Design And Implementation Of Pc Based Over Speed Violation Management For Vehicles On Highway

Ni Ni Hlaing, Zaw Min Min Htun, Hla Myo Tun

Abstract: In the present day scenario traffic rules are frequently violated by the drivers and over speeding occur due to bad driving behavior. So, a driver assistance system is provided to prevent over speeding, violation of road rules , also to display alert messages and gives alerts like “road works”, “steep slope”, “school zone” in the form of acoustical messages and also in LCD. The proposed system has a reporting, displaying and database systemfor over speed violation management. This designed system has the ability to detect the speed of the vehicle in the roads and the main highways and the places where the drivers can use of more speed while driving. The laser transmitter senses the load entered by the vehicle and then the receiver unit sends to the microcontroller. The receiver unit is used by Light Dependent Resistor (LDR). If the speed of vehicle exceeds the permissible speed for the highway, this information will sent to PC which starts the camera to capture the vehicle. And all the information of vehicle are sent to database system. Then also shows the speed information on LCD.

Keyword— PIC 16F887 Microcontroller, LCD display, laser transmitter, LDR, PC, database system.

I. Introduction

Controlling devices with the use of switches are the common case. Controlling devices with the remote control switches like infrared (IR) remote control switch, radio frequency (RF) remote control switch and light activated switches are becoming popular. This system uses an infrared remote control as a wireless communication to connect control devices.This system is to manage the speed limit of a vehicle on highway using the microcontroller. This system will be composed of a main PIC 16F887, power supply, speed sensing circuit, camera system and database system. The sensor detects the speed information of vehicleandsends signal to the microcontroller. If the vehicle is over speed, microcontroller report these information to PC and LCD will be displayed as “Over Speed”. And PC also continue to start the camera to capture the vehicle. Then all the information of vehicle are collected in database table. Otherwise the vehicle is not over speed, “Normal Speed” will be displayed on LCD. The over speed control system will comprise three major parts namely, (i)data signal from sensor, (ii)camera system and (iii)database system. The sensor detects the speed information and sends signal to the microcontroller to record and report to camera system.This system deals with one of the efficient method to provide safety to road users.

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II. Over Speed Violation Management System

The system basically comprisestwo laser transmitter-LDRsensor pairs, which are installed on the highway 100 meters apart,with the transmitter and the LDR sensor of each pair on theopposite sides of the road. The installation of lasers and LDRs is shown in Fig. 2. The main portion of this control system is laser transmitter and LDR receiver, microcontroller and LCD display. Light from the laser transmitter keeps falling on the LDR sensor continuously. The systemkeeps the time taken bythe speed of thevehicle in crossing this 100m distancefromone pair to the other. And then its speed information displays on LCD, from which the speed of the vehicle can be calculated as followed:

