

Review of Speed Control and Automatic Braking System

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Abstract - The main objective of this paper to design speed control & automatic braking system in the vehicle. The speed control & automatic braking system will involve the electronic circuits such as sensor, relay, control system, microcontroller, signal transmitter and signal receiver, Peripheral Interface Circuit (PIC). In this project we will apply the skill and knowledge in designing electronic circuit for the speed control & automatic braking system. We will use the software Proteus to design the circuit. The concept in designing the speed control & automatic braking system is strategic control of an accident being vehicles. We will use ultrasonic sensor for detection the obstacle & IR sensor for automatic braking system purpose. The system will be design to prevent the driver and passenger inside the vehicle from accident.

1. INTRODUCTION

The main objective of this paper to design speed control & automatic braking system in the vehicle. The speed control & automatic braking system will involve the electronic circuits such as sensor, relay, control system, microcontroller, signal transmitter and signal receiver, Peripheral Interface Circuit (PIC). In this project we will apply the skill and knowledge in designing electronic circuit for the speed control & automatic braking system. We will use the software Proteus to design the circuit. The concept in designing the speed control & automatic braking system is strategic control of an accident being vehicles. We will use ultrasonic sensor for detection the obstacle & IR sensor for automatic braking system purpose. The system will be design to prevent the driver and passenger inside the vehicle from accident.

Automation is fundamentally changing the role of people in many systems, and driving is no exception. An increasing number of vehicles are being equipped with speed control system. This system uses ultrasonic sensor to detect the obstacle or moving vehicle ahead and warns to driver about collision risk. When following another vehicle, the speed control system (SCS) will automatically gives signal about distance between car and obstacle through LED display to the driver to reduce the speed of vehicle.

The ultrasonic sensor is fitted in front of vehicle. This ultrasonic sensor transmits the signal continuously towards the obstacle and when obstacle is detected this signal is reflected from obstacle and receiver received this echo-signal from obstacle. The receiver sends this signal to the microcontroller for the control system purpose. The controller controls the speed of motor as per the distance

and reduces the speed of motor and warns to the driver to reduce the speed. When driver or user is was fail to reduce the speed of vehicle then by controller automatically reduce the speed and when the distance between the car & obstacle is minimum, means if accidents like situation is detected by IR sensor then the controller take total charge to control the speed of vehicle from driver or user and microcontroller make its own decision to activate the automatic braking system and our vehicle stop automatically. Means in simple language it gives the signal to driver to reduce the speed & about the danger accidents and also save the life of driver or passenger which are seated inside the car or vehicle.

2. RELATED WORK

Dhanya K. R. [1] has proposed a technology of an advance automatic braking system with sensor fusion concept. In this they uses the properties of both capacitive & ultrasonic sensor for detecting the obstacle & also for calculating the distance between the vehicle & the obstacle and this distance measurement is used to control automatic braking system for safety application. In this system they use the 32-bit microcontroller with ARM processor (LPC2138) as the brain of this system for controlling process. The programming is done by using c-language. The additional feature included in the system are automatic retarding & automatic horn disabling in restricted area, this is done through RF signal communication. The RF transmitter is placed in restricted area, where the speed is limited & horn is restricted. RF transmitter placed in the traffic signal, transmit the value of limited speed in km/hr & a signal corresponding for disabling horn and then automatically reduce speed into particular rate & horn is disabling in that area.

S. P. Bhumkar [2] presents a system of about accidents avoidance & detection on highways. This system is about advance technology in cars for making it more intelligent & interactive for avoiding accidents on roads. ARM7 is using for making this system more efficient, reliable & effective. In this system, they have described real-time online safety prototypes that control the vehicle speed under driver fatigue. The purpose of this system is to avoid accidents. The main component of this system consist of number of real time sensor like gas, eye blink, alcohol,

fuel impact sensor & a software is interface with GPS & Google maps APIs for location. Through this research work, they have proposed an intelligent car system for accident prevention & making the world a much better & safe place to live.

Vidyadhar M. [3] presents a system that can enhance the safety of vehicle. This system give solution can assist the driver by warning the driver about impeding obstacle & approaching vehicle that may lead to collision in addition to this they are also implementing & auto retarding system which helps in avoiding accidents. In this system ultrasonic sensor, motor driver and LCD are used. In addition to this, they have implemented an automatic wiper speed control which control speed of wiper is based on the intensity of rainfall. In the wiper speed control system the IR sensor is very sensitive & can detect very small quantities of moisture. In case even slight rainfall the system will get activated, in higher amount of rain the motor faster & will implies the wiper runs faster & save the driver from distraction & provide convenience & safety.

