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Research Paper

Automatic Speed Reduction System of Vehicle On Lane

Engineering

KEYWORDS : speed Reduction,sensor

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ABSTRACT

Intelligent vehicles are one of the enlightening ideas that will shape our future by providing enhanced safety and improved mobility. In this paper, we use the Robotic Assistance System to Change speed of the vehicle. Sensor based speed limiting task is automatically done from one lane to other lane position. The proposed speed detection system can be applied on sensor and remote controlled road as well as curved and straight road in different weather conditions. This approach was tested and the experimental results show that the proposed scheme was robust and fast enough for real time requirements. Eventually, a critical overview of the methods were discussed, their potential for future deployment were assist. Application By providing robust real-time detection of speed and also change the speed of the vehicle, the system shows good promise for incorporation into the next generation of intelligent transportation systems to reduce the speed of the vehicle automatically.

I. INTRODUCTION

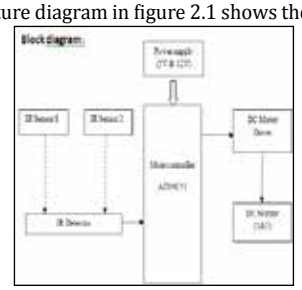
A higher speed increases the likelihood of an accident. Very strong relationships have been established between speed and accident risk: The general relationship holds for all speeds and all roads, but the rate of increase in accident risk varies with initial speed level and road type. Large speed differences at a road also increase the likelihood of an accident. In addition, drivers driving much faster than the average driver have a higher accident risk; it is not yet evident that this is also the case for the slower driver. On some roads the traffic situation is more complex than on other roads. This depends for example on the number and type of intersections; the absence or presence of pedestrians, cyclists, agricultural vehicles. In principle, higher speeds result in a reduction of the travel time. However, higher speeds lead to more accidents and accidents are an important cause of congestion. Road safety effects of speed changes are directly related to the change in kinetic energy that is released in a collision. Actual accident changes on a particular road will depend on a range of road and traffic characteristics that interact with speed and also on the characteristics. Speed has been found to be a major contributory factor in around 10% of all accidents and in around 30% of the fatal accidents. This contradiction between societal and individual consequences makes persuading drivers of the value of speed management a difficult mission.

The Speed reduction of vehicle involves with various related works. Pelegri.J.[6] et.al proposed a simple circuit can detect the magnetic perturbation caused by the cars with two GMR Magnetic Field Gradient Sensors located on the pavement of a highway or fast road without wires. When a car passes above the board, a Microcontroller processes the signal of sensors to obtain the speed and length of the car in real time. The microcontroller sends the dates through a FSK modulation, that a PC stored permanently, and after presents it with software. The authors proposed affordable system could be used to automatic traffic measurements and control at many places, replacing the expensive systems like the ultra sonic sensors and the video cameras to cover an extended area. Automation is the use of machines, control systems and information technologies to optimize productivity in the production of goods and delivery of services. The correct incentive for applying automation is to increase productivity, and/or quality beyond that possible with current human labor levels so as to realize economies of scale, and/or realize predictable quality levels. In the scope of automation is a step beyond mechanization. Whereas mechanization provides human operators with machinery to assist them with the muscular requirements of work, automation greatly decreases the need for human sensory and mental requirements while increasing load capacity, speed, and repeatability. Automation plays an increasingly important role in the world economy and in daily experience. An automatic road traffic control and monitoring system for day time sequences using a B&W camera was developed and implemented by authors Alcantarilla.f. et.al[2]. Chang A.T.S.[4] proposed a linear car-following model for the automated vehicles. Basically, when an equipped vehicle, with the equipment of automation, travels on a highway, before becoming cruise speed, a transition period exists. Also, if the equipped vehicle travels along a mixed lane, its front car may not be an equipped one such that the equipped vehicle is possibly still stayed in a transition state if the real-time situation is evaluated inadequate to create the cruise mode for speed control. Based on this the author developed an advance-F project which is been proposed for highway automation speed control. The authors Bal´azs N´emeth et.al[3] in this paper proposed the design of a new adaptive cruise control which takes into consideration the knowledge of the inclinations of the road along the track of the vehicle. Rong-wen Huang et.al[7] proposed the system which develop an automatic vehicle control system by applying the techniques of Virtual Reality (VR) and fuzzy control. Al-Rowan.M .et.al[1]proposed the design and implementation of a control system that will allow a user to drive a vehicle through the Internet, and also designed the system to drive a car model by controlling its three main systems: the ignition system, the speed system, and the steering system. All control and communication between the car and the server takes place through wireless transmitter receivers which gives total freedom to the movement of the car. The car model has an embedded system that is based on microcontroller. Vehicle over speed is an important reason for the traffic accident on the freeway and it is helpful and necessary to monitor the behavior of over speeding. Wireless Monitoring System of Vehicle Over speeding Based on GPRS is developed by authors Ma Zengqiang et.al[5]. Based on these literature we developed a system which automatically reduce the speed of the user vehicle, the speed will be different for each lane based on the lane the speed may be reduced or increased(if the user wishes to) in the user vehicle in an automated manner.

