



# Dynamic Vehicle Threshold Speed Limiter and Altering System

P. Aruna Sreee

Assistant Professor, Dept. of ECE  
RVR Institute of Engg & Tech  
Hyderabad, India  
arunasree03@gmail.com

V. Jhansi

Student - M.Tech (Embedded Systems)  
RVR Institute of Engg & Tech  
Hyderabad, India  
januveesavaram@gmail.com

Harikrishna Musinada

Professor & HOD, ECE  
RVR Institute of Engg & Tech  
Hyderabad, India  
yemhechkay@gmail.com

**Abstract:** Driving or Riding a vehicle in India is by large becoming a dangerous experience. Of Worldwide annual average of 70,000 road accidents, 10 percent occur in India. The latest annual statistics indicate that over 80,000 people are killed on Indian roads due to not following the traffic regulations by the driver. The project addresses this serious issue and proposes a low-cost dynamic electronic speed monitoring unit. The proposed project comprises of hardware design using a low-cost 8-bit AT89S52 microcontroller and the complete hardware design will be proposed which will continuously monitor the speed of the vehicle and senses the other vehicles which are going front and back, computing the distances of the vehicles during the journeys. The embedded software design is proposed using keil  $\mu$  vision 4IDE that will continuously update the accidental danger zone threshold limit in front and back. The system uses an IR sensor based hardware design connected to the 8-bit CPU for real-time speed adjuster and threshold mapping. A relay indicator is connected to alert the driver if any vehicle is running on either side of the vehicle, within the threshold danger limit. The system design uses various debugging tools such as Null modem checking, Keil  $\mu$  vision 4C51 debugger and serial debugging utilities are used for testing the design during the implementation phase.

**Keywords:** Embedded System, Microcontroller, IR sensor, Cross-compiler and Debugging.

## 1. INTRODUCTION

Various solutions has been proposed to solve this problem and even some systems are introduced that cast doubt in the efficiency and safety of the both vehicle and system. Previous systems are like warning the driver about the cause that is going to occur by making some buzzers to operate. But with this system time taken by the driver is large to operate the vehicle to be of safety, mean while the accident occurs, as in case of emergency humans cannot take wise decisions as quickly that devices take. Likewise some of the other systems made to solve the solution by not succeeded. The innovative design proposed by us is that continuously monitors the speed of the vehicle and make necessary changes to its speed. The totally work done by our system is unmanned, only installing of this system in done manually, rest it takes on.

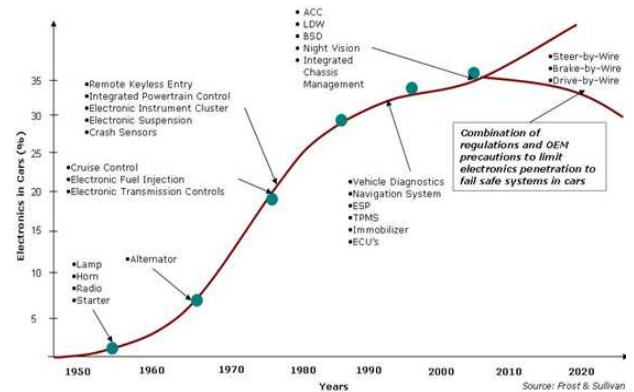


Fig.1. Rise of Electronics usage in Automobiles

Embedded System is a combination of hardware and software used to achieve a single specific task. An embedded system is a microcontroller-based, software driven, reliable, real-time control system, autonomous, or human or network interactive, operating on diverse physical variables and in diverse environments and sold into a competitive and cost conscious market.

An embedded system is a special-purpose computer system designed to perform a dedicated function. Unlike a general-purpose computer, such as a personal computer, an embedded system performs one or a few pre-defined tasks, usually with very specific requirements, and often includes task-specific hardware and mechanical parts not usually found in a general-purpose computer. Since the system is dedicated to specific tasks, design engineers can optimize it, reducing the size and cost of the product. Embedded systems are often mass-produced, benefiting from economies of scale.

Physically, embedded systems range from portable devices such as digital watches and MP3 players, to large stationary installations like traffic lights, factory controllers, or the systems controlling nuclear power plants. In terms of complexity embedded systems run from simple, with a single microcontroller chip, to very complex with multiple units, peripherals and networks mounted inside a large chassis or enclosure.

## 2. INFRARED SPECTRUM

**2.1. Introduction to IR:** One of the advantages of infrared remotes is that there is no radio for crooks to monitor and record for use against you later on. Instead, there is a beam of invisible infrared light which comes from a standard hand-held remote control unit so from that point of view it is pretty secure. There is though an enormous variety of tasks to which you could put the unit just think of the myriad of things in your home these days which use infrared remote to turn things on and off change levels, open and close.

