A Review: Design and Analysis of Electric Vehicle Speed Limit Control using Wireless Network

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Abstract
The worst thing that may happen to a driver of a vehicle is a road accident, but they do occur frequently. Human error is the primary cause of accidents. The majority of accidents are caused by automobiles travelling at excessive speeds. In contrast to slow-moving cars, high-speed vehicles are more likely to be involved in accidents and do so with more severity. The chance of an accident increases with vehicle speed. Therefore, it is vital to warn the driver and to automatically reduce the speed of the vehicle in order to avoid such accidents. The primary goal of this proposed work is the development of a signalling unit to control vehicle speed and to inform the vehicle of the kind of zone. Every zone that has a speed restriction sign board, such as a school, highway, or other similar location, may include a transmitter tag to send the zone information via RF signal. The vehicles should recognize this signal, which modifies the vehicle's speed limit. Practically speaking, a vehicle's throttle could be managed by an actuator. It is based on the concept of a system for controlling and monitoring vehicle speed. When a vehicle enters a limited region, its speed is automatically slowed and locked to a certain limit. When it leaves the restricted area, the speed is released or unlocked.
Keywords: *Electric Vehicle, Wireless Network, RF signal, Smart Display & Control*

Introduction

Most accidents in this fast-paced society are caused by violating traffic laws and going too fast. As is evident, there are more accidents every day as a result of the increased number of vehicles on the road and the heavy traffic that results from that. Many modern machines or mechanisms are controlled by embedded systems. Modern embedded systems frequently use microcontrollers, but more complicated systems still frequently use conventional microprocessors. To handle a specific activity with dedication, however, is the fundamental quality. People today drive very quickly, accidents happen regularly, and there is loss of life and property.

In order to stop such kind of accidents, to alert the vehicle’s driver and to control their vehicle speed. RF innovation is being utilized the primary goal is to plan a Smart Display regulator implied for vehicle's speed control and checking of zones, which can run on an installed framework. Information about the vehicle is displayed via Smart Display & Control (SDC), which can be specially made to fit into the indicator panel of a car. The zone

status transmitter unit and receiver (speed display and control) unit are two distinct modules that make up the proposed work. The vehicle's embedded unit warns the driver to reduce speed in accordance with the zones after receiving the data from the zones. It waits for a short period of time before the SDC unit of the vehicle naturally reduces speed. Through the use of an embedded-based prototypical robotic model, this proposed work primarily demonstrates the use of speed monitoring and control in autos.

Figure.1 Speed limit sign board near school

Literature Review

According to a recent survey, high unmanageable speeds exceeding the necessary speed limits in the specific zone as well as unnoticed obstructions are the main causes of increased rates of major road accidents. The driver's awareness of the restricted area when operating a vehicle is crucial, and it can be done through an audio or visual alert to remind them of the impediment in front of the road. And while this system is currently offered in automobiles as a particular feature, future vehicles will need to have higher levels of safety in driving controls throughout the board. In India, one of the main types of transportation is by road. All across the country, India is connected by a vast network of roads. Compared to other nations in the globe, our country experiences the most accidents and accidental deaths. In India, there is one traffic accident per minute throughout the year, with one fatality every three minutes.

A M Amulya, et al (2018) Intelligent speed controller: In this article, the authors focused on automatically preventing vehicle collisions caused by overspeeding in speed-restricted areas. Embedded systems and RF transmitter and receiver modules can be used to do this. The driver of the vehicle must manually lower the speed of the vehicle when it enters the speed zone. If the driver did not reduce the speed of the vehicle, the electronic controller would take over and do so by detecting the signal from the transmitter in that area.

