

Automatic Speed Control of Vehicle by using RFID Technology

Dakshata Ramesh Dhote^{1*}, Pragati Ramesh Lakde², Anjali Sudhakar Pachare³,
Mukesh Ankush Meharkure⁴, Mahendra Dongare⁵

^{1,2,3,4}Student, Department of Electronics and Telecommunication Engineering, Government College of Engineering, Chandrapur, India

⁵Professor, Department of Electronics and Telecommunication Engineering, Government College of Engineering, Chandrapur, India

Abstract: This undertaking focuses on naturally controlling vehicles at speed limited regions like schools, hospital zones and etc. These days the drivers drive vehicles at fast even in speed restricted regions without considering the security of people in general, the traffic police can't handle them with full impact. Likewise, it's anything but reasonable to screen these regions all through. This paper clears way for controlling the speed of the vehicles inside certain cutoff in limited zones without interference of the drivers. A RFID is utilized for this reason. The RFID reader is attached along with the vehicle and the RFID tag with these zones. These tags are programmed to convey a coded message when the reader comes in range. At whatever point the vehicles go into these zones their recipients will get this code and the speed of the vehicles is controlled consequently with the assistance of the microcontroller unit present inside the vehicle. The tags are put toward the start and the finish of the areas for which the speed should be reduced.

Keywords: RFID (Radio Frequency Identification), Over speeding, Speed control, RF (Radio Frequency), ATMEGA328.

1. Introduction

A large amount of the street accidents in India happen due to over speed and rash driving of vehicles on streets. The rate of accidents has expanded as more vehicles come on to ground. To control and screen the speed of vehicle on streets the particular departments of government has made vital step. But it is not doing enough. As of now the motor vehicle departments have been provided with laser speed indicators. In any case, a man must be there on street, which is definitely not an optimal way for checking. Also the laser tracker is expensive.

The purpose for this paper was gotten from the previously mentioned points. Here in this paper, we attempted to develop a framework to follow the speed of the vehicle in a lot more easier, efficient way [1]. This framework needs to work 24x7 automatically. The principal thought was to utilize laser module, however thinking that its expensive it was dropped. Later we discovered that IR transceivers will help in accomplishing the objective, which is exceptionally easy to develop and extremely modest, however it works just if the line

of sight is kept up which was the main reason it was dropped. At last we found that RFID module can satisfy our prerequisites with its features as more financial, high reliability etc. [5].

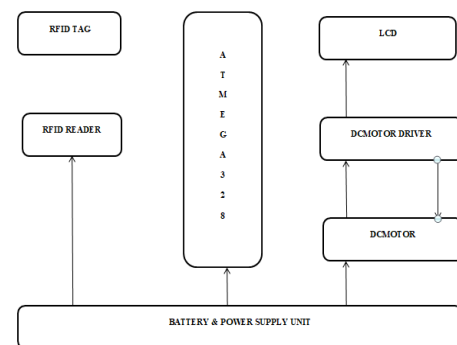


Fig. 1. Block diagram of system

In this paper, by utilizing RFID module as its principle part, automatic speed control of our vehicle can be accomplished.

RFID tag is fixed on the diverse sign boards and RFID reader on the vehicle. At the point when the reader comes in the speed limit area, speed is controlled automatically.

2. Literature Review

Amulya A M, et.al., Intelligent vehicle speed controller:

Amulya A M, discussed about Intelligent vehicle speed controller, they concentrated to avoid the collision of the vehicle due to its over speed in the speed restricted zones by automatically. This can be done through the embedded systems and the RF transmitter and receiver modules. When the vehicle enters the speed, the restricted area driver has to reduce the speed of the vehicle manually. If the driver did not slow down the vehicle, the electronic controller would take the lead to control and reduce the speed of the vehicle by receiving the signal from the transmitter in that zone. By that received signal, the Arduino microcontroller would process to give a signal to the motor to control the speed. Here mainly they use the RF transmitter and receiver to identify the restricted zone [1].

