Automatic Vehicle Speed Controller System in Restricted Areas

Suhas. S. Kotian[1], Jayesh Bhosale[2], Mrunali Shetye[3], Shraddha Tembulkar[4], M/s. Sonal Borse [5]

[1,2,3,4]*Student, Department of EXTC, Universal College of Engineering, Maharashtra, India*
[5]*Assistant Professor, Department of EXTC, Universal College of Engineering, Maharashtra, India*

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Abstract - *Nowadays in a fast moving world all the peoples are not have self-control. Such peoples are driving vehicles in a high speed in restricted areas like (school, parks, hospitals, hills area, Highways and in speed limited areas etc.) so that accidents are occurred more frequently. Because of this we lost our valuable life by making small mistakes while driving like high speed driving in restricted area, do not view the signboards which are placed by the Highway Department on the road. So in order to avoid such kind of accidents and to control their vehicle speed in restricted area like (school, parks, hospitals, hills area, Highways and in speed limited areas etc.) speed limit area, we can develop a system which can limits the speed of vehicle according to the speed limit of that particular area. So to intimate the driver about the zones and the speed limit, the project has an aim to control the speed of any vehicle automatically by means of using RF technology.*

Key Words: **Arduino UNO Board, RF Transmitter & Receiver, L293D motor driver, LCD Display, DC Motor**

1. INTRODUCTION

In today's fast moving world, as the rate of accidents is increasing day by day, speed of vehicles should be controlled as much as possible. Most of the accidents occured in India are results of lack of speed control and violating the road rules. For this reason, different speed limits are put to decrease accidents.

Unfortunately, drivers usually do not take these speed limits seriously and ignore them. To Ensure decline in accidents and to improve road safety, speed control techniques such as speed control in school and hospital zones by using RF transceiver. In fast moving world's, accidents are mostly occurs due to breaking the rules of the road and over speeding. The accidents rates are increasing year to year by more vehicles onto ground and heavy traffic. The government has taken to many steps to prevent this kind of things. But, there is problem using this system is that whenever human crosses the road it cannot detect properly so we develop a new system to control these things in a simple way using IR module which has some drawbacks that is it can works under line of sight. So we opted to work with RF.

2. HARWARE DETAILS

2.1 Arduino UNO Board

Arduino Uno is a microcontroller development board based on the Atmel ATmega328 MCU. The Arduino Uno has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. This Arduino MCU board contains everything needed to support the microcontroller. Simply connect it to a computer with a adapter or battery to get started. The Arduino Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega8U2 programmed as a USB-to-serial converter. The Arduino Uno MCU board can be powered via the USB connection or with an external power supply.[1]
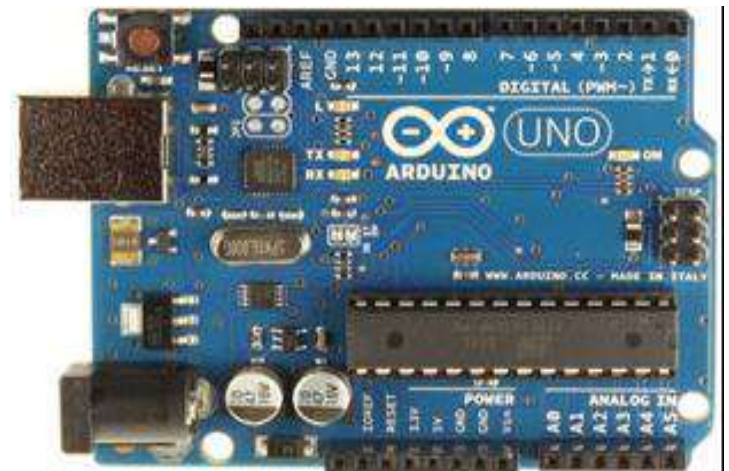

Fig 1: Arduino UNO

Table -1: Arduino Specification

Pin Count	28/32
Flash(Bytes)	32K
SRAM(Bytes)	2K
EEPROM(Bytes)	1K
General Purpose I/O Lines	23
SPI	2
TWI(12C)	1
ADC Channels	8
8-bit Timer/ Counters	2
USART	1
ADC	10-bit 15kSPS
16-bit Timer/Counters	1

2.2 RF Transmitter & Receiver

An RF transmitter module is a small assembly it can able to transmit the radio waves. This is working along with microcontroller. This is used to give data to module which can be transmitted.