The Arduino microcontroller would then use that signal to process and send a signal to the motor to control its speed. To identify the restricted area in this case, they mostly use an RF transmitter and receiver. Ankita Mishra and colleagues (2012) used RF design to develop a speed control system. The major goal is to create a smart display controller that can function

on an attached embedded system and be used to regulate the vehicle's speed as well as monitor speed zones with speed limitations. Custom-made Smart Display & Control (SDC) units can be made to fit into a vehicle's dashboard and display the information that is available there. In their 2015 study, Gummarekula Sattibabu et al. explored the possibility of wirelessly controlling a vehicle's speed while still adhering to the posted speed limit. The goal is to create an electronic display controller that can be specifically made to fit into a car's dashboard and can be used to display information about the car while controlling the speed of the car and monitoring speed zones. If implemented by a state, this method might significantly lower the amount of accidents on the road that are the result of drivers losing control of their cars at speed bumps or disregarding traffic signals.

Utilizing RF and GSM technologies, Vengadesh et al. (2015) have worked on automatic speed control for automobiles. To compare speeds, a controller is employed. The controller alerts the driver and immediately takes control if the vehicle exceeds the zone's maximum allowed speed. If they don't reply to the message, the information and the car number are sent through GSM to the closest police station in the neighbourhood, and the fine is paid at the closest toll gate. Soni Kumari and colleagues (2016) examined automatic speed control using RFID. Inside the car, a single RFID reader reads the RFID tag that is either put at a speed limit zone or a traffic signal. The vehicle's control module then makes the choice and adjusts the speed. Working with many sensors, S Nagakishore Bhavanam et al. (2017) developed autonomous speed control. The major goal is to create a system that uses RF technology to manage speed. The devices are equipped with a variety of sensors, and work is done as a result.

Method

Electric vehicles (EV) are becoming more common recently, and there are numerous reasons for this. The main one is their dedication to reducing emissions of GHGs that damage the ozone layer. 25% of the GHGs produced by energy-related regions in 2009 were radiated by the transportation sector. EVs are expected to help reduce this number if they have adequate space in the transportation sector, but this isn't the only factor that has led to the revival of this incredibly old and once-dead concept as a usable and affordable product. An electric vehicle (EV) is quiet, easy to operate, and doesn't have the fuel expenses associated with conventional automobiles. It is very valuable as a form of urban transportation. It can be driven continuously from start to finish without using any stored energy or emitting any emissions, gives its full force from startup, and doesn't anticipate trips to the local convenience shop.

It doesn't contribute in any way to the brown haze that severely pollutes the air in the city. It is extremely well suited for engine sports because of the moment force. Military use benefits from its low infrared mark and quietness as well. Infinite sources are accumulating energy when the force region transitions through a new phase. Additionally, the cutting-edge power lattice known as "bright matrix" is being developed. EVs are seen as a key enabler of this new force framework, which includes advanced network architectures and limitless production facilities. Each of these has led to renewed interest in and advancements in this

mode of transportation.

Fig. 2 Car receiving signal from transmitter

Execution of microcontroller based implanted framework to configuration speed limiter and reliever circuits for speed guideline. The 'Speed Limiter' and 'Reliever' circuits are introduced in the actual vehicle.

