

## Automatic Vehicle Speed Control System in A Restricted Zone

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**ABSTRACT:** As far as automobiles are concerned, safety is very important to reduce the occurrence of accidents in speed restricted zones. It minimizes the loss of property and life. According to the recent surveys, in the past few years, an accident near the school zones, hospital zones and sharp turnings have increased tremendously, because of their hurry to get the targeted place soon. Therefore, controlling vehicle speed has been a crucial issue to be considered. This paper aims to give a practical, compact and simple design to develop an automatic vehicle speed control system, which has to be quickly get implemented in school, college, hospital, sharp turning zones to reduce the number of accidents. This automated speed controlling system is built using the microcontroller-based platform of the Arduino Uno board. By using Arduino the entire system is controlled. Whenever the vehicle is moving at high speed in restriction zones then RFID reader will scan that vehicle and automatically controls the speed of vehicle. After crossing that restriction zone then again, the vehicle moves at its normal speed.

**Keywords:** Arduino, LED, Dc Motor, RFID

### INTRODUCTION

Every Year we find more and more Road Accidents due to increased traffic on the roads. Now a days people are driving fast, Accidents are occurring very frequently, we lost our valuable life by making small mistake while driving. The Indian Law Commission has an advisory to limit the speed at critical zones, to reduce the road accidents and to make a peaceful environment for the people. The existing methodologies can't able to reduce the accidents still now, Because of the rash driving of some drivers. Hence speed control is in need to be implemented in all the

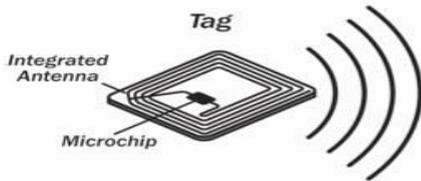
vehicles. Here is the new idea of ours to install an automated speed control system in the vehicles mainly in the restricted areas. Here setup device as a transmitter where the multiple devices are combined to monitor the speed of the vehicle when the vehicle enters above the prescribed speed and controls it by placing a receiver at the vehicles, based on the signals transmitted the speed of the vehicle get reduced by interfacing a microcontroller. The current speed of the vehicle is sensed by the dc motor and the output of it was given to the microcontroller where it compares the speed with the prescribed limit and the speed is controlled automatically.

Many Driver Assistance systems for speed control of vehicle have already been developed so as to avoid accidents. These are Cruise control system (CC) that is capable of maintaining pre-defined speed. Adaptive Cruise Control (ACC) which keeps the automobile at pre-defined safer distance from the preceding vehicle. Curve Warning Systems (CWS) detect the curved roads. But all these systems are not able to control the vehicle speed automatically if driver doesn't respond. Here we propose a dynamic model where the vehicle speed will be controlled and governed based on the information it receives. The key technology used in our model is RFID(Radio Frequency Identification).

### RFID TECHNOLOGY

In the recent years, RFID technology is being incorporated to commercial transportation, highway toll collection system is an example of RFID based system. Reason for its gaining popularity is lowcost tag which can be installed on the sign boards easily. Tag generates an ID code which is sensed by the reader. This ensures security of data. An RFID

system contains one emitter or tag which is attached to traffic lights or sign boards. They contain specific codes for different information. Other element of the system is RFID reader which is installed inside the vehicle. Reader senses and detects the tag ID.



RFID tags are of two types, viz., passive tags and active tags. Passive tags do not contain any power source. These are activated when it comes within the range of the reader. Active tag turns on only if there is power supply. These tags emit identification signals regularly within span of few seconds. There are two different possibilities of using these tags: First possibility is when tag is attached to traffic light. Only active tags, as shown in fig. 3, will be used here because active tags turn ON when it is given a supply voltage. We connect active tag in series with the Red light. Whenever there is a Red light traffic signal situation, that is, if the traffic signal turns red it also supplies power to the active tag at the same time. The tag remains inactive as long as Red light is OFF that is if there is a Green or Yellow traffic signal. When Red light turns ON the reference speed in this case is considered to be 0 Km/hr. This information of Red light is sent to the reader through specified code.

