

Automatic Vehicle Speed Controller System for Accident Prevention

Sangeeta Guttedar¹, Harshavardhan Reddy²

¹Department of ECE, Mtech(VLSI &ES)Sharnbasva university kalaburagi, karnataka, india

²Professor, Department of ECE, Sharnbasva university kalaburagi, karnataka, india

Abstract - At present scenario, people are driving very fast; accidents are occurring frequently, we lost our valuable life by making small mistake while driving (school/college zone, hospital zone, hills area, and highways). So in order to avoid accidents in restricted area and to alert the drivers and to control their vehicle speed in restricted area the highway department have placed the signboards. But sometimes it may not be possible to view that kind of signboards and there is a chance for accident or if driver don't slow the speed of their vehicles even after seeing the sign boards.

It can be done by using automatic technology with the help of embedded system. This project is focused on "automatic speed control of vehicles using RF module" by detecting the accident zones (such as school/college, hospital, etc). The project is consist of two separate units: transmitter unit and receiver unit. Once the information is received from the restricted area, the vehicles embedded unit automatically reduces the speed according to the restricted area speed. Particularly this system is designed to place near the school/college zones to avoid the accident of students, public etc.

Key Words: Signboards, Restricted area, Radiofrequency module(RF)

1. INTRODUCTION

It is evident that road accidents are increasing day by day. Recent studies show that one third of the number of fatal accidents are associated with excessive speeds in places where school/college, hospital, hill stations, highways, sharp turnings and junctions, and changes in the roadways such as the presence of road-work or unexpected obstacles. This is due to waiting for longer period of time in traffic jams, taking tortuous detours due to on road works, trying to spot speed breakers, navigating blind turns, one-ways and so on. Even in Forked roads, railway crossings, sudden reverse bends and steep ascents and descents are just few of the road oddities are also cause for road accidents. Such road oddities are indicated by road-signs. Mandatory road-signs enforce traffic laws; Cautionary road-signs are installed in hazardous areas to avert accidents. Informative road-signs denotes directions, locations and other information that is potentially useful to drivers in that locality.

However, most vehicle drivers miss using road signs boards more often than not. It is difficult to keep an eye on road signs boards when one should be focus on vehicle driving. Many vehicle manufacturers have been developed vehicles speed controller so as to prevent accidents, Such that Cruise control system (CC) that is capable of maintaining pre-defined speed and its evolution version Adaptive Cruise Control (ACC) which keeps the automobile at pre-defined safer distance from the preceding vehicle. But these systems fail to detect the curved roads where the speed of the vehicles must be reduced to avoid the accidents. Then after that Curve Warning Systems (CWS) came into existence to detect the curved roads by using Global Positioning System (GPS) and by using the digital maps accessed from the Geographical Information Systems (GIS) to warn drivers of approaching the curved road, But these maps always need to be updated regularly and are not useful if there are unpredictable road diversions or accidents. Here the proposed system model controls the vehicle speed according to the data frame that is transmitted by the RF transmitter fixed to the nearby road signs. The data frame is received by the arduino microcontroller in automobile which controls the speed of vehicle.

At present accidents are occurs due to careless driving and over speed in road. People do not bother about human lives. The accidents rates are increasing year to year by more vehicles on to ground. The government has taken to many steps to prevent this kind of things but it not enough. Most of the manufactures has developed a laser based control system but its cost is too high. And it has disadvantage that, when human crosses the road it cannot detect properly so we tried to develop a system to control these things in a simple manner. At first we have an idea to use laser diodes but it is very costly so again tried with IR sensors again there is a draw back in using this, because it works under line of sight so finally decided to use RF module.

Rash driving is the cause of many road accidents all over the world. The Road humps play crucial role and significantly contribute to the overall road safety objective through the prevention of accidents that lead to deaths of pedestrians and damage of vehicles. The speed humps are used for discouraging vehicle drivers from driving excessive speed. These are typically comprised of concrete or solid humps that form a transverse ridge in the road and are generally above the road surface. The vehicles

while passing over the hump undergo a jolt, hence the drivers are discouraged for traveling at high speed. For vehicles which are within the speed limit unnecessary fuel consumption may occur due to gear changes during the hump. So the speed hump are may require only when the vehicle is above the speed limit. This is a RFID-Based Intelligent vehicle speed controller system where RFID transceivers are arranged in the road close to the position of accident zones.