$$Speed(kmph) = \frac{Distance}{Time}$$

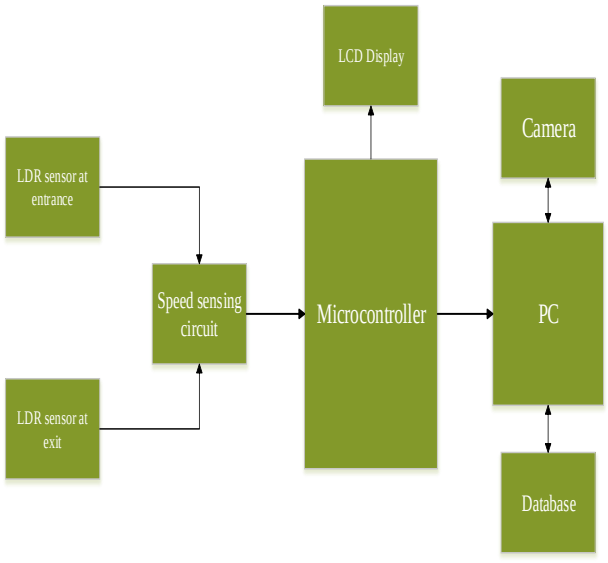


Fig. 1 *Block Diagram of Speed detection System*

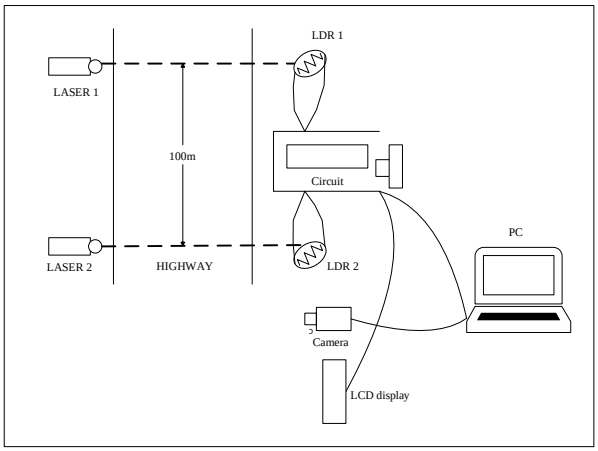


Fig. 2 *Installation of lasers and LDRs on highway*

III. OVERALL OPERATION OF THE SYSTEM

The system comprises two laser transmitter-LDR sensor pairs, which are installed on the highway 100m apart. The transmitter and the LDR sensor of each pair on the opposite sides of the road.The system displays the time taken by the vehicle in crossing this 100m distance from one pair to the other.These speed sensing circuit send information to microcontroller and display on LCD.Then microcontroller controls to send the over speed information of vehicle to PC.And PC continue to start the camera for the process of capturing the vehicle and sending these photo of vehicle to database. Then “time for state in over speed of vehicle” and “speed which data form microcontroller to PC is converted to kmph” are also collected in database table.

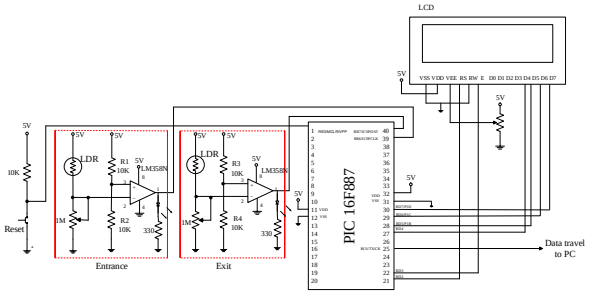


Fig. 3 *Overall Circuit Diagram*

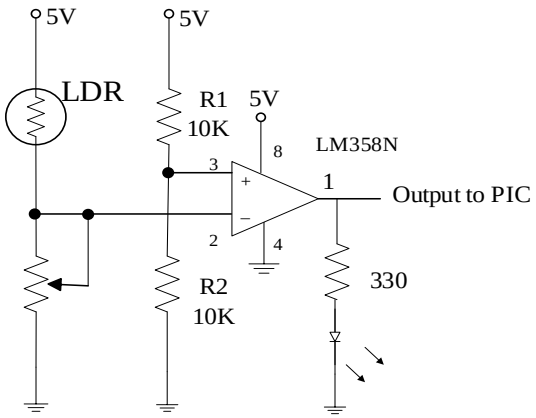


Fig.4 *Speed Sensing Circuit*

The voltage at positive terminal will be 2.5V due to two 10K Ohm resistors. When LDR is in the light, its resistance decreases to hundreds ohms which is much lower than 1M Ohm of variable resistor. Negative terminal of Op-Amp will get higher voltage than 2.5V. The output voltage of Op-Amp will be low.When LDR is in the dark, its resistance increases higher than 1M Ohm of variable resistor. Negative terminal of Op-Amp will get lower voltage than 2.5V. The output voltage of Op-Amp will be high.The desired intensity of light can be adjusted by changing variable resistor.

IV. SOFTWARE IMPLEMENTATION

Software implementation in the PIC16F887 the MicroC compiler is used. Program for this system is composed of main Processing (sensing/ assigning/ displaying). Microcontroller is main processing unit in remote control system. PIC16F887 is chosen to perform the functions needed for over speed sensing system. And Window Form Design (Fig.6) is used by using C# Program in PC to build database table. The flowchart of the algorithm is shown in Fig.5.Firstly, initialize the I/O ports. Then check and display all the condition in program needed for the system.

