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Intelligent Traffic Safety Measures by Speed Checking of Vehicle on Highway in the School Zone With Over Speed Alert and Control

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Abstract: *This project aims to monitor, alert and control the speed of any vehicles automatically in cities and also in restricted areas such schools, parks, hospitals and in speed limited areas etc. Now a days in a fast moving world people do not have self control, which leads to accidents. So it is difficult for the police to monitor all the accidents. This project provides a way to control the speed without harming others. Driver does not control anything during such places; controls are taken automatically by the use of electronic system. In this project we are using IR sensor for indicating the speed of vehicle, it is placed at the starting and end points of the restricted zones. Obstacle detectors are placed inside the vehicle.*
The controller measures the speed identify the vehicle type and gives audio and visual alert to the near by public in the zone. If any body crossed the road close to vehicle then another system will turn off or lower the speed of that vehicle automatically to avoid accident case If speed is very high then information is transmitted to the nearest security staff, police station by the use of GSM.
From the advent of increased transportation, over speeding of vehicles has become one of the major causes for accidents and killing many lives. This project presents a system, developed for over-speed detection of the vehicle or human beings and alert corresponding persons by giving buzzer automatically and also sends messages to the traffic control station. Presently, RADAR gun or LIDARS are extensively used for over speed detection but it requires a person to pull the trigger for detecting the speed. In this work it has been proved that automation provides better performance than a human handled system. Simultaneously system is capable to detect audio violation by audio level measurement circuit and co, co2 pollution by the vehicle.

Keywords: IR Sensors, Arduino, LCD Display, Servo Motor, GSM Module

I. INTRODUCTION

We all know that over speed is the major cause for road accidents. In this busy life schedule, people always prefer to drive at very high speed rather than low speed to reach their respective places in time. Thus, it is necessary to understand the need of a technology which would be used as a speed limit enforcement system. A system which helps to limit the speed of the vehicles and the owner would be punished under the law due to over speed and this is the best method for making people to drive at normal designated speeds. In some places, traffic policemen are there to monitor to proper functioning of traffic on roads and at some places, traffic places RADAR system is used and this is a technology which is based on the Doppler Effect and with just one trigger it can determines the speed of the vehicles. Every system whether it is a RADAR or any other it manually requires a human to take for watching the vehicles passing by and to report if any vehicle breaks the law or over speeds.

Every system uses advancements in technology to prioritize the automation over human handled machines. So, the traffic monitoring system should also be made as automatic which is possible in many ways. This paper is an idea of one of such system. The project is developed by keeping in view all the disadvantages mentioned above and is named as Speed Check and over speed detector. This system mainly focuses on calculating the speed of approaching vehicle that over speeds. The

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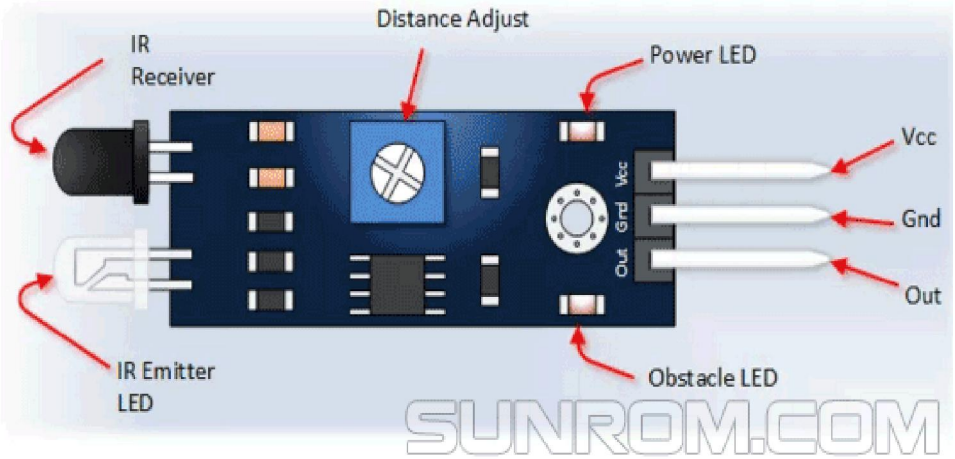
literature related work to the automatic speed detection systems is presented in section 2. Implementation details of the proposed system are in Section 3.

1) IR SENSOR: Proximity Sensor are used to detect objects and obstacles in front of sensor. Sensor keeps transmitting light and when any object comes near, it is detected by the sensor by monitoring the reflected light from the object. It can be used in robots for obstacle avoidance, for automatic doors, for parking aid devices or for security alarm systems, or contact less tachometer by measuring RPM of rotation objects like fan blades.
Digital low output on detecting objects in front.



