Car Over-Speed Detection with Remote Alerting

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Abstract

The aim of this project is to develop a device to detect rash driving on highways and to alert the traffic authorities wirelessly about the speed details and any speed violation. Accidents due to rash driving on highways are on the rise and people are losing their lives because of others mistakes. In the present system, to detect rash driving the police has to use a handheld radar gun and then aim at the vehicle to record its speed. If the speed of the vehicle exceeds the speed limit, nearest police station is informed to stop the speeding vehicle. This is an ineffective process as after detecting one has to inform the same and a lot of time is wasted. The proposed system will check on rash driving by calculating the speed of a vehicle using the time taken to travel between the two set points at a fixed distance and then transmit the data over 2.4GHz to the central control room. A set point consists of a pair of sensors comprising of an IR transmitter and an IR receiver, each of which are installed on either sides of the road. The speed limit set by the device is kept at the very location depending upon the traffic. The time taken by the vehicle to travel from one set point to the other is calculated by a microcontroller program. Based on that time it then calculates the speed and displays that on an LCD and also transmits the same. Moreover if the vehicle crosses the speed limit, a buzzer sounds alerting the police both at the location and wirelessly at the control room.

Keywords: Frequency modulation, Sensors Microcontroller, LED, detection, MATLAB software

I. INTRODUCTION

The aim of this project is to limit the speed of the vehicles on the road. This project is designed using embedded system and MATLAB technology. The main components of this project are microcontroller, LCD, Power Supply and reflector sensors.

We have used two sensors in this project sensors are used to detect the vehicle speed. Both sensors should be installed at a distance of 100 meters apart from each other. When a vehicle is passed the first sensor it gives signal to the microcontroller which starts calculating the time until it reached the second sensor. When it reached the second sensor it calculate the speed of the vehicle by the formula "Speed=distance/time". If the calculated speed of the vehicle is above the certain limit or over speed then it gives a signal to the PC. PC not directly interfaced with controller a line driver is used to which convert the RS232's to TTL voltage levels that will be acceptable to microcontroller. An application design in the MATLAB take a picture of vehicle according to the signal send by the microcontroller.

II. PROPOSED SYSTEM

This presents an automated method for detecting the over speed of vehicles and charging them fine at the Toll or by directly call through number plate. The project consists of three main modules; the RF-section where 2.6 GHz frequency signal is generated, transmitted and received, the analog to digital conversion which is used to determine the speed of vehicle and the license plate extraction which is used to extract the license plate and email it to Toll. Doppler Effect is used to calculate the speed of vehicle. If the detected speed is greater than a set speed threshold, a camera automatically captures the snap of the vehicle and license plate number is extracted using Digital Image Processing (DIP) techniques. MATLAB is used for image processing. The prototype has been implemented and successfully detects the over speed and extracts the license plate along with informing the Toll.

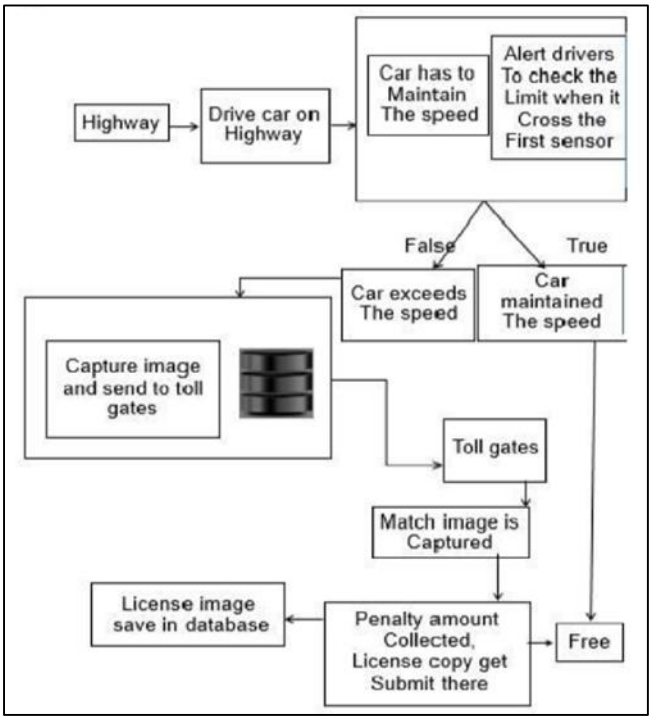

Fig. 1: Proposed system

This project will contain mainly four major modules: User interface, Activity Module, Camera Module, Data Module. First these modules will be developed independently and then this all will be integrate together.