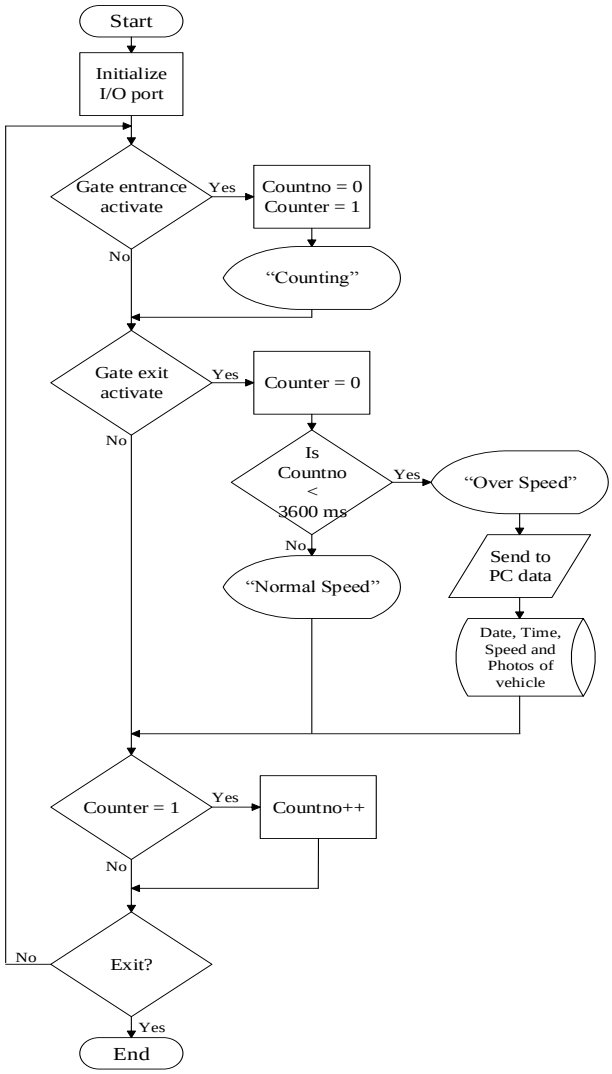


Fig.5 *Flow Chart for program*

Fig.7 shows database table design is built in window form by using service based database type. In this system, it is included the following items;

- id – to show number
- time – to keep current time state for over speed of vehicle
- Speed – to keep the information of vehicle which is converted to kmph of data from PIC to PC
- Data – to take photo of vehicle which is captured by camera

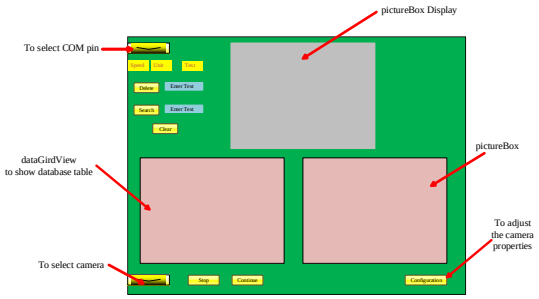


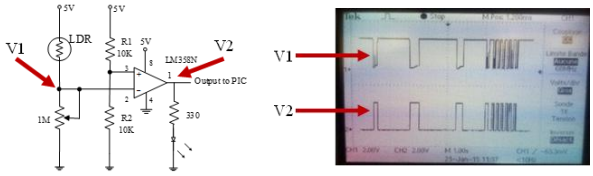
Fig.6 *Window Form Design by using C# Program*

id	Time	Speed	Data

Fig.7 *Database Table Design*

V. Test and Result Photos of the System

First pair of laser transmitter-LDR sensor takes time counting. Also second pair take time and then its time is converted to speed in kmph. This information display on LCD. If time range less than regard time range, it will display “Over Speed”. Or not, it will display “Normal Speed”. PIC microcontroller controller controls all the system. Fig.5 shows that LDR is in dark, the input voltage to op amp of negative terminal or V1 get low. Then the positive terminal of op amp get higher than negative terminal. So the output voltage of op amp or V2 get high and its input to PIC. Also PIC performs all of the system operation. Fig.6(c) shows voltage range measured by oscilloscope.



(a) (b)

Fig.8(a) and (b) *Simulation result with oscilloscope*

The prototype will be constructed. The experimental tests for the control system are to control the prototype is shown in Fig. 9to14.