Pin, Control Indicator	Description
Vcc	3.3 to 5 Vdc Supply Input
Gnd	Ground Input
Out	Output that goes low when obstacle is in range
Power LED	Illuminates when power is applied
Obstacle LED	Illuminates when obstacle is detected
Distance Adjust	Adjust detection distance. CCW decreases distance. CW increases distance.
IR Emitter	Infrared emitter LED
IR Receiver	Infrared receiver that receives signal transmitted by Infrared emitter.

2) ARDUINO UNO:
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 computerwith a USB cable or power it with a AC-to-DC adapter or battery to get started. The Unodiffers from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter.

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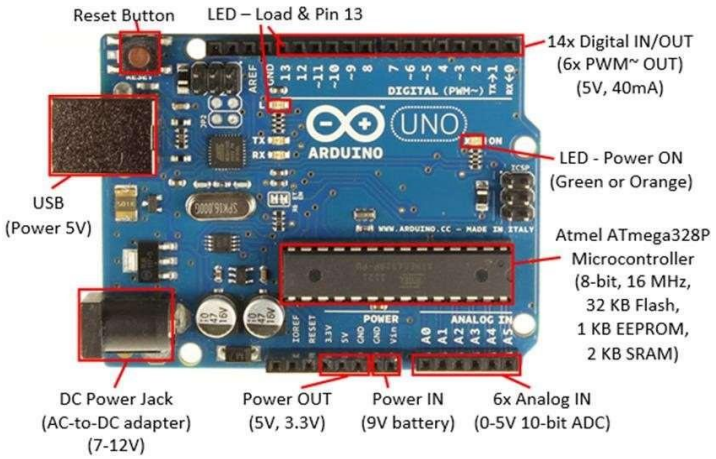

Figure 2: Circuit Diagram of a Arduino

3) 16*2 LCD DISPLAY:

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on.A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data.The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling 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. Click to learn more about internal structure of a LCD.

FEATURES:

16*2 matrics

Low power operation support 2.7 to 5.5V

Duty cycle: 1/16

Connector for standard 0.1-pitch pin headers

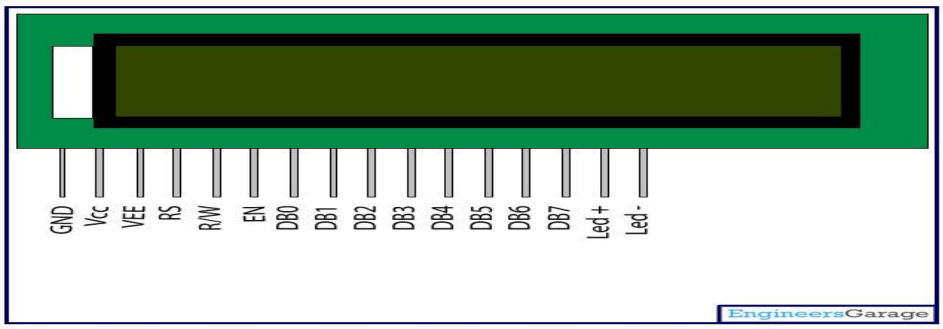

Figure 3: 16*2 LCD Display

4) RESISTOR :

A resistor is a two-terminal electronic component designed to oppose an electric current by producing a voltage drop between its terminals in proportion to the current, that is, in accordance with Ohm's lawV = IR Resistors are used as part of electrical networks and electronic circuits. They are extremely commonplace in most electronic equipment. Practical resistors can be made of various compounds and films, as well as resistance wire (wire made of a high-resistivity alloy,

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such as nickel/chrome).The primary characteristics of resistors are their resistance and the power they can dissipate. Other characteristics include temperature coefficient, noise, and inductance. Less well-known is critical resistance, the value below which power dissipation limits the maximum permitted current flow, and above which the limit is applied voltage. Critical resistance depends upon the materials constituting the resistor as well as its physical dimensions; it's determined by design. Resistors can be integrated into hybrid and printed circuits, as well as integrated circuits. Size, and position of leads (or terminals) are relevant to equipment designers; resistors must be physically large enough not to overheat when dissipating their power.

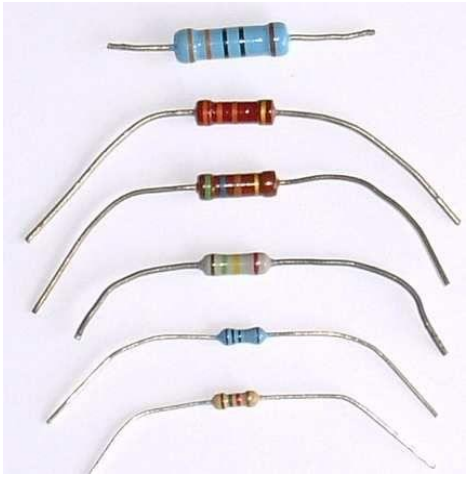

Figure 4 : Diagram of Resistors

5) Servo Motor :