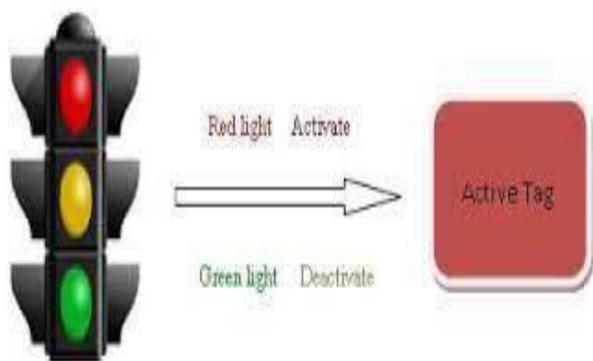


FIG: RFID Tag activates during Red Light

Second possibility is when tag is connected to

speed limit boards on the side of the road. Here we can use active or passive tags depending on the intensity of traffic. These tags contain a particular unique code corresponding to the speed on the speed-limit sign boards. This particular code ID referring to the speed to which the vehicle's speed has to be reduced is transmitted by the tag to the RFID reader. This is shown in fig

## PROPOSED SYSTEM

### 3.1 BLOCK DIAGRAM

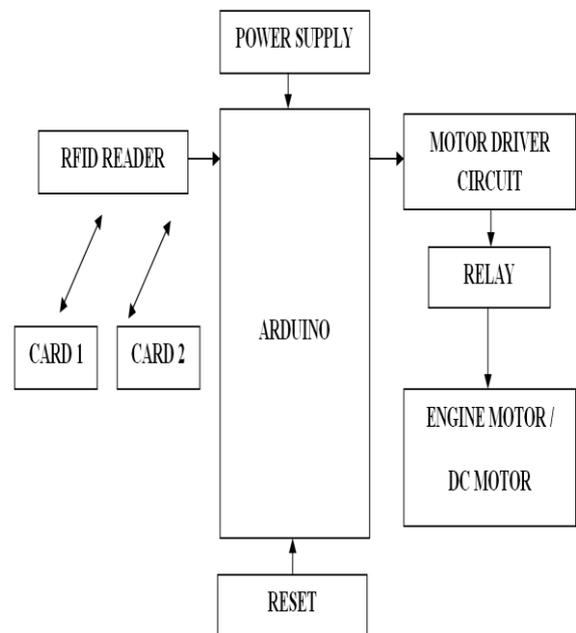


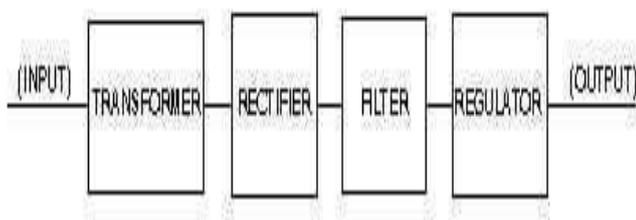
Fig 3.1: BLOCK DIAGRAM OF PROPOSED SYSTEM

#### ARDUINO:

The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

#### POWER:

The Arduino Uno can be powered via the USB connection or with an external power supply. The power source is selected automatically. External (non-USB) power can come either from an AC-to-DC adapter (wall-wart) or battery. The adapter can be connected by plugging a 2.1mm center-positive plug into the board's power jack. Leads from a battery can be inserted in the Gnd and Vin pin headers of the POWER connector.



**Fig 3.4: Block diagram of power supply**

#### **DC MOTOR:**

A DC motor is an electric motor that runs on direct current (DC) electricity. In any electric motor, operation is based on simple electromagnetism. A current-carrying conductor generates a magnetic field; when this is then placed in an external magnetic field, it will experience a force proportional to the current in the conductor, and to the strength of the external magnetic field. As you are well aware of from playing with magnets as a kid, opposite (North and South) polarities attract, while like polarities (North and North, South and South) repel. The internal configuration of a DC motor is designed to harness the magnetic interaction between a current-carrying conductor and an external magnetic field to generate rotational motion.

