“AUTOMATIC SPEED LIMITER AND RELIEVER FOR AUTOMOBILES”

PROJECT REFERENCE NO. : 37S1003

COLLEGE : PES INSTITUTE OF TECHNOLOGY AND MANAGEMENT, SHIVAMOGGA
BRANCH : ELECTRONICS AND COMMUNICATION ENGINEERING
GUIDES : RAVI M YADAHALLI AND ROHITH K
STUDENTS : VARSHITH.H.A
           DARSHAN J.NAVELE

Keywords: Speed Limiter, Speed Reliever, Parking Assistance, RF, IR, GPS, Ad-Hoc, VANETs.

Introduction:

An embedded system is one that is designed to perform a dedicated function within a larger mechanical or electrical system, often with real-time constraints. Embedded systems control many devices in common use today. Modern embedded systems are often based on microcontrollers, but ordinary microprocessors are also still common, especially in more complex systems. The key characteristic, however, is being dedicated to handle a particular task. In this project, the design and development of one such embedded system is considered. It is based on the idea of vehicular speed monitoring and control. The speed of the vehicle is automatically reduced and locked to a particular limit as it enters the restricted area and is unlocked or relieved as it exits the restricted area or zone, hence acting as an automatic speed limiter and reliever. This project mainly demonstrates the application of speed monitoring and control in automobiles through the implementation of an embedded based prototypical robotic model.

Conventional methods of speed control include the use of speed governors, speed breakers and manual speed regulation techniques such as the use of interceptors by transport authorities. Even though the objective of speed monitoring and control is achieved by the above mentioned techniques, the accuracy, efficiency and effectiveness obtained are
questionable. The use of speed governors is vulnerable to tampering and they provide a universal speed limit to the vehicle which could prove to be an inconvenience at certain areas. Speed breakers tend to limit the speed of moving vehicles only at certain points rather than limiting their speed in certain sensitive accident prone areas or zones. Manual speed regulation techniques can prove to be useful at times but always has the factor of human error which could act as a bottleneck in the system. The above mentioned factors in the conventional system causing inefficiencies for speed regulation calls for a foolproof technological solution. This project assures to give such a solution.

**Objectives:**

Safety is one of the major concerns in modern day transportation in India. Several measures are taken by the transport authorities for traffic control and safe commutation. One such measure is the use of interceptors in restricted areas such as city outskirts, hospital areas and village limits. The main objective of our project is to limit or eradicate the use of speed breakers, toll gates, speed detecting cameras, patrolling jeeps etc for manual speed regulation in the restricted areas and decrease the burden on the transport authorities. Our project which is an application of embedded systems, upon completion demonstrates the automatic locking and relieving of a particular speed limit in the restricted area. It is a huge advantage in public transport automobiles.

**Methodology:**

Implementation of microcontroller based embedded system to design speed limiter and reliever circuits for speed regulation. The ‘Speed Limiter’ and ‘Reliever’ circuits are installed in the vehicle itself.

The **Speed Limiter** circuit installed in the vehicle is responsible for locking the speed of a vehicle within the specified limit (usually 40kmph). When the vehicle enters a restricted area, the speed limiter circuit is activated and the vehicle will be unable to go beyond the restricted speed.

The **Reliever** circuit in the vehicle is designed to relieve or unlock the limiter Circuit. As soon as the vehicle crosses the restricted area, the limiter is unlocked and the vehicle can travel at a speed greater than the restricted level.
An additional feature in this project is the **Parking Assistance** circuit which is designed to protect the vehicle from physical dents and scratches which are likely to happen during parking or driving in small streets, toll booths or in forest areas. This is implemented with the help of a sensor which will be placed in the rear panel of the vehicle, which measures the distance between the vehicle and an obstacle on the rear end and produces a buzzer signal as the proximity reaches its threshold limit.

**BLOCK DIAGRAM**
Results and Conclusions:

Results: An RF based remote controlled prototypical robotic model successfully implemented demonstrating the speed regulation and parking assistance applications.

- Successful radio frequency communication established between the remote control and the prototype, enabling the prototype to navigate in all directions based on the signals received from the remote control.
- IR transmitters and receivers successfully tuned and implemented to demonstrate the speed locking and relieving application at the restricted zones.
- Parking assistance circuitry installed and verified successfully.

Conclusions: The project Design & Development of Automated vehicular speed limiter and reliever has been successfully designed and tested. It has been developed by integrating features of all the hardware components used. Presence of every module has been reasoned out and placed carefully thus contributing to the best working of the unit. Thus we conclude by referring to the flexibility in the implementation of our project and the vastness of its applications, which has been briefly demonstrated. We have been successful in attaining the desired results and hope to see its implementation at a wider domain.

Scope for future work:

The implementation of this project assures automation of vehicular speed control and safe road transportation in restricted zones. Accounting to its flexibility in implementation various improvisations can be adapted in its applications. To name a few are the technological advantages of GPS and Ad-Hoc networks that can be merged with the present system design and implementation. GPS systems can be used to locate the vehicles and to automatically lock their speed in restricted zones which eliminates the use of IR sensors. GPS systems can also be used to locate vacant parking spots which can act as parking assistance for the vehicles. Vehicular Ad-Hoc networks which are commonly known as VANETs can be used to assure the functionality brought about by the IR sensors. In the case of VANETs each vehicle acts as a mobile node which can intercommunicate with other mobile nodes or vehicles, this principle can be made use of to assure the locking mechanism. Considering the case where the IR signal is not received, the locking action fails, but the vehicle in front which already has its speed locked can in turn communicate with the vehicle behind it by sending a signal intimating it to lock its speed, hence assuring the locking mechanism. Considering the huge number of advantages that will be caused due to automation in
vehicular speed control ensures ample amount of scope and technological advancement for this project.

**Reference:**

An RFID-Based Intelligent Vehicle Speed Controller Using Active Traffic Signals; Joshué Pérez, Fernando Seco, Vicente Milanés, Antonio Jiménez, Julio C. Díaz and Teresa de Pedro; Sensors 2010.