Anti-Collision System

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***Abstract*—Traffic Management and Road safety has been given an increasing amount of attention due to the rampant growth in traffic accidents which not only harm the public property but can also be fatal. It has been observed that many accidents are caused due to over speeding of vehicles in pedestrian dense zone. As a crucial approach to stop these accidents speed breakers and speed limit signs are put up in these zones. However, many speed breakers wear out with time and speed limit signs are ignored. India has the highest number of road accidents recorded. This paper, proposes a method that will not only curb the speed of vehicles within the speed limit in city but also on highways where over speeding can be risky. Speed limits of particular zones (hospitals, public markets, highways, etc.) could be predetermined by the authorities and be set in the transmitters using RF (Radio Frequency) and be transmitted inside that specific zone. And the receiver of the same RF signal would be in the car connected to the engine/motors of the car. The proposed system is reliable in collecting and displaying real-time speed data and then capping the speed of the vehicle within the speed limit in the zone. As soon as the vehicle leaves the zone the cap will be lifted and the speed can be increased again.**

Keywords— RF, Radio Frequency transmitter, RF receiver, Speed limit, Speed Zone.

I. INTRODUCTION

In countries with many vehicles and heavy traffic, it is very common to see many fatal traffic accident. Now these accidents can happen due to various reason varying from natural incidents like landslides, heavy rain, heavy snow, difficulty in field of vision due to fog, to human error such as not following the traffic rules, being distracted while driving, and over speeding. It can be said that more than half of the road accidents happen because of over speeding. In India alone according to reports over 59.6% accidents were due to over speeding causing 86,241 fatalities and left around 271,581 injured. [1].

Hence, a more reliable system is needed than the existing ones to tackle this upsurge of accidents due to over speeding.Thankfully the radio frequency technology is one of the best alternative for wireless signal transfers and is also cost effective [3].Since all the vehicles are and will be turning towards being electric powered, which makes the programming of the motors much more sophisticated and easy to tune. By the use of RF transmitter and receiver, a specific range can be made which than can be used as a specific speed zone for the vehicles to be under. Rather than just speed limit board on the side of the road, now the speed limit can flash in front of the driver, warning him to reduce his speed and come under the limit. Failure to curb the speed within the limit under a specific time allotted the vehicle will then automatically cap the speed of the vehicle.

II. PROBLEM STATEMENT

Accidents due to over speeding has been ever increasing resulting in higher and rampant growth in severe injuries and death tolls. Response of many car manufacturers to the aforementioned crisis has been by providing the driver Advanced Driver Assistance System (**ADAS**) which communicates to driver in the event of a possible collision by producing visual or acoustic signals. **ADAS** is often paired/integrated with other systems to improve its efficiency and reduce the risk of any possible accident occurence. Systems such as Adaptive Cruise Control (**ACC**), Curve Warning System (**CWS**)in combination of Digital Maps and Global Positioning System (**GPS**) are used to prevent the accidents. But still there is no direct speed limiting or anti-collision system which directly caps the speed of the vehicle.

III. SCOPE

RF technology is most used and developed means to transmit data. Since the signal transmission can take place almost as fast the speed of light. The data transmission between the transmitter and receiver can be done efficiently and quickly [4]. Anti-collision system is one of the application of RF technology. Speed of vehicles in specific zones can be controlled by it, and the range of the zone can be determined by the transmitter. Since transmitter and receiver are used in pair the receivers will be attached to the vehicles control system. So that as soon as the vehicle enters the zone it can receive the transmission signal and notify the driver. The intent here is to notify the driver about the speed zone and if he fails to curb the speed of the vehicle, to cap it by using vehicles computer [2][5].