*Corresponding author: dakshatadhote903@gmail.com

Vaishal B. Niranjane, et. al., Automatic vehicle speed control system:

Vaishal B. Niranjane, discussed about Automatic vehicle speed control system in this paper. They explained the working of their system in three different zones where the speed wants to reduce automatically by using Zigbee technology. They are Normal zone, silence zone, speed limit zone. The speed is reduced by reversing the motor rotating direction through the microcontroller 8051. The Zigbee transmitter is placed at that zone for example hospital while the vehicle reached that area the signal is received by the Zigbee receiver in the vehicle. The speed of the vehicle is compared with the determined speed in that area. If speed is higher for that zone the microcontroller takes in action to reduce the speed of the vehicle and if it is silence zone it disables to make a horn [2].

Amarnarayan, et. al., Automatic over speed controlling of vehicle:

Amarnarayan, done research on Automatic over speed controlling of vehicle. The main aim of the authors to control the speed of the vehicle to avoid the accidents in the hospital zone, curve roads and deep cuts due to over speed. This can be done with the ZigBee technology with the arm-7 microcontroller. The prescribed speeds at that zone are incorporated in the transmitter module and when the receiver in the vehicle senses the signal that arm-7 microcontroller would check whether the driver reducing the speed for a limited time. After the timer passes the limited time, the microcontroller makes the signal to reduce the speed of the motor, which makes the vehicle decelerate without the action of the driver [3].

Gummarekula sattibabu, et. al., Automatic vehicle speed control with wireless in-vehicle road sign delivery system using arm 7:

Gummarekula Sattibabu, discussed about Automatic vehicle speed control with wireless in-vehicle road sign delivery system using arm 7. The objective is to design the electronic display controller for Vehicle Speed control and monitor the zones with the help of the embedded systems and they designed to display the information on the dashboard about the zone. To achieve this they use two units, which are zone status transmitter unit and electronic display and control unit (Arm-7). Here if the sensible zone is detected by the receiver in a vehicle the signal processes in the controller and warns the driver by displaying it and gives a buzzer sound. There is a timer for driver action to decrease speed if the time passes then the vehicle automatically sets to desired predefined speed [4].

3. System Implementation

A. EM-18 RFID Reader



Fig. 2. EM-18 RFID reader

The EM-18 RFID Reader module operating at 125kHz is an

inexpensive solution for your RFID based application. The Reader module comes with an on-chip antenna and can be powered up with a 5V power supply. Power-up the module and connect the transmit pin of the module to receive pin of your microcontroller. Show your card within the reading distance and the card number is thrown at the output. Optionally the module can be configured for also a wiegand output.

B. Microcontroller ATMEGA 328

The high-performance Microchip 8-bit AVR® RISC-based microcontroller combines 32 KB ISP Flash memory with read-while-write capabilities, 1 KB EEPROM, 2 KB SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented Two-Wire serial interface, SPI serial port, 6-channel 10-bit A/D converter (8-channels in TQFP and QFN/MLF packages), programmable watchdog timer with internal oscillator, and five software selectable power saving modes. The device operates between 1.8-5.5 volts.

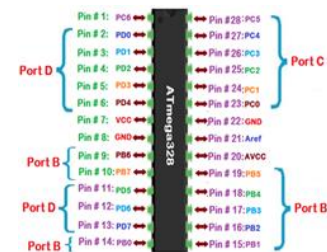


Fig. 3. Microcontroller ATMEGA 328

C. RFID Tagging

RFID tagging is an ID system for identification and tracking purposes that uses radio frequency identification devices. An RFID tagging system consists of the tag, a read/write or only read device, and a system application for data collection, processing, and transmission. RFID tags consist of minimum two parts: an integrated circuit and an antenna for receiving and transmitting the signal. The tag information is stored in a non-volatile memory.



