WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Vehicle Speed Management System

Mr.S.R.Naresh [1], Mr.R.Mugeshwaran [2], Mr.K.R.Premkumar [3]

[1] Associate Professor, Electronics & Communication Engineering, K.L.N College of Engineering, India
[2] UG Scholar, Electronics & Communication Engineering, K.L.N College of Engineering, India
[3] UG Scholar, Electronics & Communication Engineering, K.L.N College of Engineering, India

ABSTRACT:

In Today's development on Automobiles many highspeed vehicles are introduced and they are very convenient for us to go to places we have travel at a very little time. And it was mainly because of its high speed. But it also has its advantage at the same time it is also the cause of life-threatening misfortunes which are accidents. People are driving very fast and Accidents are occurring frequently, valuable life are lost due to ignorance and small mistake while driving (school zone, hills area, and highways). This project introduces a Vehicle Speed Limiter system designed to enhance road safety. The hardware components include an ATMEGA328P Microcontroller, RF module, L293D motor driver, DC motor. The software involves embedded C programming with the Arduino compiler, and simulation is carried out using Proteus designing software. The system's goal is to mitigate accidents caused by over speeding by limiting vehicle speed. The ATMEGA328P processes speed data received wirelessly via the RF module. The L293D motor driver and DC motor physically restrict the vehicle's speed based on the software tools, contributing to the overall improvement of road by combining hardware components and safety. processed data. Utilizing the Arduino compiler and Proteus software ensures efficient programming, simulation, and validation of the system before physical implementation. The proposed system provides a reliable solution to address road safety concerns software tools, contributing to the overall improvement of road by combining hardware components and safety.

Keywords: Road safety, Embedded systems, Vehicle automation, Automobile development

Introduction:

In India, the alarming statistics reveal that approximately 450,000 accidents occur annually, resulting in a staggering loss of 150,000 lives. Shockingly, recent data indicates a concerning 10% surge in fatal road accidents compared to previous years, with a significant proportion attributed to over-speeding. Over-speeding has emerged as a leading cause of accidents, emphasizing the urgent need for effective interventions to curb this dangerous behavior. Moreover, specific locations such as school zones, hospital areas, and hilly terrains experience a disproportionately high number of accidents. These areas demand targeted solutions to address the unique challenges they present. To combat this pressing issue, a comprehensive system is proposed to automatically regulate vehicle speed, combining both hardware and software components. By implementing cost-effective speed-limiting mechanisms, this system aims to enhance road safety and mitigate the prevalence of over-speeding-related accidents. The integration of modern technology into this solution underscores a proactive approach towards ensuring safer driving conditions. Emphasizing the importance of innovative solutions, this system represents a pivotal step towards fostering a transportation environment characterized by enhanced safety and efficiency.

Methodology:

In this following section the components used and the method of speed reduction are highlighted, also the functional flow diagram of the proposed system is provided.

Components Used:

Hardware components:

- ATMEGA328P Microcontroller: A popular choice for embedded systems, known for its low power consumption and versatile functionality, supporting a wide range of applications from simple projects to complex ones.

- RF Module: Enables wireless communication between devices, commonly used for remote control, telemetry, and data transmission in various projects such as remote-controlled cars, weather stations, and home automation systems.

- L293D: A versatile motor driver IC capable of driving DC motors bidirectionally, commonly used in robotics and automation projects due to its ability to control motor speed and direction with ease.

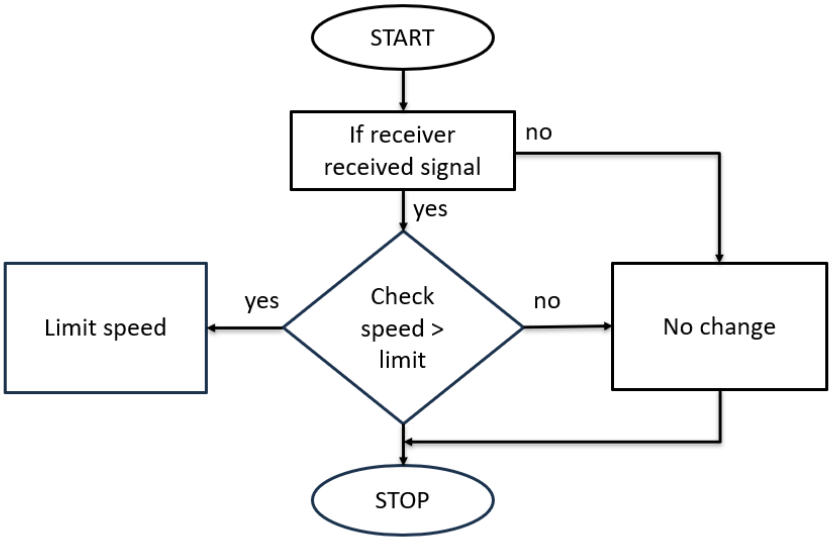
- DC Motor: A fundamental component in robotics and automation, converting electrical energy into mechanical motion, widely used in various applications such as automotive mechanisms.

