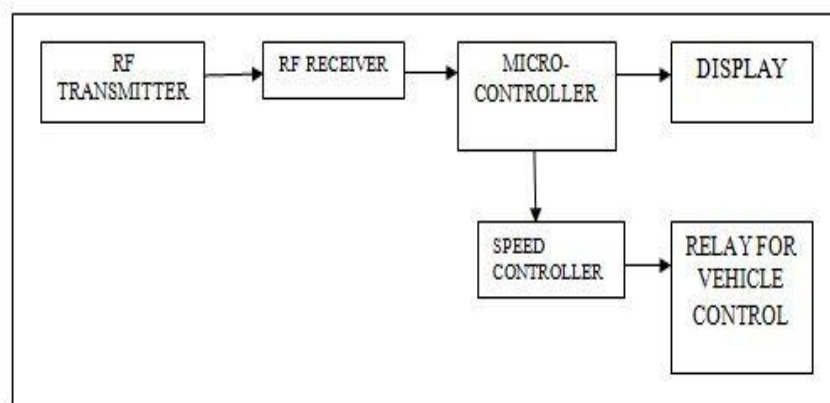


Figure 4.1 Block diagram for speed control

#### 4.1 RF Transmitter:

An RF transmitter module is a small PCB sub-assembly capable of transmitting a radio wave and modulating that wave to carry data. Transmitter modules are usually implemented alongside a micro controller which will provide data to the module which can be transmitted. RF Transmitters are usually subject to Regulatory Requirements which dictate the maximum allowable Transmitter power output, Harmonics, and band edge requirements. The RF module, as the name suggests, operates at Radio Frequency. In this RF system, the digital data is represented as variations in the amplitude of carrier wave. This kind of modulation is known as Amplitude Shift Keying (ASK).



Figure 4.2 RF Transmitter

#### 4.2 RF Receiver:

An RF Receiver module receives the modulated RF signal, and demodulates it. There are two types of RF receiver modules: super-heterodyne receivers and super-regenerative receivers. We use a super-regenerative module. These are usually low cost and low power designs using a series of amplifiers to extract modulated data from a carrier wave.



Figure 4.3 RF Receiver

#### 4.3 Micro-Controller:

It is the major part of the system. It has serial ports that receives and transmits data. Transmission and reception can take place simultaneously. It contains a processor core, memory, and programmable input/output peripherals. Program memory in the form of RAM, ROM and is also often included on chip. This controls the action to be taken at the output.

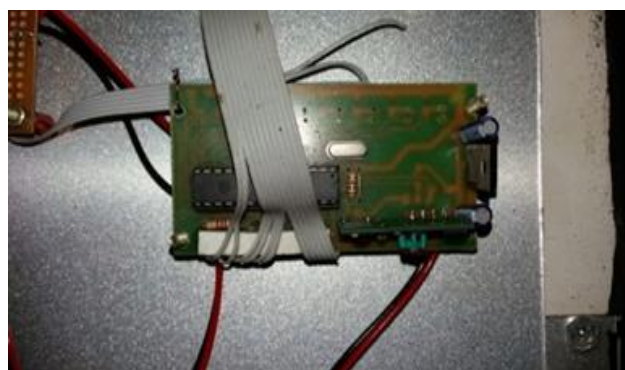


Figure 4.4 Micro-Controller

#### 4.4 LCD Display:

Liquid crystal display which is commonly known as LCD. It is an Alphanumeric Display, it means that it can display alphabets, numbers as well as special symbols thus LCD is user friendly display device which can be use for displaying various messages. Here we have use 16 x 2 alphanumeric display which means on this display we can display two lines with maximum of 16 characters in one line.



Figure 4.5 LCD Display

#### 4.5 Speed Controller

The speed controller consists of an electronic circuit in which it has got voltage regulators. The voltage regulator is a device, which maintains the output voltage irrespective of the change in supply variation. Here we use a +12V regulator and a +5V regulator.

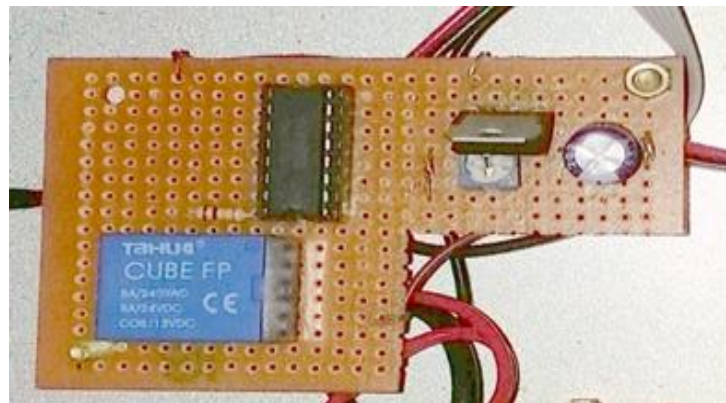


Figure 4.6 Circuit used for speed controlling

#### 4.6 Relay Controller:

A relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used. The relay controls the power supply to the fuel injection system. Thus by reducing the supply voltage to the relay by speed controller circuit, fuel injection gets reduced to the engine.

### 5. WORKING

The speed of vehicles can be controlled by the RF communication method. By attaching transmitter in speed restrictions zones and attach the RF receiver in the vehicle. When a vehicle enters this zone, then these transmitters will send continuous coded signal to those vehicle. The receiver in vehicle will receive those signals and then microcontroller, which is attached inside the vehicle, will control the speed of vehicle automatically by varying the relay switch signals to the fuel system. When a micro controller receives the code signal then it will control the speed of the vehicle. To obtain back the normal condition of the vehicle, we place transmitters, which transmit codes which bring the relay switch signals back to the normal running condition. The system will be deactivated using a timer if the vehicle goes out of the range of the second transmitter and it will persists as long as the vehicle is in the particular zone We can use these techniques to control the accidents between vehicles and ensure the safety of peoples in such zones.

## 6. CONCLUSION

This project will be the future of all types of traffic controls implemented on a vehicle, thus reducing the traffic rule sign board violation of vehicles in an easier manner. Accidents due to the ignorance of the traffic rule sign board can be reduced by using a permanent RF Transmitter fixed on the speed restricted zone and a RF receiver that is placed in the vehicle after receiving the signals, vehicle slows down automatically by cutting off the fuel supply using relay in the vehicle. This idea can be widely implemented for colleges, schools, hospitals to control rash driving and prevent accidents. Automatically working clutch and brake is another eye catching point of the project. Human have less response than a sensor and sensor can react in micro seconds. While driving behind a car and if that car stops suddenly the sensor placed in front of the vehicle sense the distance and if the distance between the vehicle is equal to or less than 1 meter the sensor activates the actuator and then it make the brake and clutch to stop the vehicle. After the obstacle has been moved, actuator releases its force on brake and then the clutch slowly .Hence this idea can also be used in Bumper to Bumper drive in heavy traffics effectively.

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