**2.2. What is Infrared:** Infrared is an energy radiation with the frequency below our eyes sensitivity so we cannot see it. Even that we cannot "see" sound frequencies, we know that it exist we can listen them.

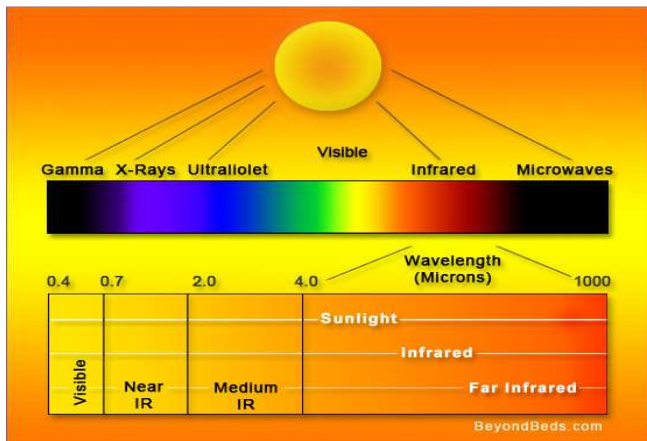


Figure. 2. IR Spectrum

This existence of the infrared and its width in the spectrum is shown in the figure. When you approach your hand to fire or warm element, you will "feel" the heat, but you can't see it. You can see the fire because it emits other types of radiation, visible to your eyes, but it also emits lots of infrared that you can only feel your skin.

**2. 3. IR Transmitter:** The IR LED which is used in the IR sensors which behave as a transmitter, it continuously sends the rays to the receiver when there is an obstacle between them then it sensed.

## 3. OPERATION PRINCIPLE

Power Management Block Provides Required amount of power (5Volts) needed for the operation of the system. Coming to input devices i.e., 3 IR Sensors required for sensing the occurrences of the vehicles at a far, nearer, very nearer distances respectively. The IR Sensor 1 is meant to detect the vehicle in the front at a far distance 6 meters distance. This indicates vehicle is in partial danger mode LED is made to glow and speed of the motor is unchanged and the same is displayed in the LCD which is placed near the driver. The IR

Sensor 2 detects the vehicle at a distance of range 3 meters and buzzer rings and reduces the speed automatically, and a message appears on the LCD that Vehicle is under some dangerous condition. The whole operation is carried out under the control of micro controller; it takes the role of making the reduction of speed of vehicle. Finally, when the IR sensors 3 when the vehicle is in the range of 0 to 1 meters the vehicle is stopped completely.

## 4. RESULTS

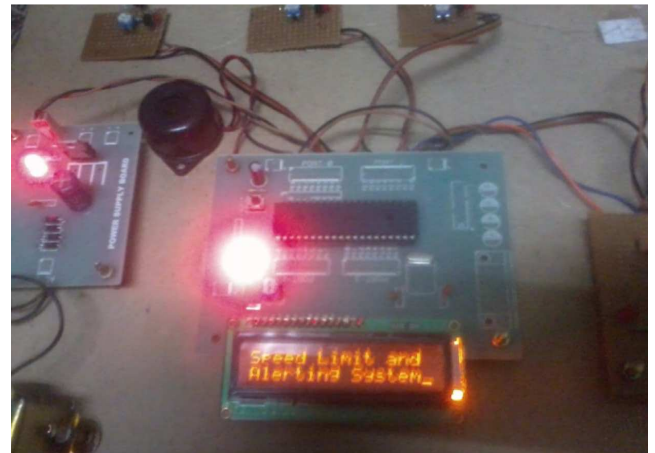


Figure .3. The basic project kit

Above figure shows the project kit of 'DYNAMIC VEHICLE THRESHOLD SPEED LIMITER AND ALTERING SYSTEM' mainly this project is used to detect the accidents occurred by not following the traffic regulations by the driver. By using 3 IR sensors pairs and one microcontroller and embedded systems and driver circuit and power supply and motor and buzzer etc.

