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AUTOMATED SPEED CONTROL OF AUTOMOTIVES

Pranav M[1], Prasath Kumar R[2], Swathiga S[3], Suresh Kumar V[4]

[1,2,3] Student, Dept of Electronics and Instrumentation Engineering, Valliammai Engineering College
[4]Assistant Professor, Dept of Electronics and Instrumentation Engineering, Valliammai Engineering College

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Abstract - *Our Project is designed in order to replace speed breakers by the usage of RF transmitters and receivers, and limit the speed autonomously and establish a safe zone. The system also uses a collision detection sensor by analysing the possibilities of collision and stops the car when there is a possibility of collision. Henceforth the possibility of accidents is as well reduced. The system is fail safe and redundant as we make use of both GPS and RF Signals which makes sure the speed control is established in all the regions. It can also help establishing a comfort and secured journey without bumps that are caused during the crossing of speed breakers. Being a futuristic concept this can be used in all the future cars that are smart by production.*

Key Words: **RF Transmitter – Receiver, Safe zone, Collision Detection Sensor, GPS Signal, Speed Breakers**

1.INTRODUCTION

It is estimated that around 90 percent of all the accidents all around the world occur due to factors like over speeding, careless driving, vehicle collision due to bad weather and driver behaviour. 3 out of 10 accidents are caused due to over speeding. There is also a report published by WHO which states that about 1.25 million deaths worldwide are caused by accidents. In spite of various methods available to regulate speed at restricted zones, accidents are still occurring. Nowadays many research and different studies are ongoing in this field to ensure safe, comfortable and reliable journeys. The concepts involved in this project make sure that the speed control is done automatically having in mind the safety of both the driver and the vehicle at the same time.

1.1 RF Based Speed Control

RF transmitter and receiver consume very less power operating and it can be usable for a long period sometime even over more than a decade. It has an inbuilt short range antenna or we can use handheld antenna. The antenna type used in the RF module has a scanning antenna. The scanning of the RF transmitter's antenna just releases the signal and it is in short range. Whenever an RF receiver that is placed in the car, come across the transmitter devices the information transmitted by the transmitter is passed to the receiver module placed in the vehicle will receive the signal which was transmitted by the transmitter which is placed in the zone in which the speed is to be controlled.

1.2 GPS Based Speed Control

Here, we obtain the co-ordinates using the GPS Module which is attached to the car, the GPS Module is used as a redundant system, just if in case, the RF System present in the car fails, the GPS Module send signal to the Controller and the controller proceeds with the standard procedure of controlling the speed which is discussed in working. In this methodology, we define speed zones and the speed limit of each area in the maps and if the vehicle is found to be present inside the restricted area, the speed is controlled by first alarming the driver to stay below the speed limit and if the driver choose to travel in excess speed, the speed is limited by performing the control action. Once the co-ordinates indicate that the car has crossed the speed zone, the preset value in the controller is reset and the speed limit is taken.

2. Collision Avoidance

The ultrasonic sensor is used as the collision detection sensory module for this project. Ultrasonic ranging module HC - SR04 can provide non-contact measurement function from 2cm to 400cm, the ranging accuracy can reach to 3mm. The modules includes ultrasonic transmitters, receiver and control circuit.

Table -1: Collision Avoidance Values of ultrasonic sensor

Distance	Action	Medium of Action
10 mts	LED Indication	Warning lights are glowed in the driver information system
5 mts	Buzzer warning	Buzzer blows on a repeated interval
2 mts	Forced Stoppage	Brake is applied and supply to traction motor is cut

As when the ultrasonic sensor is placed and connected in the car, the trigger of the ultrasonic sensor is enabled for a particular period of time. Once the ultrasonic waves pass and gets echoed, the echo part of the sensor senses the ultrasonic waves. The time taken by the ultrasonic waves to hit another vehicle and get back to the transmitting vehicle is measured and the distance is calculated with respect to the time taken.

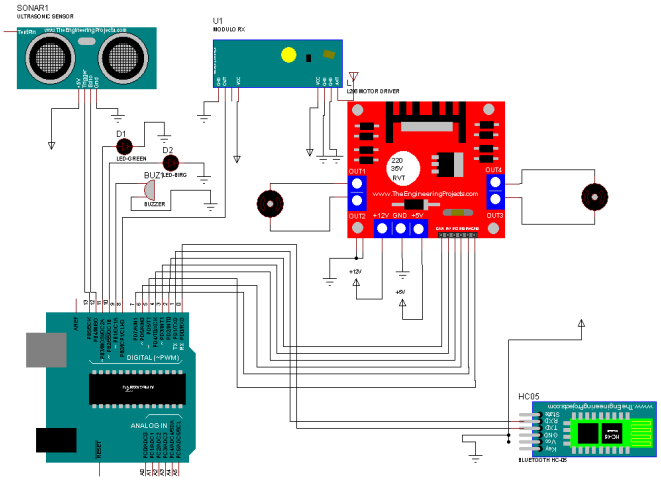

Fig -1: Schematic of Hardware used

The distance is measured by the microcontroller present in the vehicle. This distance is then compared with the preset sample values. If the range of the distance is present within the described range, then the necessary control action is taken by the microcontroller.

