



Design of Zonewise Vehicle Parameter Control System

Imran Ahmed Khan, Pragma Jaitly, Ram Krishna Gupta, Sakshi Kishor
Department of ICE, GCET, Greater Noida,
India

Abstract—As accidents are very prone nowadays so there is an increased need to prevent them. The paper presented here is an approach towards vehicle navigation & safety implementation. In this smart zone sensing system, with the help of RF module and sensors the parameters of the vehicle are controlled by sending and receiving the signals accordingly. This system can also be used for ‘time keeping’ purpose in public transportation, such as departure & arrival timings, number of rotations each vehicle turned and by Cargo Companies to intimate their on-road vehicles about the next delivery spot or assignment.

Keywords—smart zone sensing system, RF module, sensors, vehicle navigation, safety implementation

I. INTRODUCTION

Nowadays accidents are very prone as everyone ignores the sign boards and do not consider the speed limits. As an example, near school zone, the sign board displays “School Zone Ahead, Drive Slowly”, or near a hospital, “Hospital Area-Do not Blow Horn”, but in reality rarely this is practiced. Drivers go at very high speed as usual near school zone, or operate the harsh horns loudly causing inconvenience to the patients in the hospital. Even though these are meant for the safety of the vehicles traveling and also for the general public, it is hardly practiced by the vehicle drivers. As a result, it makes the whole concept of displaying warning sign and messages on the roadside boards meaningless.

So, to prevent accidents and make the driver follow rules automatically as well as add to the driver's convenience we can vary some parameters of the vehicle. The parameters to be varied are as follows –

- Speed- when a vehicle enters a zone in which there is a need to exercise speed limit, it will automatically reduce its speed to that particular limit.
- Horn- in areas where there is a restriction to blow horn, the vehicle's horn will be automatically disabled.
- Wipers- During rains, the wipers of the vehicle will be turned on automatically.
- Window Panes- During rains the window panes will be closed automatically.

Therefore, an automated vehicle which changes the parameters- speed and horn, according to the region has been designed. For example in the school zone its speed is limited and in hospital region it disables its horn automatically. The advantages of this system are: (i) this concept can be used in any type of vehicle, (ii) it is easy to install and easy to operate, (iii) manpower can be saved by implementing auto detecting circuits, (iv) it is more reliable than manual operation.

Specifically, this system has the following applications: (a) it may be used to secure and avoid the road accidents, (b) it can be used as part for automation of Public Transportation, (c) this system is used to trace the culprit vehicles by the police, (d) it can also be used by Cargo Companies to intimate their on-road vehicles about the next delivery spot or assignment, (e) this system can be used for ‘time keeping’ purpose in public transportation, such as departure & arrival timings, number of rotations each vehicle turned etc.

This ‘Smart Zone Sensing System with Automatic Control’ system has two monitoring zones, each fitted with RF Transmitter units with unique Identity Code. The vehicle is fitted with RF Receiver and respective circuitry on the vehicle's number plate. Display is fitted on the dash board for visual representation of the alert messages sent by respective zone transmitters [1]. These results in a very effective and fail proof system to provide traffic regulation, safety and convenience to the people.

II. EXISTING WORK

Earlier some implementation has been done on this technology. The previous work included the variation of the speed of the vehicle in zones like school, hospital, U-turn and highway for accident prevention [2]. It included a smart zone based vehicle speed control using RF and obstacle detection and accident prevention system.

Whenever the vehicle is within the zone, the vehicle's speed has been controlled by receiving the signal and reducing it to some cutoff value and kept constant until the vehicle moves out of the zone, and then the vehicle gets accelerated by itself. It detects obstacles by using IR sensors and prevents accidents by stopping the vehicle.

The modules used in the system were RF transmitter and receiver modules for establishing wireless communication, DC motors for the movement controller, IR sensor for obstacle detection.

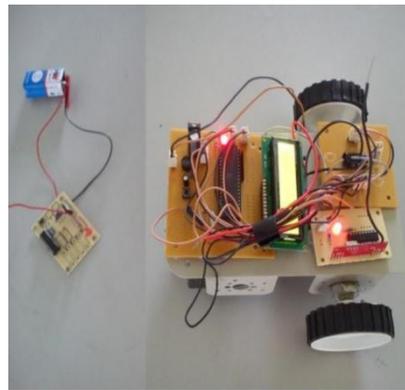


Fig 1. Existing work

III. PROPOSED WORK

The proposed work in zone wise vehicle parameter control includes the reduction of speed of the vehicle in school zone and hospital zone for accident prevention and the disabling of horn in hospital zone for the convenience of the patients. In this, the Transmitter is fitted on each zone and the receiver is fitted on the vehicle. Now, when the vehicle enters the school zone, the LCD display change to “SCHOOL ZONE ENTER” and as the vehicle leaves the zone it changes to “SCHOOL ZONE EXIT”. As soon as the vehicle enters the school zone, its speed has been reduced according to the speed limit.