At sensor 1, it detects 6m distance and the 'LED' glow and LCD display vehicle is in safe mode

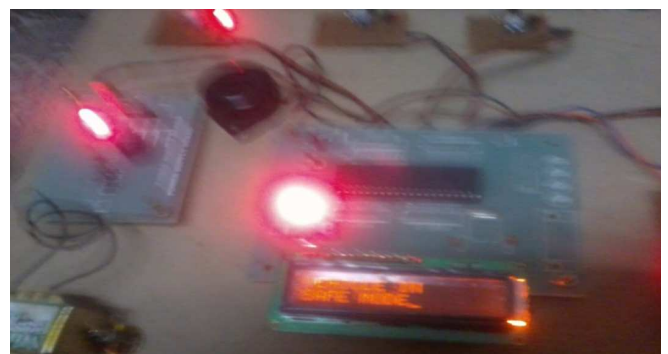


Figure.4. Sensor 1 output

- At sensor 2 ,it detects the distance 3m when the obstacle is come in front of the vehicle the led glow and buzzer gives ring

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Figure .5.sensor 2 Output

At sensor 3, it detects the distance 0 to 1m, when the obstacle is come in front of the vehicle in a distance of 0 to 1m the vehicle automatically will be stop.

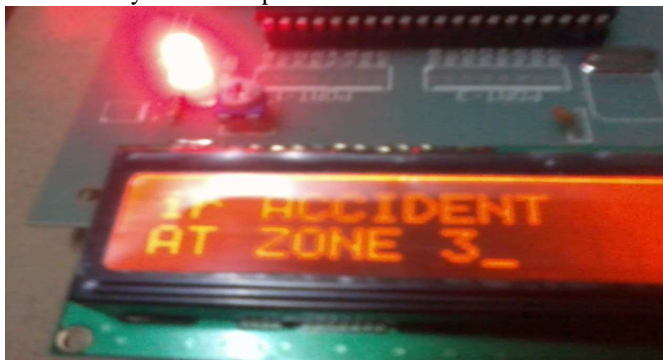


Figure .6. Sensor 3 Output

5. CONCLUSION

The vehicle threshold speed limiter and altering system mainly deals with the vehicle is sensed from a distance and according to the distance the vehicle speed is reduced. To achieve this, system requires 3 different IR sensors which are meant for the 3 specific operations that contribute to the safety of the vehicle sensing the vehicle and reducing the speed of the vehicle and making even to stop is done by incorporating the micro controller which plays a key role in the working of the system. To sum up, the system brought up is supreme solution to the problems being faced in reducing the speed of the vehicle to prevent the accidents and also to warn the person. By incorporating the RADAR system in vehicle and trains, obstacles and vehicles can be sensed from a very large distance in the order of few kilometers. Undoubtedly in hilly areas where there are narrow pathways and unexpected turns plays a key role in providing the information of the roads or ways in advance. By implementing the GSM/GPS technology the additional feature can be added to the system. Whenever the accident occurred message can be sent to the concerned people in the concerned departments. Using this technology it also helps the driver to be get the route which is adopted and also by getting the alerts from weather stations about climatic changes.

About the authors:



**P. Aruna Sreee** received B.Tech degree in Electronics and Instrumentation Engineering from the University of JNTU and M.Tech in Embedded Systems in JNTU Hyderabad. She is currently working as an Assistant Professor in ECE department at RVR Institute of Engineering & Technology, Hyderabad. Up to now attended several National & International Conferences, Workshops. Research interests in Embedded systems, VLSI, Control and Instrumentation



**V. Jhansi** Received B.Tech Degree in Electronics and Communication Engineering From The University Of JNTU Hyderabad And M.Tech, Studying In The University Of JNTU Hyderabad .Up to Now Attended Several National And International Conferences ,Workshops Research Development Programs. Research Interested In Embedded Systems and Attended Several Faculty Development Programs.



Professor **HARIKRISHNA MUSINADA** received Bachelor of Engineering and M.Tech degrees in ECE from Marathwada University, Aurangabad and JNTU-Hyderabad. He is currently Professor in ECE Department of RVR Institute of Engineering & Technology, Hyderabad and pursuing Ph.D degree at Department





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of ECE OU-Hyderabad. He has 8 Research papers into his credit published in various International Journals, Magazines and Conference Proceedings. He is an active life member of professional bodies like Indian Society for Technical Education (**MISTE**), Institution of Electronics and Telecommunication Engineers (**MIETE**), Society of EMC Engineers (INDIA) - **SEMCE (I)**. Secured **Best Teacher Award** in the course of teaching and inspiring many students in the academics. He has conducted many conferences, workshops, short term courses and was convener for many technical symposiums in the Engineering colleges he worked. He was Co-Chairman to one of the technical sessions of **2nd International Conference** on Innovations in Electronics and Communication Engineering (ICIECE) organized by ECE Department of Guru Nanak Institutions Technical Campus (GNITC) on 9-10 August, 2013 in association with IETE, ISTE, CSI and BESI. He is an Associate Editor for International Journal of Pure Research in Engineering and Technology (**IJPRET**) and Governing Body Member for International Journal of Ethics in Engineering and management Education (**IJEEE**). His currently research interests include Mixed Signal VLSI design, Bio Technology with Signal Processing.