Muquaddas Bin Tahir [4] have Proposed a new technique distance measuring (Hurdle Detection) for safe environment in vehicle through ultrasonic rays. In this system eight ultrasonic sensor are used to sense the different type of object. By implementing a possible improvement in safety system in vehicle, the vehicle & sensor will be able to operate normally until the sensor detects possible risk. In this the sensor does not give output or signal until the car comes within 75 feet of an object, at which timer sends information of hurdle to driver. The sensor only indicates the presence of an object; it is up to user or driver to tackle the hurdle.

3. PROPOSED WORK

The proposed work is likely to control the speed of vehicle and automatic format braking system. It is divided into three main steps;

1. Detect the object (Hurdle) from vehicle.
2. Control the speed of vehicle.
3. Automatic braking system.

The proposed method will automatically inform about the hurdle in the path of the vehicle on the display with the help of different sensors. Ultrasonic sensors are connected in the vehicle to sense the object (Hurdle) and then send signals to the controller. The controller takes different actions based on these signals in order to create a safe environment for the driver. After detecting the obstacle in front of the car, we will directly view the distance between the car and obstacle on the LED display. When the distance between two cars or distance between cars & obstacle is very small, means if accidents like situation are detected by IR sensor then the automatic braking system is activated.

a) Hurdle Detection

The purpose of this part of the proposed method is the secure the speed of car or security of driver and vehicle against different hurdles. To achieve this target ultrasonic sensors are used on front sides of the vehicle. Sensor consists of one transmitter and one receiver. The transmitter of the sensor will continuously transmit the signals. When these signals will collide with any object and will be reflected back, the receiver of sensor will catch these reflected signals and forward them to the microcontroller. To find the object side the signal is send to processing unit through different ports. In ultrasonic sensor, the power is directly proportional to range of ultrasonic sensor.

$$P \propto \text{Range}$$

b) Car Speed Controlling System

The system involves the controlling of speed of vehicle through the microcontroller. Different commands will send to the ports of controller to control the speed of vehicle. The microcontroller receives commands which show the obstacle in front of the vehicle and output will encoded 8 bit value. The input signals will come from ultrasonic distance sensor and IR sensors on board the vehicle. After analyzing the inputs from the sensors, controller maintains the speed of vehicle according to the distance from the vehicle.

c) Ultrasonic Hurdle detection Circuit

The speed of the sound in the dry air is about 340 m/s. We cannot hear the echo if we send a short ultrasonic pulse at 200 KHz in the air but it is possible to detect the back pulse with an ultrasonic sensor. If the time of the forth & back travel of the ultrasonic wave will known then the distance will also known. If we divide the distance by two then the range from the ultrasonic sensor to the first hurdle in front of it will be known. Here the proposed method also uses an ultrasonic piezzo transmitter with its receiver because they are very efficient, easy to find and quite cheap. In this proposed research, first the pulse will be send, it is easy to get a 20 KHz pulse from a PIC PWM output. We can drive an ultrasonic transmitter directly from the PIC output, but the sense range will not exceed 50 cm. Using a transistor and a resonator circuit, the ultrasonic transmitter will get around 20 volts to generate 200 KHz pulse and the sense range will be extended up to 75 feet.

d) Activation of automatic braking system-

After the detection of the obstacle in front of the car, the distance between car & obstacle directly shows on the LED display. Whenever the distance between car & obstacle goes to minimum then speed of car also decreases. When the distance between two cars or distance between cars & obstacle is very small, means if an accident like situation is detected by IR sensor then the automatic braking system is activated.

4. CONCLUSION AND FUTURE SCOPE

This study suggests that there may be safety benefits from using this technology, such as reduction in stress, decreased lane changes and longer following distances for younger drivers. However, many drivers are not aware of the limitations of their systems, which raise safety concerns. The misunderstandings evidenced in the study, such as the false assumption that systems will help avoid a collision with a stopped vehicle. Drivers need to be better informed about situations in which their system is unlikely to react. Based on the potential safety benefits and problems more research is needed to determine the overall safety impact of these systems. The future scope of the system is implementation on hardware. We can also include buzzers, indication lights and can set speed by using keyboard and keyboard encoder IC in this system.

5. REFERENCES

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