II. IMPLEMENTATION

The system which is implemented is divided into two parts
1. Prototype Vehicle
2. Sensing system

The architecture diagram in figure 2.1 shows the implementation.



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This hardware circuit in the prototype vehicle consist of dc motors and IR sensor. The process of this prototype explains about when a moving vehicle exit the speed limit on particular lane speed the sensor available on the road will intimate to the microcontroller circuit in the vehicle then the microcontroller reduces the speed of the vehicle by providing the interrupt in the DC motor. After that the vehicle is shifted to appropriate lane.

Prototype Vehicle:
The prototype vehicle which is based on the embedded system with the microcontroller. The PWM code with embedded c language for 8051 micro-controller is implemented.

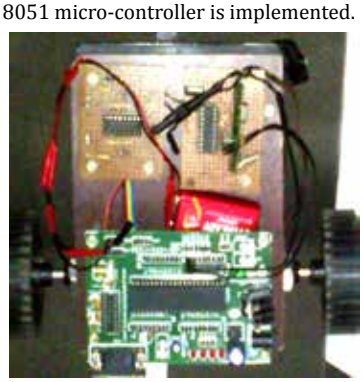

Figure 2.2 Prototype Hardware of Vehicle

The speed of the vehicle can be controlled by reducing dc motor speed using PWM. Timer is used here to generate the PWM. We can change the duty cycle in the code by changing the variable name in PWM. The interrupt is introduced in to the microcontroller to reduce the speed of the dc motor in the vehicle.

Sensing :

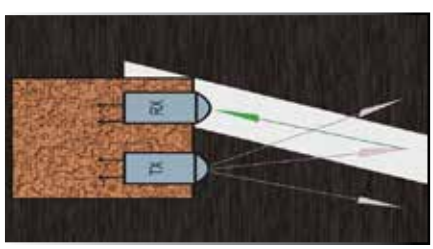

Figure2.3 IR Transreciever

The IR sensors act as a transmitter and receiver. A sensor in the vehicle will act as receiver, which get the information from the transmitter sensor on the lane. The Microcontroller which acts as interface to the IR transmitter. The IR transmitter is to be fixed to the top of the pole at the locations where speed of the automobile needs to be controlled. The role of the IR transmitter is to transmit the frames that specify the maximum speed and the time for which the speed limitation must be implemented. Whenever the vehicle passes nearby IR transmitter, IR receiver in the automobile detects the frame and gets ready to receive the frame. After completion of receiving the frame it generates interrupt to microcontroller. The power supply is been given to the DC motor and the microcontroller in the range of 5V and 12V.

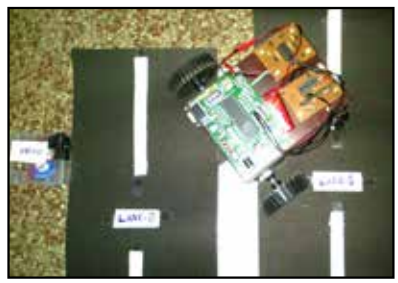

Figure 2.4 Prototype implementation diagram

This system proposed the speed adaptation a are designed to detect and alert the vehicle has entered a new speed zone and limit the speed of the vehicle, when variable speed zones are in force and when temporary speed zones are imposed. The speed will be limited for the different lane's in which the vehicle is travelling. An embedded system is the one which is designed to perform a specific task and the embedded software rules the entire system. This software for a particular embedded system could be developed using various embedded programming languages. But embedded C is the well-known embedded programming language.

III.CONCLUSION
This system described how the speed reduction systems in vehicle is been applied. It can also significantly help to avoid the traffic congestions on roadways. The intelligent speed adaptation uses information about the road on which the vehicle travels to make decisions about what the correct speed should be and constantly monitors vehicle speed. The speed of the vehicle is reduced automatically when the vehicle is detected to be exceeding the speed limit on the particular lane. The traffic on the road is limited by implementing the speed adaptation system on the different lane.

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