#### **RELAY :**

A relay is an electromechanical switch, which perform ON and OFF operations without any human interaction. General representation of double contact relay.

Relays are used where it is necessary to control a circuit by a low-power signal (with complete electrical isolation between control and controlled circuits), or where several circuits must be controlled by one signal.

#### **RFID READER:**

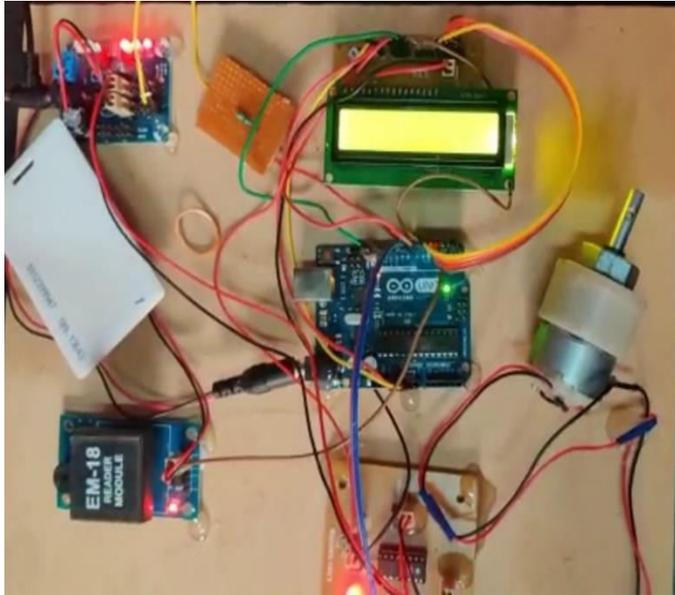
RFID reader is one of the commonly used RFID reader to read 125KHz tags. It features low cost, low power consumption, small form factor and easy to use. It provides both UART and Wiegand26 output formats. It can be directly interfaced with microcontrollers using UART and with PC using an RS232 converter.

All the tag numbers or the tag code IDs is already saved in the database microcontroller of the reader section which is installed in the vehicle. When the microcontroller gets the code ID, it knows which zone the vehicle is entering and what should be the speed which should be maintained by the vehicle in this zone. Appropriate action will taken either by the driver or automatically by the vehicle system.

Tags are installed at the beginning of speed limit zone and at traffic signal. When a vehicle enters the speed limit zone or if there is a red light at traffic signal, RFID reader installed in the vehicle detects the tag code. This code indicates the speed which is to be maintained at that area. Reader transfers tag code to microcontroller. When microcontroller gets the code it compares this code ID with the codes which are already saved in database of microcontroller. If match is found, the code ID is valid. Microcontroller knows the speed limit which is to be maintained in the zone. Microcontroller compares the speed of the vehicle with the specified speed limit. If vehicle speed is lower or equal to the specified speed limit, microcontroller displays a message to remain below the specified speed limit on LCD screen. But if vehicle speed is more the buzzer turns ON and driver is asked to reduce the vehicle speed down to the specified limit. If no action is taken by the driver within a specified time (2 seconds in our system), the microcontroller will send necessary signal to the ECU of the vehicle to reduce the speed automatically down to the specified speed limit. If speed is reduced to the specified limit buzzer and display will be turned off. When vehicle reaches outside the tag range, microcontroller removes the control over the

vehicle and entire control is transferred back to the driver.

**RESULTS:**



**FIG: Final Output**

**CONCLUSION:**

This paper explains the intelligent vehicle control based on the RFID technology. RFID system alerts the driver about the speed limit zone. If the driver is inattentive the speed of the vehicle can be maintained in the limited speed without the intervention of the driver. The system can prevent the road accidents in critical zones. It also reduces the traffic rule violations. Main motive for designing this system is to avoid accidents and alert the drivers about speed limit for safe travelling. It is used to govern and regulate the speed of the vehicle in hospital, school and work zones. Accidents can be prevented which are caused by the negligent driving or speeding by the driver. Thus saves many valuable lives.

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