Fig. 4. RFID tag

4. Working of Proposed System

The fundamental target of this system is to diminish the accident rates in the speed restricted zones like school zone, medical clinic zone and sharp u- turns because of the carelessness of the driver to decrease the vehicle speed to restricted speed as referenced in the signboard in that zone. In this automatic vehicle speed control framework, When the vehicle enters the speed restricting zone the transmitter block begins to work and send the sign to the vehicle recipient which is set in the vehicle, the RFID receiver which is associated with microcontroller read the signs and compares the speed of

vehicle and the predefined speed of that specific zone [7], [8]. The two microcontroller was used here one for transmitter control and other for the receiver and different moves to make place dependent on the code arrangement in the controller&. The transmitter circuit is powered by dc battery is sufficient for the working of RFID tags which is put close to the limited zones. The driver of the vehicle will be cautioned to reduce the speed of the vehicle. On the other hand, if the speed of the vehicle is not exactly the predefined speed programmed in the microcontroller no activity happens. Assuming the speed of the vehicle is more than the predefined speed, the microcontroller controls the speed of the vehicle motor by conveying a message to the motor driver in it and the engine driver utilized reduces the speed of the motor, if rpm of motor reduces which naturally reduces the speed of the vehicle in that specific zone.

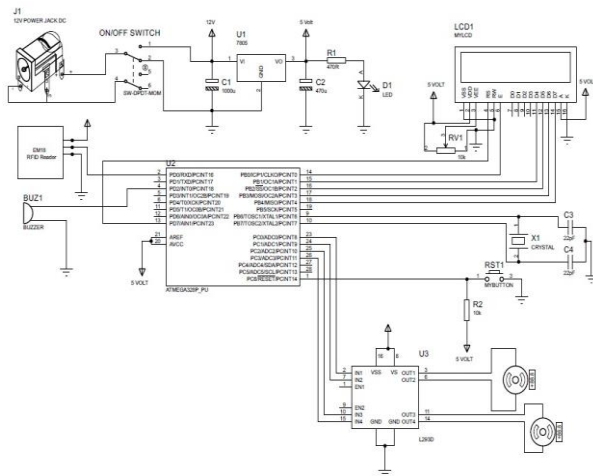


Fig. 5. Circuit diagram of system

The execution of 'Automatic Speed Control of Vehicle by Using RFID Technology' using microcontroller, DC motor, RFID module and Tags, where the speed of the vehicle is reduced automatically. This speed control framework guarantees that the number of accidents near to the school and another particular zone to reach at its minimum speed. This framework requires exceptionally minimal expense, durable, low power, and gives greatest safety to general society and simple plan to execute in the particular regions [9]. This framework also deals with bad climate days. This system will protect the people from the rash drivers, heavy drinkers, and the drivers who lost their minds while driving. By executing this system, we can give a protected and peaceful environment to general society.

5. Result

Our project is divided into three parts:

1. RFID tag (speed limit) detection
2. Car instantaneous speed detection
3. Comparison and speed reduction

Since the vehicle entered the critical zone RFID reader read the controlling tag, the microcontroller read the speed of vehicle from potentiometer (speedometer sensor) and compares it to reference speed in the microcontroller code (30 km/h).

If the speed is over the limited speed, automatically the motor closed the throttle, thus the vehicle started Deceleration and speed was decreasing to specific speed within critical zone.

If the speed is equal or less than the limited speed, Here the driver will be able to control the speed if they do not exceed (30 km/h), and if the driver exceed (30 km/h) Automatically the motor closed the throttle, thus the vehicle started Deceleration and speed was decreasing to specific speed within critical zone, and that will repeated continually until the vehicle exit from the critical zone.

6. Future Work

This system proves to be highly effective in minimizing the over speeding and unwanted accidents in restricted zones. In current systems, there is no autonomous speed restriction in the vehicle to avoid accidents. Hence further research and optimizations of the automatic vehicle speed control system will allow us to implement in vehicles for improved safety for roadside pedestrians, passengers, and other road users.

7. Conclusion

This investigation shows the job of reducing vehicle speed automatically and its contributions to the security public on road. It is tracked down that the utilization of the vehicle speed control framework contributes a great deal in limiting the accident rate that happens because of the carelessness of the driver ignoring the road signboards in specific zones. However, the VSC framework in a vehicle is effective, they help much as far as further developing security, keeping both the traveler safety and the pedestrians on the streets. Considering the automatic VSC system is incorporate in school zones or medical clinic zones which permits the vehicle to act autonomously to slowdown the vehicle when the vehicle comes at a higher speed which limits the accidents because of carelessness of the driver effectively and in a manner all the more successfully. Hence it is concluded from the above examination that the uses of Automatic vehicle speed control system in restricted zones limit unwanted accidents to a great extent compared to normal behavior.

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