- IR Sensor: An IR (infrared) sensor is a device that detects infrared radiation emitted or reflected by objects, converting it into electrical signals to provide information about the presence or proximity of objects within its detection range.

Software components:

- Arduino IDE: The software toolchain used to write, compile, and upload code to Arduino microcontrollers, providing an easy-to-use interface for programming embedded systems, suitable for beginners and experienced developers alike.

Flow diagram:

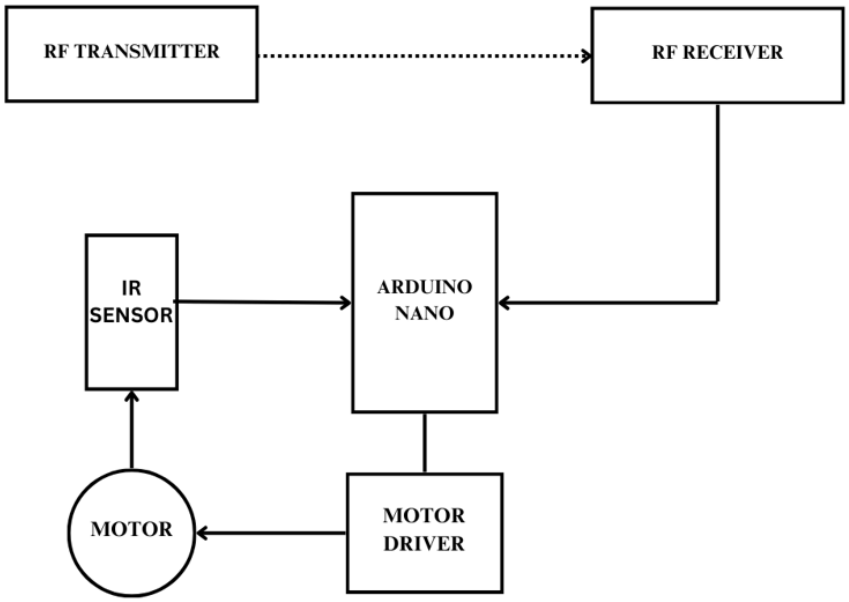


In this project, we have a clever system set up to help control vehicle speeds. It all starts with a transmitter, which sends out signals. These signals are like messages that have been coded in a special way. When a car or any other vehicle gets into the range of this transmitter, a receiver inside the vehicle picks up these signals. Now, this receiver is connected to something called a controller unit. Think of the controller unit as the brain of our system. It takes the signals from the receiver and processes them. One of the important things it does is figure out how fast the vehicle is going. To do this, the controller unit has a way to set a maximum speed, kind of like a speed limit. If the vehicle is going faster than this limit, the controller unit steps in. It tells another part of the system, the motor driver, to slow the vehicle down. The motor driver is like the muscles of our system. It's responsible for controlling the speed of the vehicle. So, when the controller unit tells it to slow down, the motor driver makes it happen. But how does the controller unit know how fast the vehicle is going in the first place? Well, that's where the IR sensor comes in. This sensor is like the eyes of our system. It can "see" how fast the vehicle is moving and sends this information back to the controller unit. So, to sum it up: the transmitter sends out signals, the receiver picks them up, the controller unit processes these signals and sets a speed limit, the IR sensor measures the vehicle's speed, and if it's too fast, the controller unit tells the motor driver to slow down. All of this works together to help keep vehicles safe and within the speed limits, especially when they're near the transmitter. It's like having a smart helper in the vehicle, making sure everything stays under control.

