



e-ISSN: 2278-8875
p-ISSN: 2320-3765



International Journal of Advanced Research

in Electrical, Electronics and Instrumentation Engineering

Volume 10, Issue 6, June 2021



ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 7.282



9940 572 462



6381 907 438



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Speed Control Using RFID and Ultrasonic Sensor

¹G. Narasimhulu, ^{2*}Karengula Shiva, ³Sanju Kumari, ⁴Thalla Srinath Goud, ⁵Myneni Alekya

¹Assistant Professor, Department of Electronics and Communication Engineering , St. Peter's Engineering College, Hyderabad, Telangana, India

^{2,3,4,5}UG Student, Department of Electronics and Communication Engineering, St. Peter's Engineering College, Hyderabad, Telangana, India

ABSTRACT: As you see these days drivers ride their vehicles at high speed even in a speed-limited zone and this kind of rash driving results in accidents. To avoid these problems we are using RFID, which reduces the speed of the vehicle in restricted areas and an ultrasonic sensor to prevent accidents.

KEYWORDS: Arduino, RFID, Ultra Sonic sensor, L293D IC.

I.INTRODUCTION

Over the last few years, the accident rate is gradually increasing due to rash driving and over speeding in speed-limited zones such as schools, Hospital zones, etc[1]. To overcome the situations a system needs to be invented which controls the speed of the vehicle from a particular distance and applicable as per the road conditions. The Radio Frequency Identification consists of an RFID tag, RFID reader, the reader is attached to the car, and the tag is placed on the roads or on the caution boards. When a vehicle enters into speed-limited zones like a pedestrian crossing, hilly areas, etc. the tag placed in that area is activated, and the information in the tag is read by the reader, which results in a decrease in the speed of the vehicle to a certain constant value. The ultrasonic sensor can detect any obstacle in front of the car, it continuously monitors and sends the signal to the Arduino, after receiving the signal it sends a signal to the motor driver to stop the car immediately. Based on this technology, we can reduce accidents in many areas where high-speed driving is not required.

II.LITERATURE SURVEY

Bindhu V. proposed a system i.e., the ARM is additionally interfaced with four motors and utilizes a battery to supply a 12V power supply. On accepting the call, the ARM processor runs the car by sending PWM signals to the motors. On the off chance, the turning directions are detected and the car runs with synchronized speed. In this vehicle, they are presenting a splendid element is "Battery Saving Mode" which controls the speed, if the battery is sensed low. If any mischances happen through GSM, the client can send the area message to the regarded individual. In addition to these features, the car can be unlocked through a mobile phone, and the user can be notified for charging the car through coding[2].

A.Vengadesh, K.Sekar said, RF is used to indicate the speed limit areas and it is placed in front and back of the restricted zones. RF receiver is placed inside the vehicle. Speed is acquired with the help of a speedometer in the vehicle. The controller compares the speed. If it passes the limited speed the controller alerts the driver and automatic controls are taken. If they do not respond to that message by the use of GSM, a piece of information is transmitted to the nearest police station along with the vehicle number, and the penalty amount is collected in the nearest tollgate[3].

According to **D. Yoshida**, the system describes a vehicle speed control system for performing vehicle speed control by controlling the displacement of at least one of a hydraulic pump and a hydraulic motor of a hydraulic transmission through an electric servo device[4].

M. Saritha Reddy, K.Swetha, A.Yamini, K.RaviTeja, submitted a paper titled "ZigBee Based Speed-Sensing System and Providing Alarm of over Speed" that contains a combination of solar energy, ZigBee, and Arduino to sense the Over speed of a motor. Hall sensor is placed near the ZigBee transmitter by which the ZigBee transmitter senses the



speed. The ZigBee transmitter unit sends the speed limit to the transmitter Arduino and then to the ZigBee receiver of the particular speed of the motor and the receiver unit placed near the motor receives the messages, and sends them to the receiver Arduino. When the speed of the motor exceeds the limit, the microcontroller records the violated speed and the alarm buzzes the sound as a warning of over speed[5].

“Obstacle Avoidance Robotic Vehicle Using Ultrasonic Sensor, Android and Bluetooth for Obstacle Detection” has been designed by **Vaghela et.al**. He mentioned that an enormous amount of work has been done on wireless gesture controlling of robots. Numerous methodologies have been explained and reviewed with their advantages and faults under various operational and practical approaches. Thus, it can be concluded that features like user-friendly interface, lightweight, and portability of android OS based smartphone has overtaken the sophistication of technologies like a programmable glove, static cameras, etc., making them obsolete[6].