The major concerns in the world is road facilities. Road humps are laid at the service road junctions. In locations where very low speeds are needed and reasonable usage of speed humps are done. Speed humps are typically placed on the residential roads. In order of comparison Humps are less aggressive than the speed bumps at low speeds and are used on the actual streets, as opposed to bumps which are primarily placed in the parking lots. Depending on the speed of the vehicle and the distance to the speed breakers on the road to any vehicle, the device indicates the driver about the hump through the embedded system feedback. When ambulance or any of the VIP vehicle arrives its prime important them to move faster so that automatically hump detects vehicle through the RF signal and hump goes flat. Even at the traffic signal, traffic signal senses such vehicles through RF signal and signal shifts to color green. sensor system for infrastructure to vehicle communication and to humps, which can transmit the information provided by the active signals placed on the road to adapt the vehicle's speed and to prevent collisions is the main aim. Sensors which have been installed in the vehicles and the humps in order to control. By active signals which means ordinary traffic signals that incorporate long-range active RFID tags with information stored in them. This information is collected in the real time by RFID sensors placed onboard of the vehicle

I. EXISTIG SYSTEM

1. Public places such as school, hospital, and work or accident zone have warning sign and messages displayed on a pillar or road sign poles.
2. It has to be followed by the vehicle driver according to the traffic rules.

II. PROPOSED SYSTEM

1. A system that detects the particular zone and according the action are being carried out.
2. The project proposed here consists of a set of units are 1. Transmitter Unit. 2. receiver Unit.
3. The transmitter transmits the signal according to the restricted area speed and receiver unit receives the signal sent by the transmitter according to that the motor adapt vehicle speed automatically.

2.PROPOSED SYSTEM

2.1. TRANSMITTER MODULE

The transmitter module consists of RF transmitter, arduino microcontroller and power supply. Transmitter which is placed in the restricted areas. This unit simply contains the information of how much the vehicle speed in that region it can run. The arduino microcontroller is used to transmit the information through RF transmitter to an multiple RF receiver. As shown in figure 2.1(a) and 2.1(b) below.

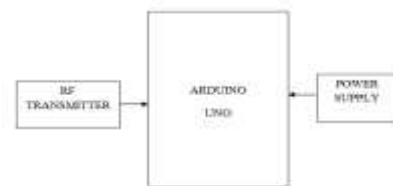


Fig-1: Transmitter module block diagram.

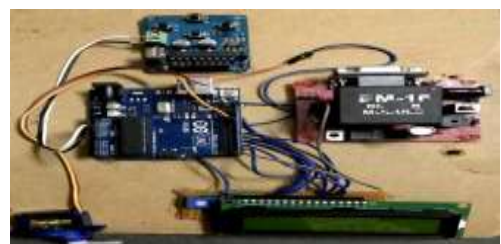


Fig-2: Transmitter module circuit diagram.

2.2. RECEIVER MODULE

The receiver module block diagram is shown below fig-3 and fig-4,the receiver is used to acquire an information from the transmitter based on the information it received, arduino uno controls the speed of the vehicle. The receiver modules consists of RF receiver, lcd display , dc motor. Lcd is used to display the information about limited speed in that zone to the driver who drives the vehicle. If the driver does not reduce the speed manually it wait for few seconds after that the control goes automatically.



Fig-3: Receiver module Block diagram

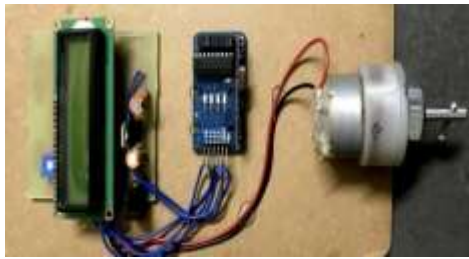


Fig-4: Receiver module circuit diagram

2.3. RECEIVER UNITE FOR SPEED BREAKER

The receiver unite block diagram is shown below fig-5. The receiver unite consists of RFID reader, LCD display, servo motor, power supply. LCD is used to display information to the driver who drives the vehicle. RFID tags placed near the restricted area on the sign board, which contains the information of limited speed. RFID reader acts as receiver unite which is connected to the arduino microcontroller to receive information sent by RFID tags, and servo motor is used for rotating speed breaker up and down on road based on the information received by the transmitter.



