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Review of Automatic Vehicle Speed Control and Braking System

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*Abstract-*The major goal of this work is to create a vehicle speed control and automatic braking system. Electronic circuits such as sensor, relay, control system, microcontroller, signal transmitter and signal receiver, and Peripheral Interface Circuit will be used in the speed control and automated braking system (PIC). We will use our skills and expertise to construct an electronic circuit for speed control and automated braking in this project. To construct the circuit, we'll utilise the Proteus software. The strategic control of an accident involving automobiles was the rationale behind the construction of the speed control and automated braking system. We'll employ an ultrasonic sensor to detect the impediment and an infrared sensor to activate the automated braking system. The system will be built to keep the driver and passengers safe inside the car.

Index Terms- Road accidents, alerting the driver by message

I. INTRODUCTION

According to surveys conducted and figures released by the governments of various countries and states, the rate of road accidents is steadily increasing each year as a result of increased traffic on the roads. The rate of causation is steadily growing year after year. One of the key causes, according to experts, is the rise in the number of motorists. Another big worry of city dwellers is long working hours. Nowadays, life is becoming increasingly difficult. The three criteria described above are widely recognised as the primary and most common causes of traffic accidents, particularly on highways in most states.

We could save many lives and reduce the number of people killed in highway accidents if we could inform drivers on the road ahead of time. On highways, it is extremely typical to install some sort of device that can detect a vehicle's speed and inform the driver that he is not in the speed limit.In a specific location, there is a speed limit. However, with our system, the geographical location of the user is taken into account.The speed restriction and no horn area information is broadcasted on a continuous basis via the transmitter systems.Furthermore, it would be a fantastic feature if the automated braking system could be activated on overspeed.We tried to come up with a simple solution, however it was not successful.

The role of the human being is being radically altered by automation.People are present in many systems, including driving. AnSpeed control systems are being installed in an increasing number of automobiles. This technology makes use of an ultrasonic sensor, detects an impending obstruction or moving vehicle and issues a warning.driver about the possibility of a crash When you're following another car,The speed control system (SCS) will provide you an automatic response.LEDs provide information regarding the distance between the car and the barrier,display urging the driver to slow down the vehicle

II. LITERATURE SURVEY

Dhanya K. R. [1] has proposed a sensor-fusion technology for an advanced autonomous braking system concept. They use both capacitive and resistive qualities in this ultrasonic sensor for obstacle

detection and trackingdetermining the vehicle's distance from the obstacle.This distance measurement is used to govern the automatic transmission of data.For safety purposes, a brake system has been installed. They are in this system utilize an ARM CPU with a 32-bit microcontroller(LPC2138) as the regulating brain of this systemprocess. The programming is done in the C programming language.Automatic features are integrated in the system as well.In a restricted region, this device slows down and disables the horn automatically.RF signal communication is used to accomplish this.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.

Muqaddas 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.

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.

AnamFirdouset.al., Zone Based Speed Control using RF: They developed an automatic car speed model that took intoaccount all hardware components. The data that is transmitted is stored in the transmitter signals, and the signal that isreceived can be used to automatically control the car's speed. The proposed model is capable of showing substantial trafficsignals on a liquid crystal display panel that is mounted inside [3]. Sathishkumar S, et.al., Automatic Vehicle Speed Controlsystem in a Restricted Zone:In this system, they usedthe method for recognizing the restricted zone is done through theZigbee transmitter in thezoneandtheZigbeereceiveris placed on the vehicle. In school zones or hospital zones, anautomated VSC system is mounted, which enables the vehicle to behave independently to slow down while approaching at ahigher speed, thus actively and more efficiently minimizing accidents caused by driver negligence [7].The findings of thestudy had a major effect on the design and component selection of the automatic vehicle speed control system, and it wasconcluded that IoT(Internet of Things) communication could be used instead of an RF communication module and anRFID tag in the system for real-time vehicle operations[3][4][5] and Zigbee communication module [7][8]. The above-mentionedreviews'contentis automaticallyconsideredwhendesigninganddeveloping thevehicle speedcontrolsystem.

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 preventation& making the world a much better & safe place to live.

III. PROPOSED WORK

The suggested work is anticipated to control the vehicle's speed and brake system in an automatic way. It consists of three key steps:

1. Locate the object (Hurdle) from the vehicle.
2. Keep the vehicle's speed under control.
3. Braking system that operates automatically

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) Vehicle Speed Control System

The microcontroller is used to control the vehicle's speed in this system. To regulate the vehicle's speed, several commands will be sent to the controller's ports. The microcontroller receives commands that display the obstacle in front of the car and outputs an 8-bit value that is encoded. The input signals will come from the vehicle's ultrasonic distance sensor and infrared sensors. The controller maintains the vehicle's speed based on the distance from the vehicle after processing the inputs from the sensors.

b) Activation of the autonomous braking system-

When the automobile detects an obstacle in front of it, the distance between the car and the obstacle is displayed on the LED display. When the distance between the car and the obstacle is reduced to a minimum, the car's speed reduces as well.If an accident-like condition is identified by the IR sensor while the distance between two cars or between automobiles and an obstruction is very small, the automatic braking system is engaged.

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) Hurdle Detection

The goal of this section of the suggested approach is to protect the car's speed or the driver and vehicle's security from various obstacles. Ultrasonic sensors are employed on the vehicle's front sides to achieve this goal. One transmitter and one receiver make up a sensor. The signals will be continuously transmitted by the sensor's transmitter. When these signals collide with something and are reflected back, the sensor's receiver picks up the reflected signals and sends them to the microcontroller. The signal is sent to the processing unit via several ports in order to locate the object. The power of an ultrasonic sensor is related to the range of the sensor.P ∞ Range

IV. CONCLUSION

This study reveals that adopting this technology may have safety benefits for younger drivers, such as reduced stress, fewer lane changes, and longer following distances. many drivers, on the other hand, are unaware of their devices' limitations, which raises safety problems. the investigation revealed misunderstandings, such as the incorrect idea that technologies will assist in avoiding a collision with a stopped car. drivers need to be more aware of instances where their system is unlikely to react. more research is needed to establishthe overall safety impact of these technologies, based on the potential benefits and problems.The system's future scope includes hardware implementation. This system can additionally contain buzzers, indicator lights, and the ability to set speed using a keyboard and a keyboard encoder IC.

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