III.PROPOSED SYSTEM

RFID SPEED REDUCTION TECHNIQUE

At the beginning and end of the speed limit zones, RFID tags are placed and an RFID reader is installed in the vehicle. When a vehicle enters the speed limit zone, the reader recognizes the tag which is placed at the beginning of the speed limit zone. The reader has the 12-digit code, which is assigned by the tag. This 12-digit code has the information of the speed limit that is to be maintained in that area. Once the reader sees the code, it is transferred to the control unit, the ATmega328P Arduino. When the control unit gets this code, it compares it with the codes that are already saved in the database of the Arduino. If the code matches any of the codes in the database, then Arduino knows that it is a valid code. Also, the speed of the vehicle is varied respectively to the speed limit which is indicated by the tag. The Pulse Width Modulation (PWM) technique is used to control the speed of the motor, the pulse generated by the PWM is given to the motor driver unit, which controls the speed of the motor. The speed of the motor increases when the pulse width is large and it decreases when the pulse width is small. Normally the speed prediction unit controls the speed of the motor but when a tag is detected and identified, the Arduino has to control the speed of the vehicle indicated by the RFID tag.

An RFID system has three parts

- Scanning antenna
- Transceiver
- Transponder i.e. the RFID tag

Further, it can also developed by placing LED system using RFID. Using RFID traffic signals are operated so that there is no need of traffic police in some areas. Whenever the signal goes red, the reader in the car detects the tag connected to red light and car stops in the same way yellow and green. We can also insert a camera if a vehicle didn't reduced its speed in areas where tag are placed it captures the car details and sends it to nearby police station.

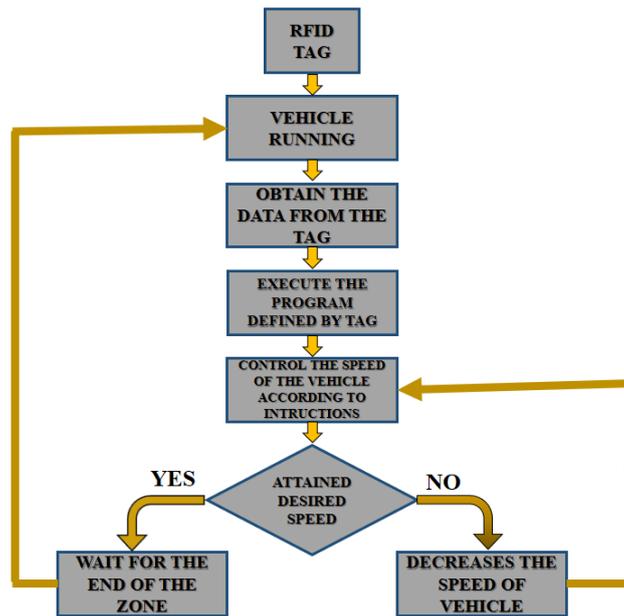


Figure 1: Flow chart of RFID speed reduction technique.

ACCIDENTS PREVENTION AND OBSTACLE DETECTION

The ultrasonic sensor continuously sends a signal to the motor driver whether there is any obstacle or not in the way. Ultrasonic sensors have two components i.e., the transmitter and the receiver. The transmitter emits the sound using piezoelectric crystals if the sound waves strike the object a reflection signal is produced and the receiver encounters the sound after it has traveled to and from the target. Ultrasonic sensors are also used as proximity sensors, like anti-collision safety systems and parking technology. The range of ultrasonic sensor might be more but in our case, in 30cm if any obstacle is detected in the range given it sends a signal to Arduino, as per the code given it generates a signal to the motor driver to reduce vehicle speed. It can also be improvised by connected LCD and modifications in the code like right, left, forward and backward.

