

Traffic Violations for Safe Speed System

Ola Marwan Aseem

Department of Computer Engineering, Mosul University, Iraq.

Abstract

Most of the cities suffer from roads problems, including the problem of excessive speed, which cause many traffic accidents and many deaths. As a result, there is a need to design a safe speed system to sponsor road safety and save lives for control the speed of vehicles and thus reduce the number of traffic accidents. The proposed integrated system uses modern techniques for measuring speed, recording violations and taking picture of violated vehicles.

Keywords: Violations, traffic accidents, recording violations, safe speed system.

1. INTRODUCTION

Cities today face many common transport problem one of these problems is recording traffic violation, many car drivers try to reach the speed limit on public roads by driving in high speeds with the absence of road monitoring or old method for monitoring the speed limits, this will Great risks. Road accidents due to speeding vehicles' have increased over the last year and many of these accidents have occurred as people choose alternate routes to overcome congestion. An efficient system is needed to monitor the roads and the cars on the roads and record violation without any fault. This system is to reduce the number of accidents due to the high speed of vehicles. When the car exceed the specified speed, the camera will take a picture for the car which exceed the speed and save the picture which is considered as a violation. Applying such a system in the roads will make drivers obey traffic lights more than ever before. In this paper a graphical user interface design was proposed for easier general using it needed typing user name and password to provide higher security.

2.1 Review Stage

In Ref [1], the number of fatalities in road traffic peaked with a record of 3264 in 1972. This amounted about 9 deaths every day. After 1972, the increase in deaths reversed, despite ever increasing mobility, and a downward trend has been maintained. The number of deaths first decreased sharply (except during the 1975–1977 period), but from the mid 1980s on wards this trend became some what less pronounced. In 2006, 811 fatalities in road crashes were reported, four times less than in 1972.

[2] In this paper the focus is to evaluate the possibility of public approval of the information that is to be released, e.g. camera strategic initiatives assessed by through mail-out questionnaires.

[3]In this article the author determine the speed of the road depending on signals in the roads and which is not a priority is suf-ficient to safety, while the proposed research was the priority for safety by putting the limit exceeded speed (the speed of safety) in the specific region and release the violation for the person that exceed this speed.

[8]This paper describes an ultrasonic sensor that able to measure the distance from the ground of selected points of a motor vehicle.

The sensor head emits an ultrasonic wave and receives the wave reflected back from the target. Ultrasonic Sensors measure the distance to the target by measuring the time between the emission and reception. Such a technique, which takes the frequency response of the ultrasonic transducers into account, allows a sub-wavelength detection to be obtained.

2.2 Radar

Radar is used to detect the violation; it uses radio waves instead of sound waves because of its ability to reach farther distance and its ability to function even when they are weak[4]. For ground radars they are influenced by several factors. When radar signals are launched they may receive echoes from many objects, such as buildings or even from mountains. To avoid this problem the police radar is usually Doppler type where the radar is narrowly focused to collide with only one car. Doppler radar specialized in determining