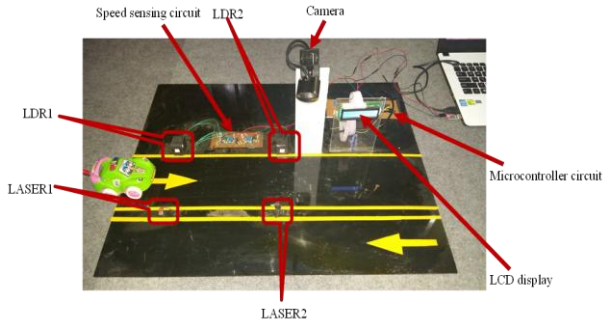


Fig.9 *Prototype for over speed detection*

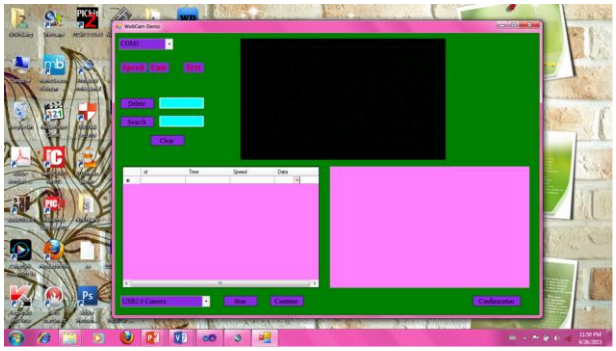
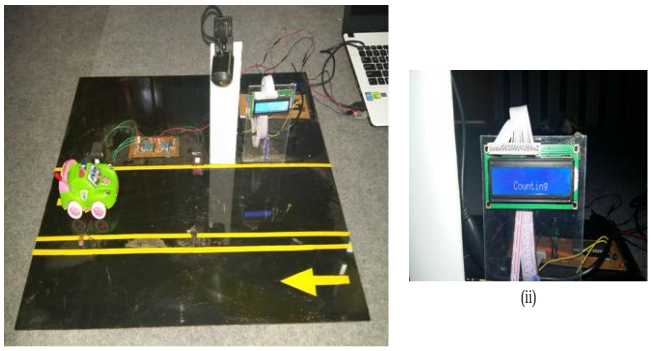
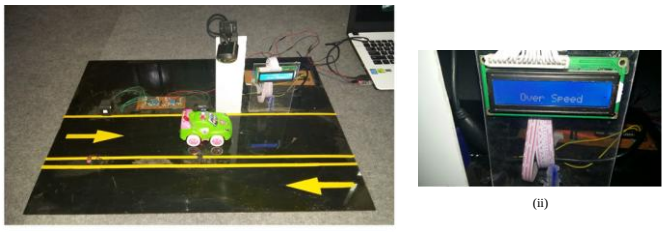


Fig.10 *Start debugging the program of window form design in PC*



(i) (ii)

Fig.11 *Gate entrance activated (i) LDR1 active and (ii) Display on LCD “Counting”*



(i) (ii)

Fig.12 *Gate exit activated (i) LDR2active and (ii) Display on LCD “Over Speed”*

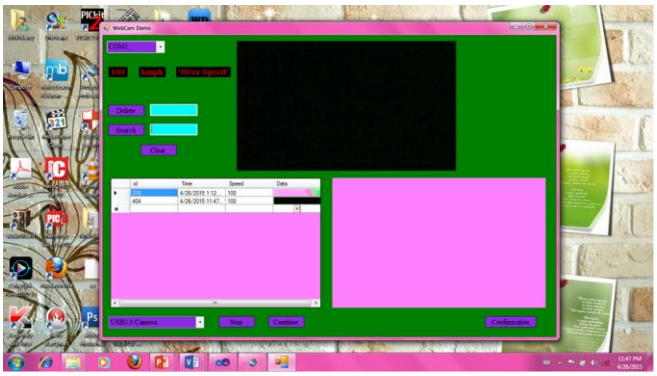


Fig.13 *After vehicle is captured due to "Over Speed"*

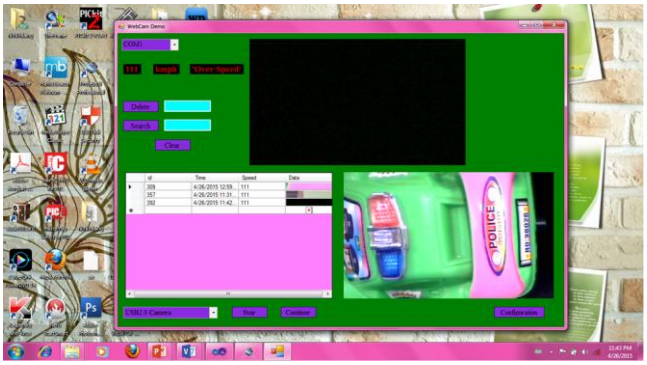


Fig.14 *Show the photo after captured the vehicle*

VII. Conclusion

A microcontroller is essential if an automated system is to be achieved. This design had to establish physically how the circuit to work and by other hand we were programming and programming until the measure was desired. This system can give a lot of benefits either to the road user or to the highway system management. Can get the safety system. It also reports and displays the vehicle information respectively. Microcontroller performs the complete operation i.e., reporting the over speed information to PC and displaying on the LCD.

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