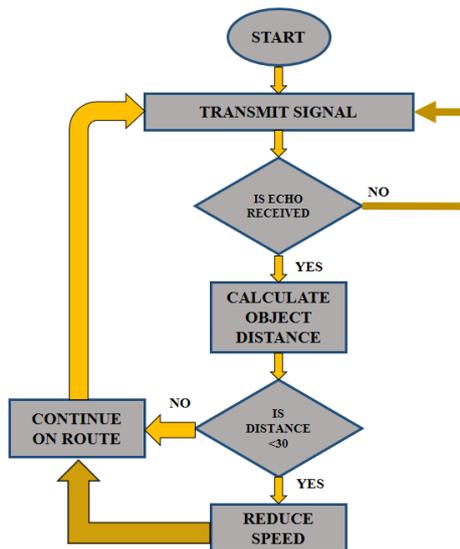


Figure 2: Flow Chart of Ultrasonic sensor working.

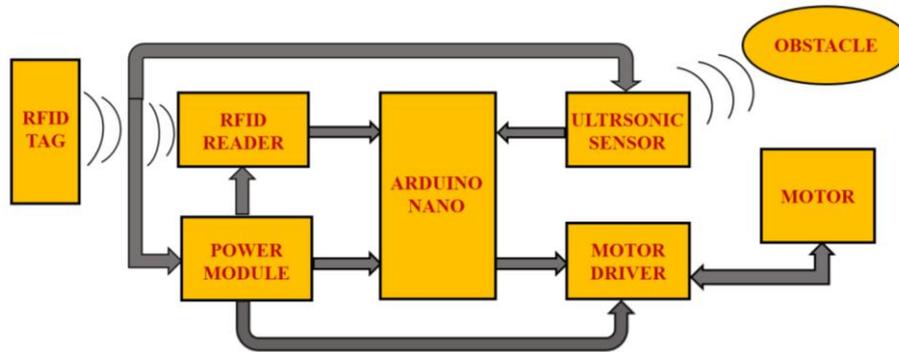


Figure 3: Block Diagram of Proposed System.

IV.EXPERIMENT AND RESULTS

The result of proposed system is when RFID tag 1 is place near RFID reader the speed of the car reduces to particular speed, which is dumped inside the Arduino, and similarly when tag 2 is placed near reader the speed of the motor reduces to certain value that is already given in it.

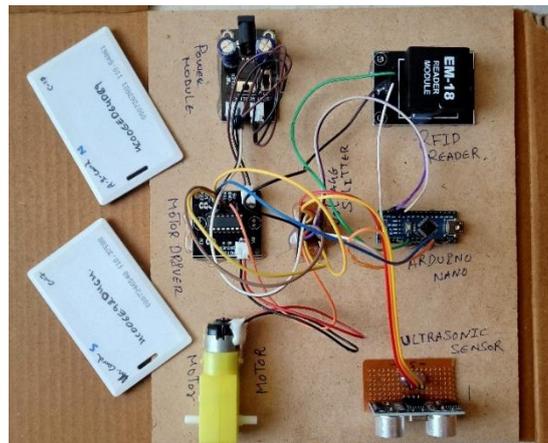


Figure 4: Expected output of proposed system.

When any obstacle is placed in front of ultrasonic sensor it senses the object and sends the signal to Arduino, which initially generates a response to slow the motor, the command is forwarded from Arduino to motor driver. So motor driver gradually decreases the motor speed that prevents collision with the obstacle.