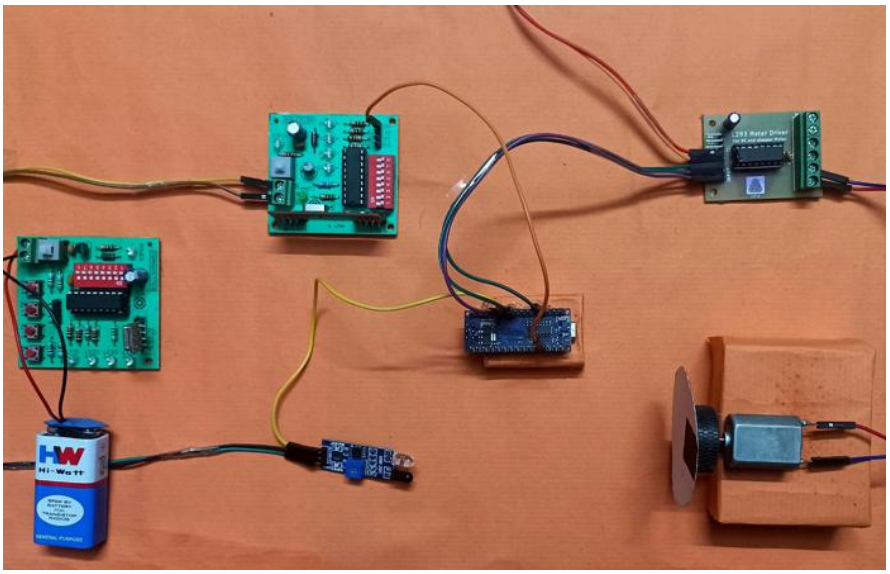
Results:

The implementation of the proposed speed control system holds immense promise for revolutionizing road safety standards. Through the fusion of cutting-edge technology and innovative design, this system has the capability to redefine our approach to managing vehicle speeds. A standout feature is its proactive enforcement of speed limits, effectively mitigating the dangers posed by over-speeding. The vigilance and rapid response of the controller unit promise to quell instances of reckless driving, thereby significantly reducing the incidence of accidents and fatalities on our roads. Additionally, the provision of real-time speed feedback via the IR sensor empowers drivers with critical information, fostering a culture of heightened awareness and responsible driving behavior. The following block diagram describes the components being used and their respective connections, as the working of the smart vehicle speed reduction system starts from the transmitter receiver block and the processed signal being transmitted to the controller unit and the relevant actions are being taken that is the reduction of the motor speed using the motor driver module with the help of the pulse width modulated signal. The overall function is described in the upcoming paragraph of the block diagram and working chapter.

Block diagram:



The purpose of this project is to develop a model that demonstrates both theoretical and practical elements. This model will demonstrate how the device can be implemented in cars for safety. We're considering all the pros and cons of the project. Our goal is to create a model that represents the experimental view of a Smart Display and Control device. This device is designed to automate speed control, preventing accidents, and managing traffic. We are proposing the project layout, which consists of two major components: the zone status transmitter and the speed display and control unit. When information is received from the zones, the vehicle's embedded device instantly notifies the driver. The SDC unit may lower the vehicle's speed as needed.



Conclusion:

In summary, the developed Vehicle Speed Limiter system demonstrates promising outcomes in tackling over speeding-related road safety concerns. It provides a pragmatic approach to mitigating the dangers associated with speeding, significantly bolstering driving safety by seamlessly combining advanced software tools with hardware components. Ongoing research and development efforts could further optimize the system's functionalities, reinforcing its positive impact on road safety. This would not only validate its effectiveness but also facilitate broader acceptance and adoption of vehicular safety technologies, ultimately contributing to a safer and more secure driving environment for all road users. Future advancements for the vehicle speed control system include integrating it with advanced driver assistance systems (ADAS), enhancing sensor technology with LiDAR or

radar, implementing predictive analytics for proactive speed adjustments, leveraging vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communication, integrating with autonomous driving technologies, utilizing machine learning and AI for adaptive speed control, and optimizing energy efficiency. These advancements aim to improve overall safety, efficiency, and convenience in transportation systems by incorporating advanced technologies, predictive capabilities, and seamless integration with emerging automotive systems.

REFERENCES:

Research Papers:

[1] eshan pathak, tushar sharma, ashutosh, shubhra dixit "rf basedsmart zone vehicle speed monitoring and control system" presented at the 2nd international conference on green computing and internet of things (icgciot), bangalore, india, aug. 16-18, 2018.
[2] takeshi kasuga, satoshi yakubo "design of a dependable modelvehicle for rear-end collision avoidance and its evaluation"international conference on instrumentation and measurementtechnology, austin, tx, usa, may 3-6, 2010.
[3] takeshi kasuga, satoshi yakubo "highly safe driving control system for model vehicles using different kinds of sensors and one- waywheels" presented at the 9th international conference icheon, southkorea, sep. 28-30, 2009.references.