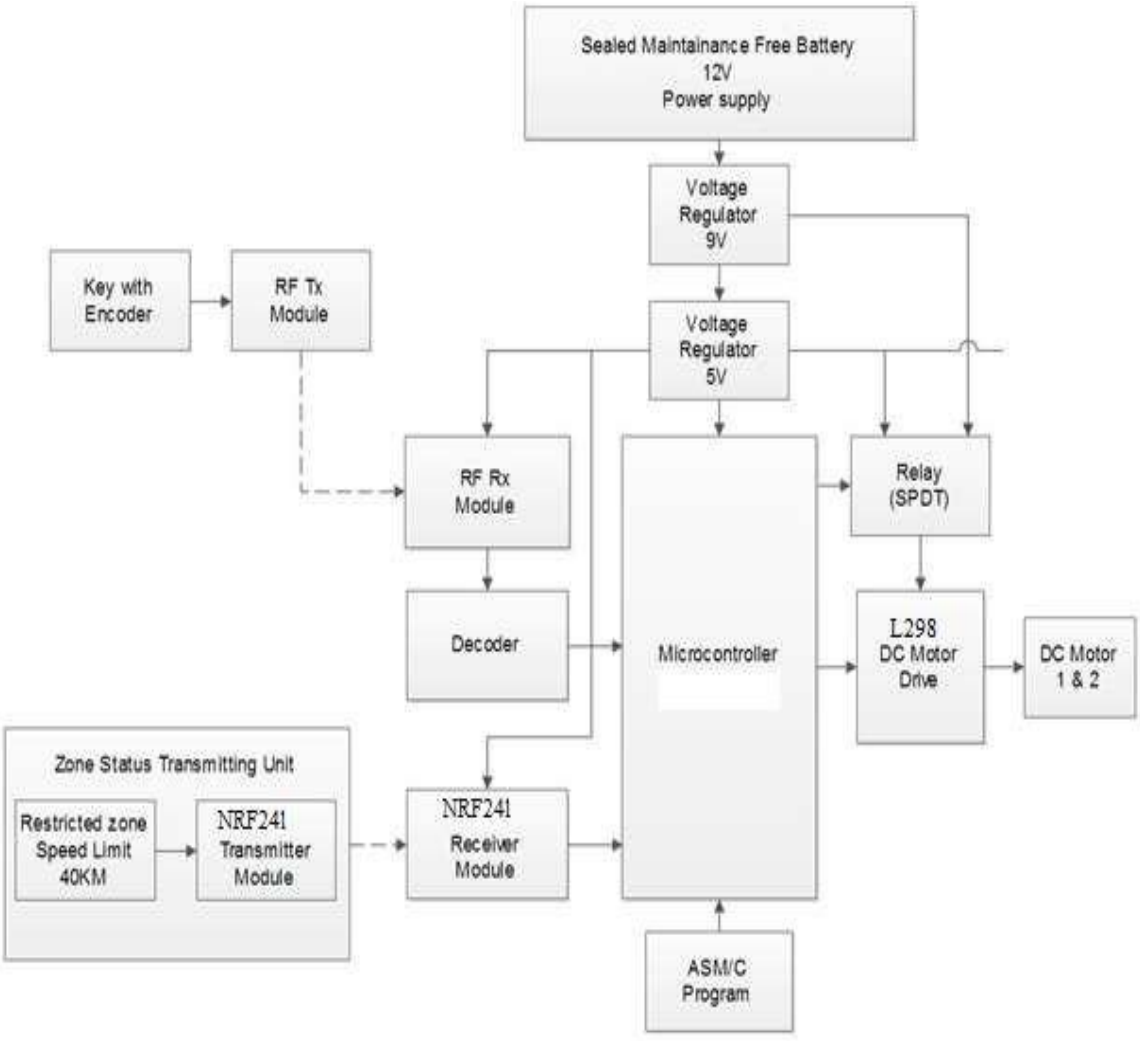

Fig. 3 Block diagram of mode.

The Speed Limiter circuit introduced in the vehicle is liable for locking the speed of a vehicle inside as far as possible (typically 40kmph). The speed limitation circuit is activated when the vehicle enters a limited area, preventing it from exceeding the confined speed. The vehicle's Reliever circuit is designed to reduce or open the Limiter Circuit. The limiter opens when the vehicle enters the restricted area, allowing it to go at a speed that is notable above the restricted rate.

Conclusion

Therefore, it is concluded from the preceding analysis that the use of automatic vehicle speed control systems in restricted zones reduces unwanted accidents generally when compared to customary behaviour relating to ignoring side of the road billboards in special zones.

This is a very helpful method for automatically controlling the speed of the car. We managed the speed of the vehicle using a microcontroller in accordance with zones. It is most useful in areas where accidents happen at a rapid rate, similar to a city traffic signal, which regulates fuel and enforces traffic laws.

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