A. User Interface Module (Augmented Reality):

This module will basically provide the camera view for the authority. It will also show the sensors. The sensor will show the pin points that are extracted from the various data source. The vertical scrollbar will allow the user to adjust the area to be covered in kilometres.

B. Camera Module:

This module represents the camera and its view. It also allows a user to project a point given this camera's view. It also represents the camera's surface and all the initialization involved with it.

C. Activity Module:

This module represents the Sensors Activity and is designed with the Augmented View

1) Augmented view:

Augmented view class in the activity modules extends the View class and is designed draw the zoom bar, radar circle, and markers on the View.

2) Sensor Activity:

The sensor activity class extends Activity and processes sensor data and location data.

D. Data Module:

This module contains Abstract class which should be used to set global data. It extends Data source from various data sources such as Google Buzz, Wikipedia, Twitter and it has many methods to get and parse data from numerous web sources.

E. Steps:

1) Step 1- Apply the power supply by flipping the switch to ON.
2) Step 2- Reset the circuit so that display shows '0000'.
3) Step 3- Select the speed limit to 60 kmph.
4) Step 4- When any vehicle crosses the first IR Diode light, PHOTO DIODE1 will trigger IC1 hence LED 1 glow during for period.
5) Step 5- When the vehicle crosses the second IR Diode light, the output of IC2 goes high and LED2 glows for this period.
6) Step 6- If the vehicle crosses the distance between the IR Diode set-ups at more than 60 kmph, the buzzer sounds an alarm.
7) Step 7- The counter starts counting when the first IR Diode beam is intercepted and stops when the second IR Diode beam is intercepted.

8) Step 8- The time taken by the vehicle to cross both the IR Diode beams is displayed on the 7-segment display.