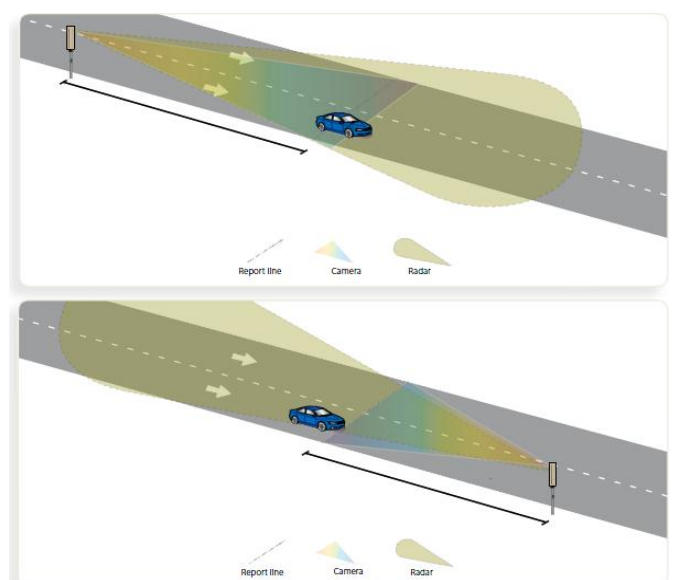


Figure 1: Radar System

the speed of the objects the principle of his work is on the knowledge that of the waves produced by the body will gather at the approach from them and will spread when he is absent from them. In the proposed system the ultrasonic sensor was used to measure the speed of the car in the road, As the name indicates, ultrasonic sensors measure distance by using ultrasonic waves. The sensor head emits an ultrasonic wave and receives the wave reflected back from the target. Ultrasonic Sensors measure the distance to the target by measuring the time between the emission and reception. The project will produce a system recording the violation automatically.

value is the person responsible for the composition of the database identified and vary from one way to another. The third column consists of the number of overruns (nofexe) and the data type for this variable is integer, the initial value is 0 at each override this value increases automatically. The fourth column is for the path name (location) and the data type for this variable is varchar, which is specified at the entry the data. The last column is (ipaderss) to specify the adress to store images for overrides that occur in the road and the data type for this variable is varchar as shown in figure 2.

2.3 The goals of the project

- 1) Using a self-recording traffic violations system the car will have a system(hardware and software) of automatic recording of traffic violations.
- 2) Making the roads safer than ever been by monitoring the roads throughout the day.
- 3) Reducing human errors.
- 4) Reducing the number of accidents.

2.4 Project software programs

- Arduion IDE program.
- Matlab program
- Xampp program.

2.4 project hardware

- Arduino
- Ultrasonic sensor
- Camera

3 METHODOLOGY

In the proposed safe speed system project the main objective was to reduce the number of accidents due to excess speed by recording a traffic violation on the driver exceeding the specified speed of the road. Most cities suffer from the lack of awareness among motorists of the importance of compliance with the speed limitation for the safety of pedestrians or drivers of other vehicles or safety themselves.

3.1 Database Configuration

Configure the database using the xampp program. The first step in our project is configuring the database. For example : Database consists of five columns of the first of the sequence of the paths (id) and the data type for this variable is integer and it is increasingly automatically when adding a new path. The second column consists of the highest speed possible for that road (maxspeed) and the data type for this variable is integer, this

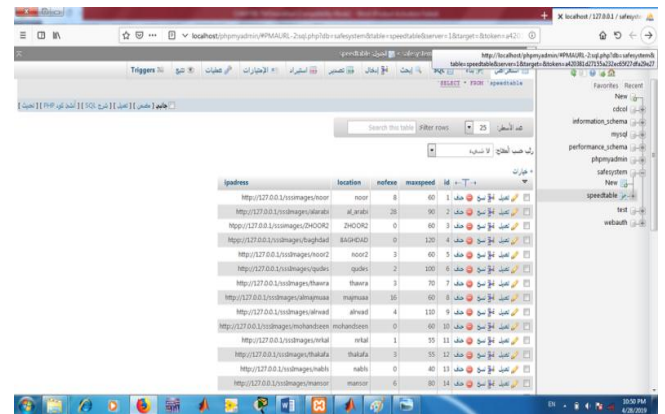


Figure 2: Database configuration

3.2 Create a function to insert a new system

The second step in our project is to create a function using the Matlab program. This function is to insert a new path into the database without having to login to the xampp program. This function includes the link of the MATLAB with the database that was configured in the first step by the data file name and its extension. Executing this function by enter the name of the new road, maxspeed, and its folder name to store the images of the cars violations in this folder.