When the vehicle enters the hospital zone, the LCD display change to “HOSPITAL ZONE ENTER” and as the vehicle leaves the zone it displays “HOSPITAL ZONE EXIT”. As the vehicles enters the hospital zone, the horn of the vehicle has been disabled and as the vehicle leaves the zone it has been enabled.

In the Transmitter circuit, an encoder and the transmitter of the RF Module is used along with a voltage regulator. In the Receiver circuit, a decoder, Receiver of the RF module, a voltage regulator and microcontroller are used. When the car enters the School zone then the transmitter sends a signal to the receiver which is fitted on the vehicle [3]. The encoder encodes the 12 bit parallel data into serial for transmission through an RF transmitter [4]. That data is received by the Receiver of the RF module. Then the serial data is send to the decoder. It decodes the serial addresses and data received by RF receiver and convert it into parallel data [5]. It then sends them to output data pins and then to the microcontroller.

Microcontroller is programmed to decrease the speed of the vehicle when it enters school zone, which is done by using a resistance connected to the DC motor of the vehicle, and disable horn when it enters the hospital zone [6]. Also with the help of microcontroller we are able to display the different messages on the LCD at the entry and exit of each zone.

In the circuit of the receiver, a crystal oscillator is used for the clock. The relay is used because we need to control a large amount of current and/or voltage with a small electrical signal. The Darlington Transistor is used to drive the relay. Transistors are used as switches. The LCD display is used along with a contrast switch for the display of messages. The 10u capacitor and 10K resistor are connected to the RST pin of microcontroller for resetting it.

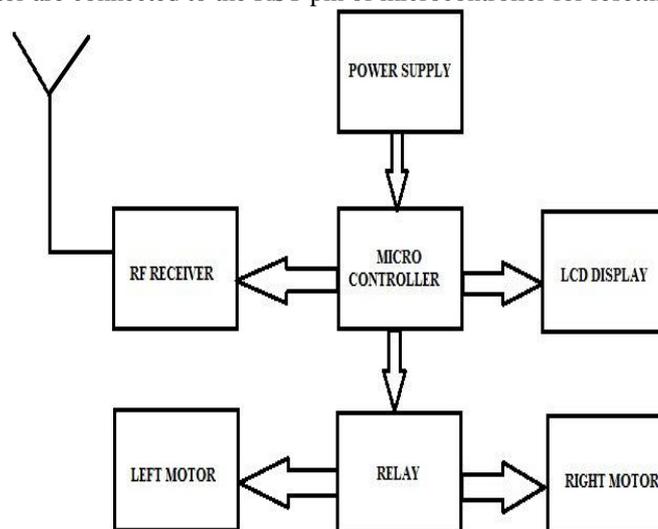


Fig 2. Block Diagram

A. Components

- Microcontroller
- Voltage regulators
- Encoders
- Decoder

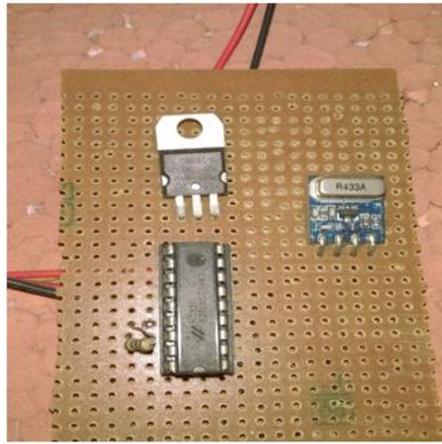


Fig 5. Transmitter circuit of the proposed work



Fig 6. Vehicle entering school zone

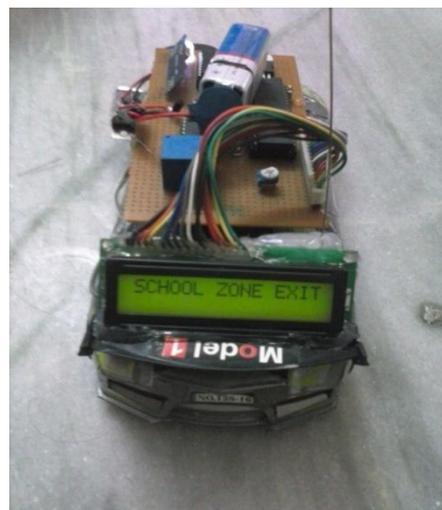


Fig 7. Vehicle exiting school zone

V. CONCLUSION AND FUTURE SCOPE

This device (integrated with modern technology) has been initiated to prevent accidents; safety and convenience to the people by making them follow traffic rules automatically. This system is also cheap and easy to install as compared to GPS system. It can be used in any type of vehicle.

In the future we intend to add RFID Tags to our vehicle for its tracking. We can also use GPS instead of RF Module in our vehicle. If this system is installed in all the vehicles it can be used for traffic regulation. In case of traffic jams it can even be helpful as we are able to monitor number of vehicles in a particular zone and can deliver information regarding heavy traffic in a particular area.

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