Transmitter power output can be decreased by the physical environmental changes such as harmonics, noise and so other parameters. So we can take a necessary steps to overcome this to make transmitter to increase or maintain the quality. An RF Receiver module receives the modulated RF signal, and demodulates it. There are two types of RF receiver modules: super heterodyne receivers and super-regenerative receivers. Super-regenerative modules are usually low cost and low power designs using a series of amplifiers to extract modulated data from a carrier wave.
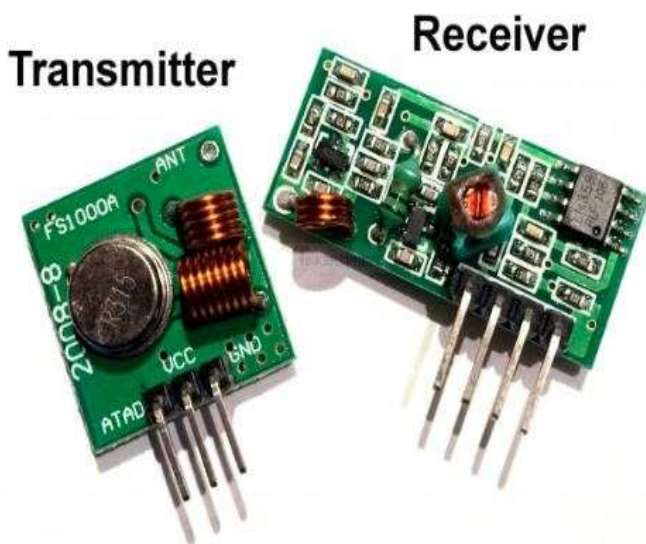

Fig -2: RF Transmitter & Receiver

2.3 L293 Motor Driver

The most common method to drive DC motors in two directions under control of a computer is with an H-bridge motor driver. H-bridges can be built from scratch with bi-polar junction transistors (BJT) or with field effect transistors (FET), or can be purchased as an integrated unit in a single integrated circuit package such as the L293. The L293 is simplest and inexpensive for low current motors, For high current motors, it is less expensive to build your own H-bridge from scratch.

The L293 is an integrated circuit motor driver that can be used for simultaneous, bi-directional control of two small motors. Small means small. The L293 is limited to 600 mA, but in reality can only handle much small currents unless you have done some serious heat sinking to keep the case temperature down.

Fig 3: L293 Motor Driver

2.4 LCD Display

Liquid Crystal Display (LCD) screen is an electronic display module. This modules are preferred over seven segments and other multi segments LEDs. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. The command register stores the command instruction given to LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing display etc. The data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD.[4]
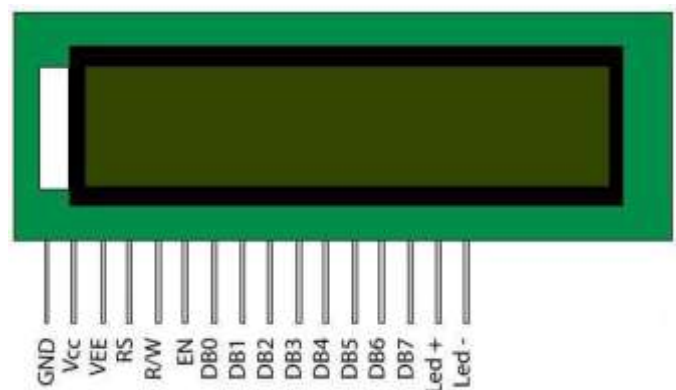

Fig 4: LCD Display

2.5 DC Motor

A DC motor is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor.