IV. OBJECTIVE

The objectives of our project are:

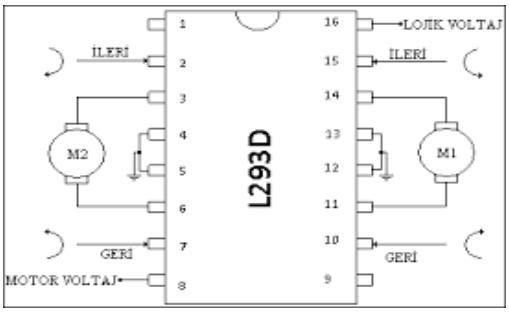
1) To use is Radio Frequency Identification (**RFID**) Technology.
2) Where a transmitter will be placed in the specified zone (hospitals, parks, schools, sharp curves, highways,etc) which will emit a signal continuously.
3) And the receiver placed in the car can receive it as soon as it reaches the zone and will provide the driver signals to reduce the speed.
4) And if by some reason the driver isn't able to reduce the speed of the vehicle, then the system will automatically bring the speed of the vehicle under the speed limit of the zone coming up ahead.

V. PROPOSED SYSTEM

System proposed in here will use L293D Motor Driver to detect the signals from transmitter in the particular speed zone using Nrf24L01 Transceivers Pairs.

1) Hardware

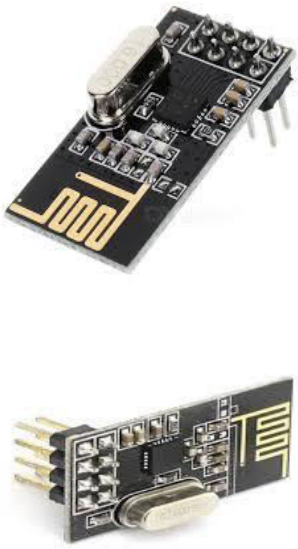
- *L293D Motor Driver*



1. L293D Motor Driver

L293D Motor driver makes it possible to control speed and direction of the prototype vehicle, mimicking the actual vehicle. Motor voltage Vcc2 (Vs) ranges from 4.5V to 36V making it quiet versatile and reliable for use with Supply voltage Vcc1(vss) from 4.5V to 7V. Its maximum peak motor current is 1.2A and Maximum Continuous Motor Current is 600mA with a transition time of 300ns (at 5V and 24V). And it also has automatic thermal shutdown.

- *Nrf24L01 Transceivers Pair*



2. Nrf24L01 Transceivers Pairs

Nrf24L01 is a pair of Transmitter and a Receiver. It has Ultra low power operation capability of 26µA Standby-I mode, 900nA power down mode and uses 2.4 GHz band and can operate from 250 kbps to 2 mbps. With SPI interface with microcontroller and integrated RF transmitter, receiver and Synthesizer. Input voltage can tolerate 5V and Operating Voltage is around 1.9V-3.6V.

- *Microcontroller 89s52*

3. Microcontroller 89S52

Microcontroller 89s52 is a 8 bit CMOSCPU with 40 pins. And an operating voltage of 4 to 5.5V, programmable I/O pins are 32 in total and timmer module is of 16 bit. It has Flash type program memory and 8KB of program memory with 256X8-bit of RAM

bytes. 89S52 is a part of popular 8051 family of Atmel microcontrollers. Can be programmed using various software Keil µVsion, and Arduino are the most popular software.

