

Vehicle Over speed Detection and Control

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Abstract: Over the pass years, Pakistan has been experiencing terrifying rate of highway accidents. These accidents have risen to a very high rate over the pass years. Highway accidents obviously have very negative effect and many people get hurt in the process or even die. Therefore, it is very important to have a new efficient system that will decrease the rate. To over come this problem we have developed a system to detect the speed of the over speeding vehicle and capturing using image process, send this data to the authorities.

Keywords: Road accident, Microcontroller, Arduino, sensors, LCD, Speed detection, Image processing

1. Introduction

Road accidents are increasing in Pakistan due to increased vehicle speed [1]. This has become a serious problem, every year approximately 9000 accidents occur in Pakistan which plays with life. Considering heavy loss of lives [2], and wealth in road accidents the concerned road and traffic management agencies have started to incorporate road safety issues in their program but it seems inadequate as the losses of life and property form road accidents is increasing [3-6]. To overcome these problems we have developed an automatic system that addresses the issue of over speeding without use of human resources [7]. The Doppler radar detect the speed of vehicle and send it to microcontroller for measurement and comparison [8]. When system detect over speed, the camera capture the number plate of vehicle send it to the server for processing to authorities [9-10].

2. System Architecture

The overall system has a number of components as sensor, Arduino, LCD display, camera. Firstly the sensor is a major part of system. It senses the moving vehicle and produces output signal. The signal is fed to the digital pin of Arduino. The micron roller measures the frequency of input signal and calculate the speed of the vehicle from the value of frequency. It also checks if the speed limit is exceeded and crossed the limit. It triggers the camera attached to the board. The image is then sent to the server via internet connection.

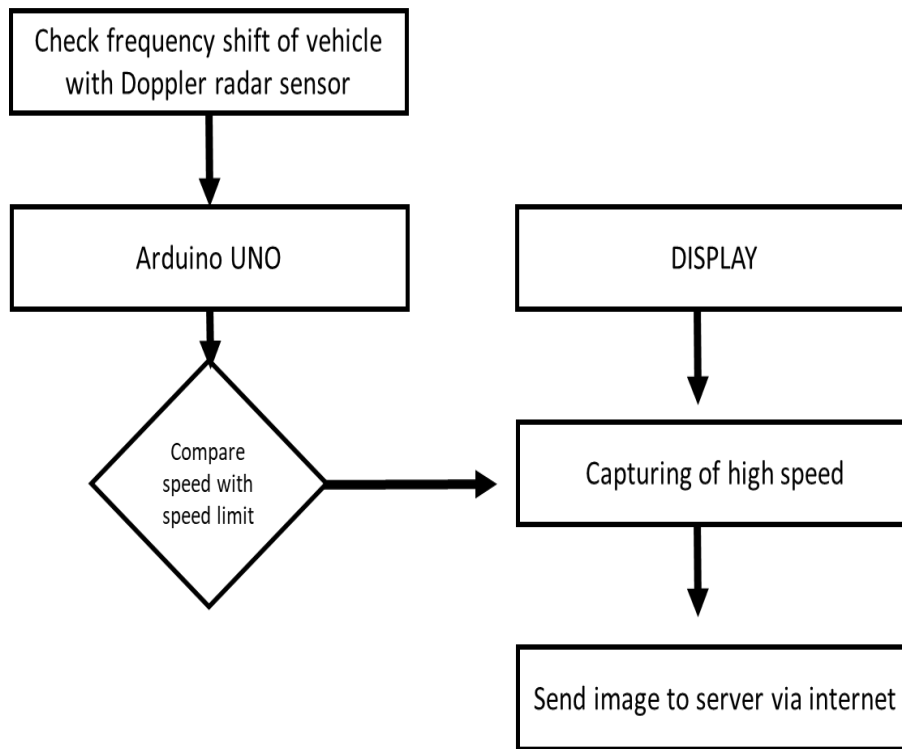


Fig.1- Flow Chart of System

3. Project Hardware and Software

Arduino UNO: Arduino is a single board microcontroller, intended to make the application of interactive objects or environments more accessible. The hardware consists of an open source hardware board designed around an 8-bit Atmel AVR microcontroller. It has USB interface, 6 analog input pins as well as 14 digital IOs pins.



Fig. 2 – Arduino UNO

HB100 sensor: HB100 Miniature Microwave sensor is X-Band Bi- static Doppler transceiver module. Its built-in dielectric resonator oscillator and a pair of micro strip patch antenna array make it ideal for use in motion and speed detection.



Fig. 3 – HB100 sensor

Proteus VSM: The proteus VSM combines mixed mode SPICE circuit simulation, animated components and microcontroller models to facilitate co-simulation of complete microcontroller based design.

Arduino IDE: The Arduino development environment contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino hardware to upload programs and communicate with them. It has many build in libraries along with libraries for LCD display.

4. Result And Discussions

The accuracy of the system in frequency measurement was tested using a function generator and an oscilloscope. The test showed very high degree of accuracy in measurement of frequency of input signal. Accuracy in terms of speed measurement is also good.

5. CONCLUSION

The designed speed detection system was capable of continuously monitoring the speed of approaching vehicle. The sensor detects the speed of moving vehicle and send it to the Arduino for measurement and comparison. When speed detect is limit crossed the microcontroller triggered the camera to capture the image of vehicle and send it to the server, this data is displayed on laptop display.

6. Future Recommendation

The system can be advanced to make more reliable and accurate. The stolen vehicle can be detected by comparing with registered entry of stolen vehicles. Accuracy can be increased using neural networks. Advance image processing and algorithms can be used to make system more accurate.

7. References

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