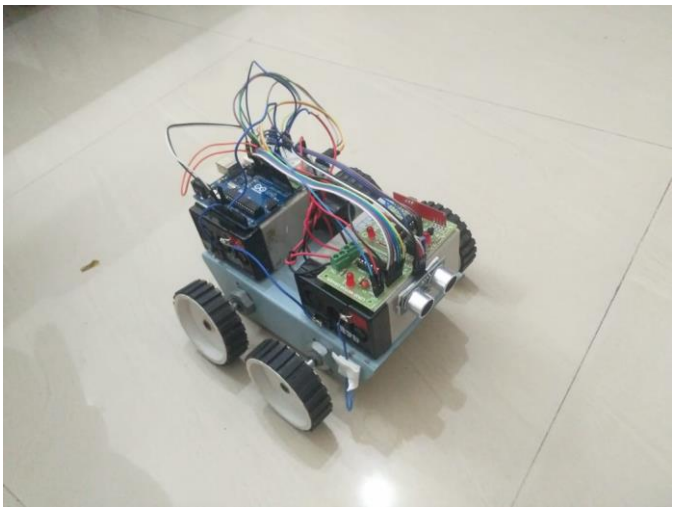

Fig -2 : Real time Prototype of automatic speed controlled car

All the above said methodologies were implemented and the system was interfaced and the working prototype of a automated speed controlled vehicle was made. During the testing of the vehicle, it was found that the speed control was both redundant and at the same time efficient. Collision Detection on the other hand was found to be accurate and precise and relatively very fast.

3. WORKING

When the vehicle travels in normal zones, its speed does not decrease and it travels normally and hence no action is performed. When the vehicle enters into the speed restricted areas, the transmitter module just transmits an information that contains how fast the vehicle is permitted to travel inside the speed limited region. Then the signal is received by the receiver present in the vehicle and the acquired signal from the transmitter is given to the controller. The signal is basically analog in nature that is converted into digital using the microprocessor.

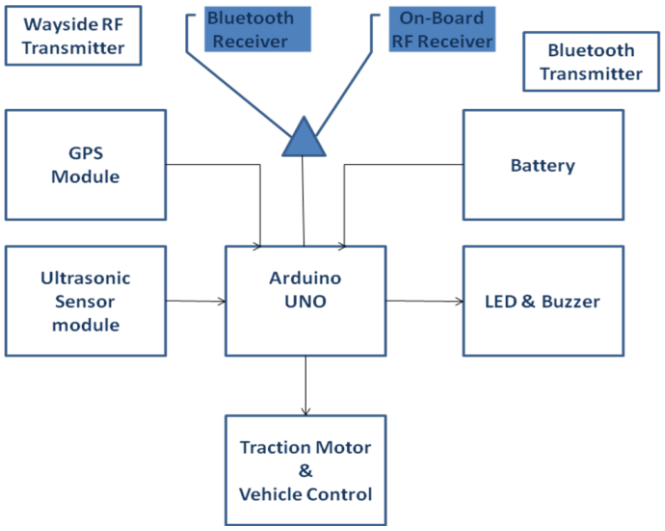

Fig -3 : Functional Block Diagram of Automated Speed Control of Auto motives

The signal from the transmitter and the speed o meter is compared by the controller first.

Here, there are two case:

Firstly if the current speed of the vehicle is less than the transmitted speed the vehicle goes normally no action is performed.

Secondly, the information from the speedometer is given to the controller and the controller compares the speed of the vehicle and the permitted speed, if the vehicle's speed is greater than the transmitted speed by the transmitter module the controller waits for few second and indicates the driver to reduce the speed. If the driver reduce the speed, the controller goes to idle mode, if the driver remain to drive in excess speed, the controller automatically takes the control action and reduces the speed.

Once the vehicle crosses over the speed limit zone, the speed restriction is turned off.

4. CONCLUSIONS

We believe that, sometime in the near future, we would come across signboards stating "No Accident Zone" and we believe firmly that this concept when brought into real life will definitely save numerous lives. Also being a futuristic concept and at the same time having less complexity in applicability, this method shall be implemented at ease. We

can expect other vehicles interfering nearby and possibly blocking or attenuating RF signals. In this aspect, we are also using gps location for restricted areas.

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