2)Software

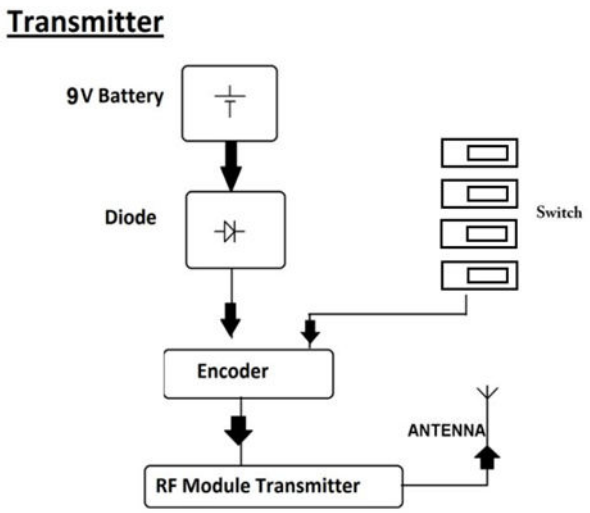
- *Keil uV3*

To program the 89S52 Keil uV3 is the required software environmentby writing a code and uploading it to the 89S52. Version 4.3 (Genuine) is used here in this project supporting the drive motor to receive and execute the command through transceivers. On-Chip Peripheral is accurately simulated by the Keil µVision Debugger (CAN, UART, SPI, Interrupts, I/O Ports, PWM Modules) of the device. All compiler, assembler, linker, and memory options are set by µVision.

VI. IMPLEMENTAION PLAN

Implementation of the proposed architecture, from the transmitters speed zone setting to the receiver in the car alerting the driver and controlling the speed is as follows:

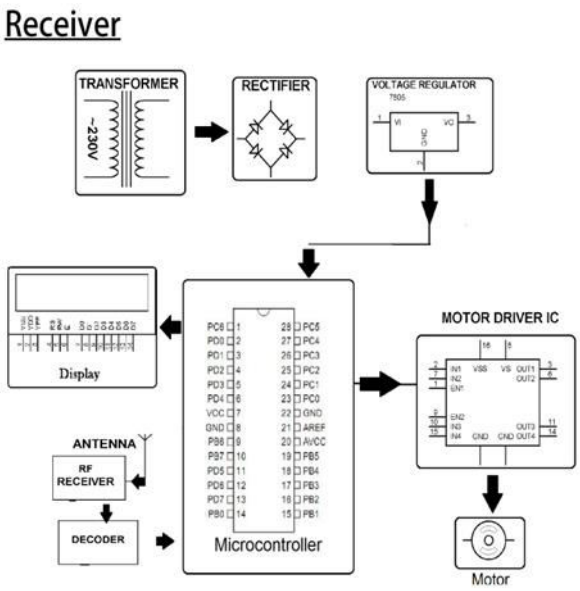
A. Transmitter in the speed zone.



4. Transmitter

Transmitter is an essential part as it is constantly transmitting the signal of dedicated speed limit in the particular speed zone limiting it to on the pre-determined area. Depicted in Fig. 2, the transceiver consists of a transmitter and a receiver. The Schematics of the transmitter is shown Fig. 4

B. Receiver in the vehicle.



5. Receiver

Like transmitter receiver as well is an essential part of the system as together they make the transceiver pair as shown in the Fig. 2. Receiver is the part that receives the transmitted signal in the zone once the vehicles enters it and translates it to the controller. The schematics of the receivers is shown in Fig. 5

C. Microcontroller of the vehicle.

As mentioned before the microcontroller 89s52 a 8 bit CMOS CPU (shown in Fig. 3) is used to control the vehicle after the receiver translates the signal. First it detects whether the vehicle is above the speed limit of the zone, if not it stand just displays the speed limit on the LCD screen and notifies the driver alongside capping the speed to the limit of the zone. Or else if the speed excides the limit of the zone upon entry then it signals the drive to limit the speed and bring the car under the limit.

D. Motor Driver.

Once the signal has been sent by the controller to the drive, it then reduces the speed of the vehicle, and caps the speed according to the limit. Also once the car exits the speed zone the driver then releases the speed limit and allows the increase in speed if driver wants to. L293D Motor Driver is used in the vehicle the schematics are shown in Fig. 1.

VII. CONCLUSION

Anti-Collision System is designed and implemented one of the most trusted RF technology in order to solve a very crucial crisis of the modern day world. As the objective clearly states the system is to be placed near hospitals, markets, schools, crowded space where pedestrian traffic is the most and on highways. This places are of the utmost importance as there are many fatal accidents currently occurring in those areas. As the implementation plan shows the way transmitter, receiver, microcontroller and motor driver works together in sync to bring this system to life. Further improvements can be done by liking this system to IOT.

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