A servo motor is a type of motor that can rotate with great precision. Normally this type of motor consists of a control circuit that provides feedback on the current position of the motor shaft, this feedback allows the servo motors to rotate with great precision. If you want to rotate an object at some specific angles or distance, then you use a servo motor. It is just made up of a simple motor which runs through a servo mechanism. If motor is powered by a DC power supply then it is called DC servo motor, and if it is AC-powered motor then it is called AC servo motor. For this tutorial, we will be discussing only about the DC servo motor working. Apart from these major classifications, there are many other types of servo motors based on the type of gear arrangement and operating characteristics. A servo motor usually comes with a gear arrangement that allows us to get a very high torque servo motor in small and lightweight packages. Due to these features, they are being used in many applications like toy car, RC helicopters and planes, Robotics, etc.Interfacing Servo Motors with Microcontrollers:

Interfacing hobby Servo motors like s90 servo motor with MCU is very easy. Servos have three wires coming out of them. Out of which two will be used for Supply (positive and negative) and one will be used for the signal that is to be sent from the MCU. An MG995 Metal Gear Servo Motor which is most commonly used for RC cars humanoid bots etc. The picture of MG995 is shown below:

Figure 5 : Servo Motor

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6) PIEZOELECTRIC BUZZER :
MICRO BUZZER 5V DC / 20mA PCB TYPE

Features
sealed: yes
operating power: 3-6V DC / 25mA
extremely compact, ultrathin construction
no electrical noise
low current consumption yet high sound pressure level.

Specifications

- tone type: single
- operating voltage: 3-6V DC
- rated voltage: 5V DC
- current consumption: 25mA
- osc. frequency: 3.2kHz
- sound level: 87dB
- connector type: pcb
- body color: gray
- weight: 0.056oz

7) GSM MODEM
This GSM modem has a SIM800A chip and RS232 interface while enables easy connection with the computer or laptop using the USB to Serial connector or to the microcontroller using the RS232 to TTL converter. Once you connect the SIM800 modem using the USB to RS232 connector, you need to find the correct COM port from the Device Manger of the USB to Serial Adapter. Then you can open Putty or any other terminal software and open an connection to that COM port at 9600 baud rate, which is the default baud rate of this modem. Once a serial connection is open through the computer or your microcontroller you can start sending the AT commands. When you send AT commands for example: "AT\r" you should receive back a reply from the SIM800 modem saying "OK" or other response depending on the command send.
SIM800 is a complete Quad-band GSM/GPRS solution in a LGA type which can be embedded in the customer applications. SIM800H support Quad-band 850/900/1800/1900MHz, it can transmit Voice, SMS and data information with low power consumption. With tiny size of 15.8*17.8*2.4 mm, it can fit into slim and compact demands of customer design. Featuring and Embedded AT, it allows total cost savings and fast time-to-mar for customer applications.

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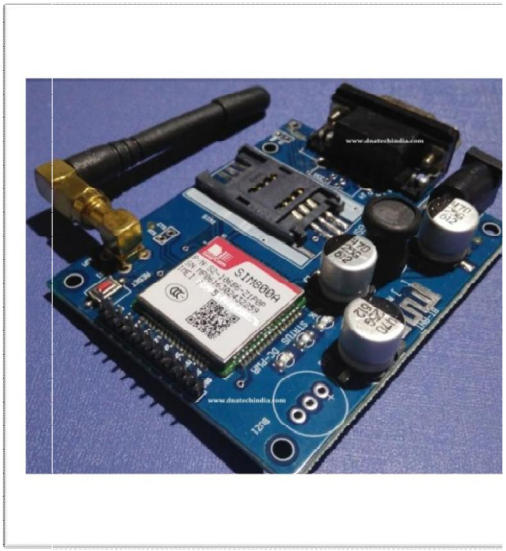

Figure 7: GSM MODEM

II. CONCLUSION

In this project we are developing a new design to monitor speed and type of vehicle and to control it at critical situation at restricted zone. In normal slow driving mode no alert, no sms and not required to control speed of vehicle. But at high speed we can expect other vehicles interfering with auto speed control system.

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Electrical engineering department where knowledge is considered s wealth and it is proved that the power of mind is the ways of sun; when concentrated they illuminate. First & foremost, we express our gratitude toward our Prof. M. S. Gadakh who kindly consented to act our guide. We cannot thanks enough, and almost contagious positive attitude and critical comment are largely responsible for a timely and enjoyable completion of this assignment. We appreciate his enlightens guidance especially his pursuit for the perfect work will help in long run. We would like to express our deep gratitude regard to Dr. M. A. Venkatesh (Principal Amrutvahini college of engineering), and Prof. S. S. Kadlag (Head of Department) (Seminar coordinator for their support. We are also graceful to our entire staff of AVCOE, our friends and parents without their support this task is difficult

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