DC motors were the first form of motor widely used, as they could be powered from existing direct-current lighting power distribution systems. A DC motor's speed can be controlled over a wide range, using either a variable supply

voltage or by changing the strength of current in its field windings. Small DC motors are used in tools, toys, and appliances. The universal motor can operate on direct current but is a lightweight brushed motor used for portable power tools and appliances. Larger DC motors are currently used in propulsion of electric vehicles, elevator and hoists, and in drives for steel rolling mills. The advent of power electronics has made replacement of DC motors with AC motors possible in many applications.

Fig 5: DC Motor

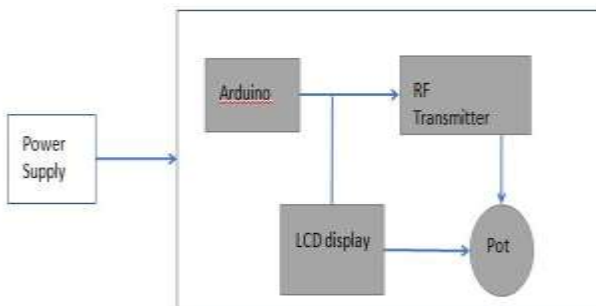## 3. BLOCK DIAGRAM

3.1 Transmitter Section

Fig 3.1: Transmitter Block Diagram

The power is connected to Arduino through USB (Type B). The LCD display is connected to Arduino. The Arduino is main controller which controls all input devices connected to it. The Arduino is reprogrammable device, which can be programmed according to user requirements. RF transmitter transmits the allowable speed level of the restricted area and the potentiometer sets the speed level. The Arduino will display the required output over the LCD Display according to the program.
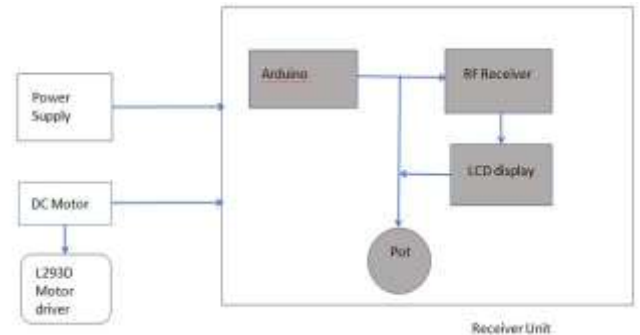
3.2 Receiver Section

Fig 3.2: Receiver Block Diagram

The power is connected to Arduino through USB (Type B). The LCD display is connected to Arduino. The Arduino is main controller which controls all input devices connected to it. The motor driver is used to control the direction of the wheels connected with the dc motors whereas RF receiver receives the signal of the speed level of the restricted area. The LCD display will display the car speed level as well as the restricted area speed and then the arduino determine the course of action accordingly(whether the speed needs to be decreased).

4. WORKING

When the vehicle moves in the normal area no action is performed. But when the vehicle enters into the restricted areas that means it enters into the speed limiting zone. Hence whenever it enters the transmitter module sends an information that contains how much speed a vehicle can go inside the speed limited zone. Then the signal or information is received by the receiver. The signal from the transmitter and the speed of the vehicle is compared. In this there are two cases, First if the current speed is less than the transmitted speed the vehicle goes normally no action is required. Second if the speed of the vehicle is greater than the transmitted speed by the transmitter module the controller waits for few second for the driver to reduce the speed to the below value and if the driver does not decrease the speed then it automatically takes the control and reduces the speed according to the limited level.

5. RESULTS

The developed prototype is low cost and gives an idea of controlling the speed through RF module. This system can be used as a reference in the automatic driven electric cars. As it uses RF signal concept some changes can be made to effectively increase its range.

6. CONCLUSION

In this paper after taking into consideration the various methods provided by different researchers we can conclude that the RF technique is quite feasible option in the near future and we can also add on features like GPS system for tracking as well as GSM system for alerting the concerned authorities if in case of any offense.

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