III. FLOWCHART

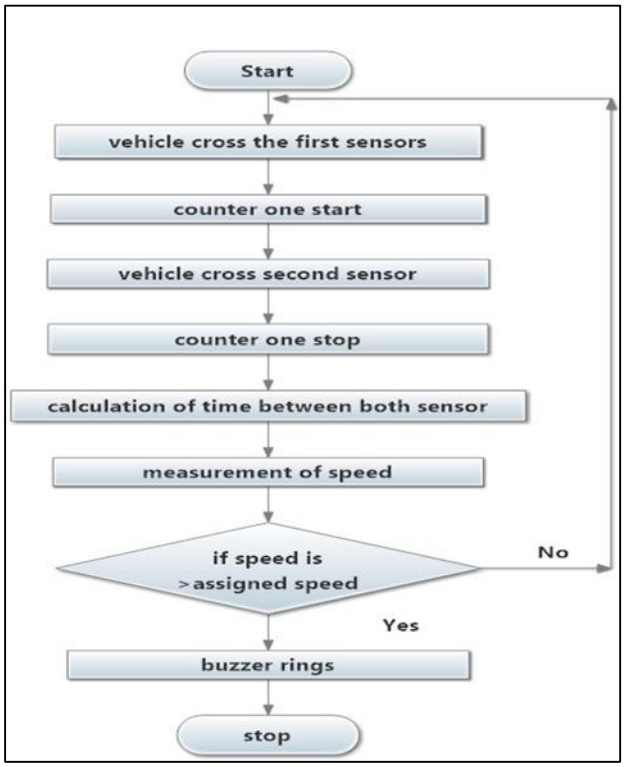

Fig. 2: workflow of proposed system

IV. PROPOSED HARDWARE SYSTEM

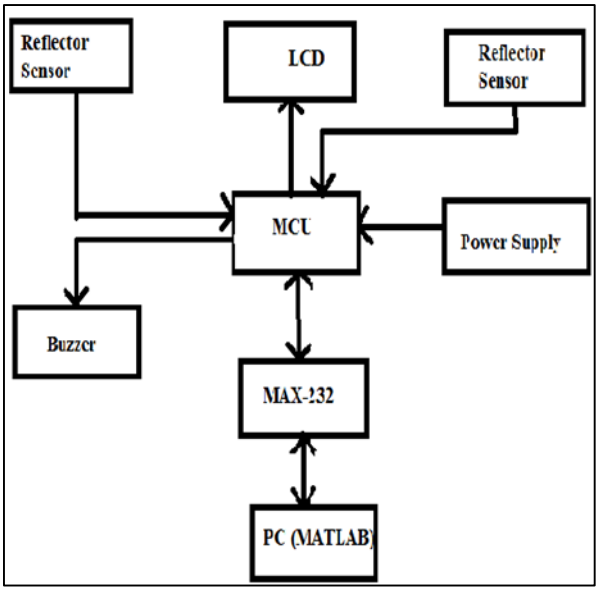

Fig. 3: proposed hardware system

A. Regulated Power Supply:

Power supplies are designed to convert high voltage AC mains to a suitable low voltage supply for electronic circuits and other devices. In our project the various electronic modules are being used for which power supply requirement is +5V DC. The Microcontroller unit needs a pure regulated +5V DC.

B. Microcontroller:

In the projects we will use from Atmel corporation AT89C52/AT89S52 having similar features of 8052. The benefit of using AT89S52 is that it is In-circuit system programmable (ISP) i.e. it can be reprogrammed without removing it from the application using ISP Programmer. But if we are using AT89C52 then if we have to reprogram it then first of all we have to remove it from our application then program it using its programmer and then install it again in the application to use.

C. Display Unit (Liquid Crystal Display):

Display unit used in our project will be Liquid crystal display (LCD) which makes our project user friendly by displaying everything on the display. It can display 32 characters at a time on the display. There are two rows (lines) and 16 characters can be displayed in each line. And it will be used in 8 bit mode i.e. its 8-bit data bus will be used to transfer the data codes from MCU to LCD.

Fig. 4:Liquid crystal display (LCD)

D. Buzzer for Beep Source:

A Buzzer will be used as an audio alarm in our project. Typical uses of buzzers and beepers include alarm devices, timers and confirmation of user input such as a mouse click or keystroke. The buzzer used in our project will be piezoelectric buzzer.

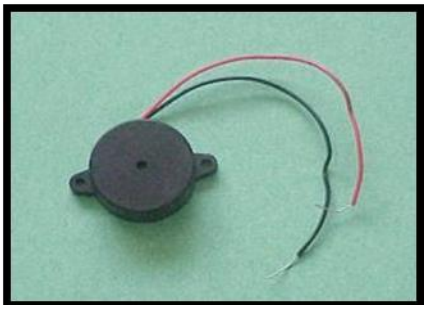

Fig. 5:Buzzer

E. MAX232

This chip is used when interfacing microcontroller with PC to check the Baud rate and changes the voltage level because micro controller is TTL compatible whereas PC is CMOS compatible. it does is to convert signal voltage levels.

F. IR Reflector Sensor

r An IR transmitter or source converts an electrical signal to an optical signal. A receiver or detector converts optical power into electrical current by detecting the photon flux incident on the detector surface.

G. MATLAB

(matrix laboratory) is a numerical computing environment and fourth generation programming language. Developed by Math Works, MATLAB allows matrix manipulations, Plotting of functions and data, implementation of algorithms, creation of user interfaces, and interfacing with programs written in other languages, including C, C++, Java, and Fortran. An application design in the MATLAB take a picture of vehicle according to the signal send by the microcontroller

V. FUTURE SCOPE

If over speed is detected it sends alert massage to driver. Wireless transmission is achieved with the help of zigbee, which provides low cost transmission of data. The Drivers are made aware of their driving behaviour and violations made so that careful and conscious driving can be achieved.

Repeated violations results to increase in penalty amount which will help in reduction of violations by the vehicle user.

VI. CONCLUSION

It is a boon for the as well as people whose precious time and reduce workload. The system not only lessens the work load on the traffic police. For the concerned educational institute's authority whose workload is tremendously reduced and for the government at large, whose services are protected from exploitation

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