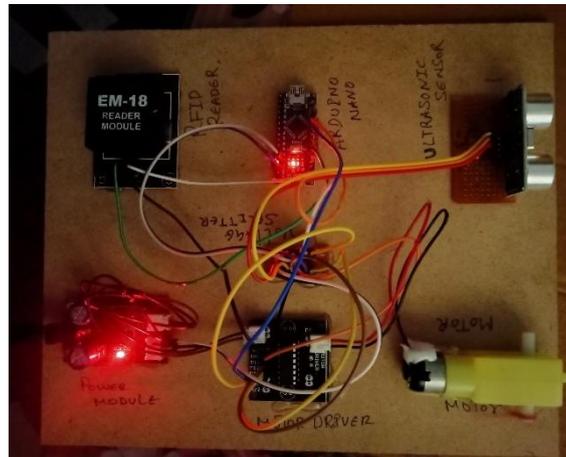


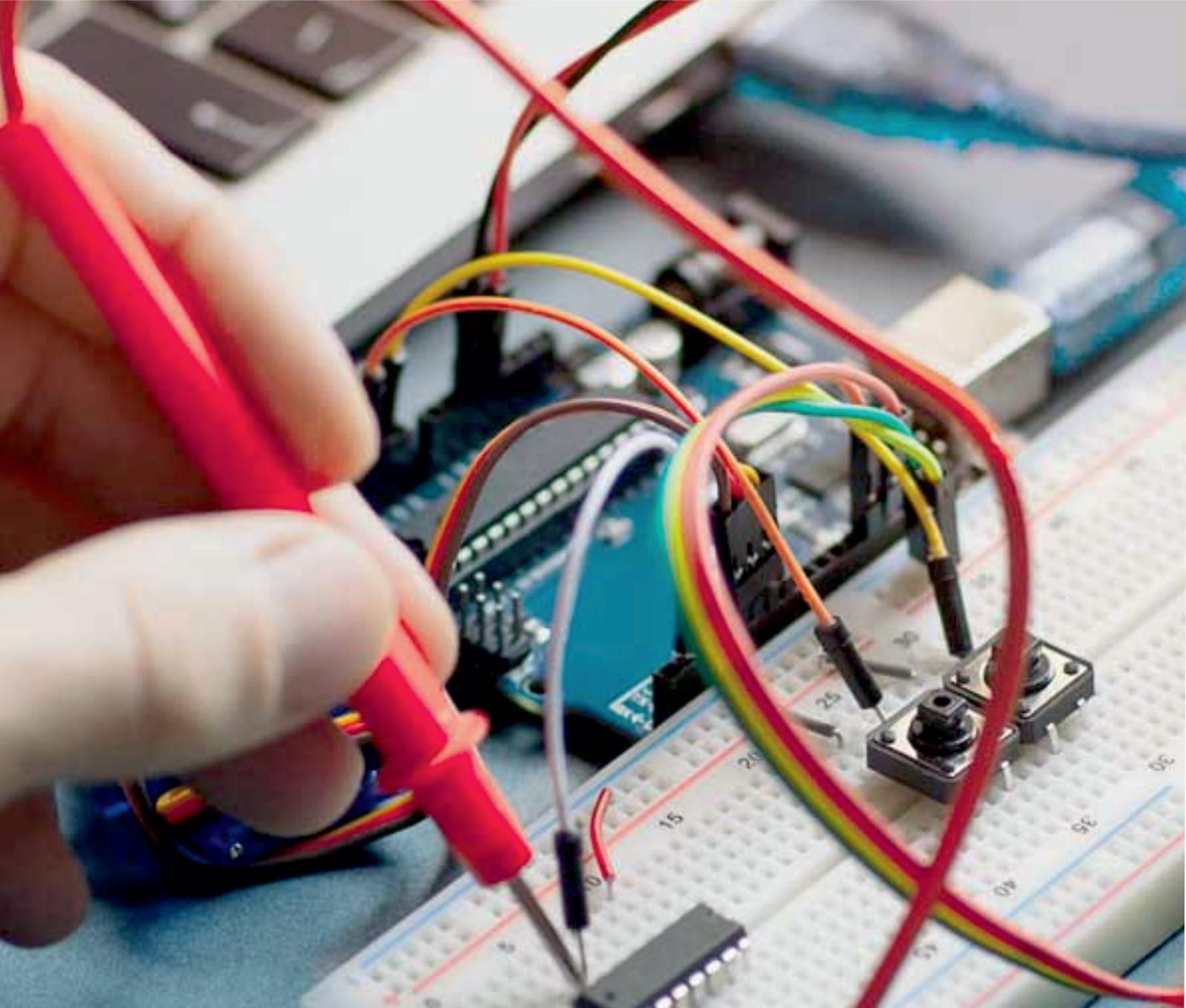
Figure 5: Working of the project.

V.CONCLUSION

This project the role of reducing vehicle speed automatically and its contributions to the safety of pedestrians and road users. It is found that the use of the vehicle speed control system contributes a lot in minimizing the accident rate that occurs due to the negligence of the driver to disobeying roadside signboards in special zones. Though the VSC system in a vehicle is effective, they help much in terms of improving safety, keeping both the passenger safety and the pedestrians on the roads. Considering the automatic VSC system is incorporate in school zones or hospital zones which allows the vehicle to act independently to slow down the vehicle when the vehicle comes at a higher speed which minimizes the accidents due to negligence of the driver actively and in a way more effectively. Hence, it is concluded from the above study that the uses of Automatic vehicle speed control systems in restricted zones minimize unwanted accidents to a great extent compared to normal behavior.

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Impact Factor: 7.282



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