Fig-5: Receiver unite for speed breaker

3. WORKING

When the vehicle is in the normal area its speed does not decrease and it goes normally no action is performed. When the vehicle enters into the restricted areas (such as school/college, hospital, hill station etc) that means it enters into the speed limiting area. Whenever it enters the restricted areas RF transmitter sends RF signal that contains the information that in how much speed a vehicle can go. Then that information is received by the RF receiver and the signal acquired from the speed meter both are given to the arduino controller. Pin number 6 of arduino board which gives PWM output, it is used to control the speed of motors. Basically signals are analog in nature that will be converted into digital so only the micro controller able to process the signal. The signal from the transmitter and the speed meter is compared by the arduino controller.

In this there are two case: first, the current speed of the vehicle is less than the transmitted speed, the vehicle goes normally no action is required. Second, the current speed is greater than the transmitted speed by the transmitter

module the controller sends signal to LCD display it shows the information about limited speed in that zone to the driver who drives the vehicle and controller waits for few seconds, whether the driver reduce the speed to the below value if the driver does not reduce the speed, it automatically takes the control and reduce the speed according to it. After that at the end of the restricted area it stop. The control released by the controller to driver.

Consider RFID Tags which acts as an transmitter, it contain information of restricted area speed. RFID reader is connected to the arduino microcontroller which acts as an receiver. Once the information is received from the transmitter, it compares the vehicle speed with information obtained for the transmitter. If vehicle speed is below the restricted area speed, the controller will not sends any signal to the servo motor, hump is flat. so that vehicle moves smoothly without any kind of disturbance. If vehicle speed is more then the restricted area speed, then the controller will sends signal to the LCD display and servo motor. So that it display the message on lcd and hump is raised on the road.

4. APPLICATIONS

- It can be implemented in school/college, hospital, hill station, railroad crossing etc zones
- Fuel consumption is reduced due to limited speed

5. ADVANTAGES

- Speed of the vehicle is controlled and accident is prevented.
- No man power required.
- Low cost
- Easily adapted in accident zones

6. RESULT

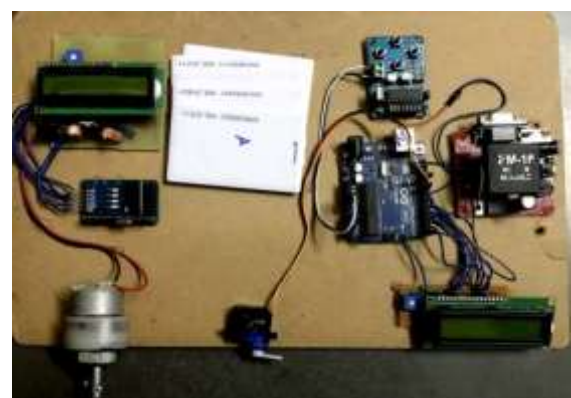


Fig-6 : Overall Circuit Diagram for Automatic Vehicle Speed Control System For Accident Prevention

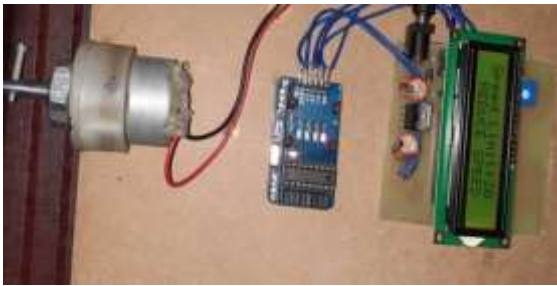


Fig-7: Vehicle speed reduced to 20rpm

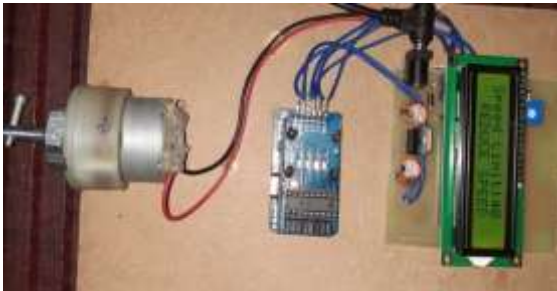


Fig-8: vehicle speed reduced to 40rpm



Fig-9 :Flat hump due to limited speed



Fig-10:Due to high speed hump generated

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7. CONCLUSION

The proposed system can control the speed of the automobile has been demonstrated. The proposed system is very simple which is durable and is of low cost. This project consumes less power. This system is easy to implement on present system which ensures maximum safety for drivers, passengers, peoples. The vehicle reduced according to the restricted area speed and Raising and falling of Hump based on the speed of the vehicle are implemented. This has been developed to avoid road accidents due to over speeding of the vehicles. This kind of system may reduce fuel consumption of vehicles which are traveling within the speed limit.