3.3 CONNECT DATABASE WITH MATLAB + ARDUINO:

The third step in our project is as a pilot step for the project. To link the arduino IDE with Matlab should to enter the port number, baud rate, and parity bit as shown in the figure 3.

```
s = serial('com16');
set(s, 'DataBits', 8);
set(s, 'StopBits', 1);
set(s, 'BaudRate', 9600);
set(s, 'Parity', 'none');
fopen(s);
```

Figure 3: connect MATLAB+ARDUINO

3.4 Design of the Graphical interface

The fourth step in our project is to create an interface using the (app designer) the interface consists of two tabs, the first tab that

displays information to the person responsible for the database, by selecting the road number , automatically will display the speed of that road and its name of the road, as well as the images of the existing violations.

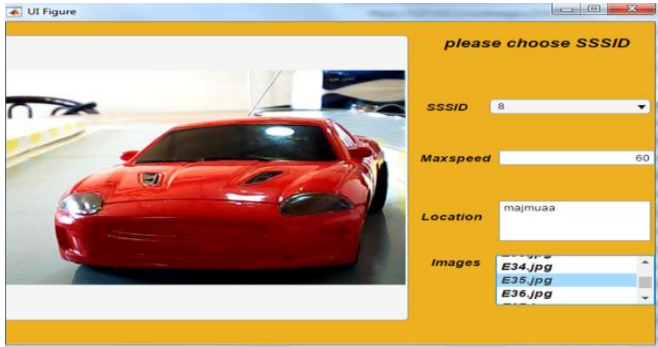


Figure 4: Tab (1)Information about all the systems.

The second tab is to add a new road without opening the database by write the road name and its max speed in addition to the name of the folder in which the images will be stored violations by pressing the insert button as shown in figure 5.



Figure 5: Tab (2)Function to insert new road.

3.5 Speed measurement using ultrasonic Or Ultrasonic speed measurement

The fifth step in our project, using the Arduino IED program, write a program to measure the speed by setting the first distance (s1) and the second distance (s2) when the car reaches (s1) the timer counter will start (start time) and when the car reaches (s2) this timer is called (end time) as shown in equation (1).

$$S = d / (\text{endTime} - \text{startTime}) \quad \text{eq.(1)}$$

If the testing velocity is very high, for example the movement of a bird or wind movement, this value is ignored. In the Matlab program, by writing a function to monitor the roads by inserting

the road number which you want to monitor, the matlab will return the maxspeed for of this road then comparing the speed of the car with the maxspeed of the road then in the Arduino by writing a program to decide if there are a violation or not. In the case of a violation , the camera will take an image for the car violation and store it in the specific road folder. This violation done for all cars except for ambulance by using the (Alexnet) Library :[10] AlexNet is a convolutional neural network that is trained on more than a million images from the ImageNet database. The network is 8 layers deep and can classify images into 1000 object categories, such as keyboard, mouse, pencil, and many animals. As a result, the network has learned rich feature representations for a wide range of images. The network has an image input size of 227-by-227. When the ambulance passes and exceeds the specified speed of the road, the system does not record a violation.



Figure 6: The exception ambulance.

3.6. Design login page security:

For security purpose and to ensure the information protection in the database from manipulation, changing the images for the violation cars, the login page is designed which contain the user name and password. That is given to the person responsible for the system.

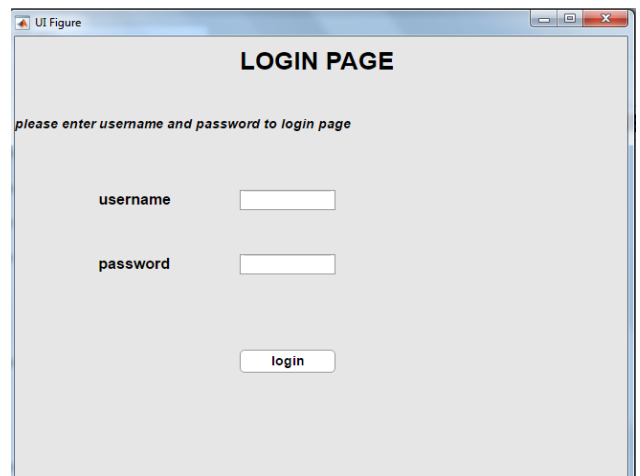


Figure 7: Login page for security.

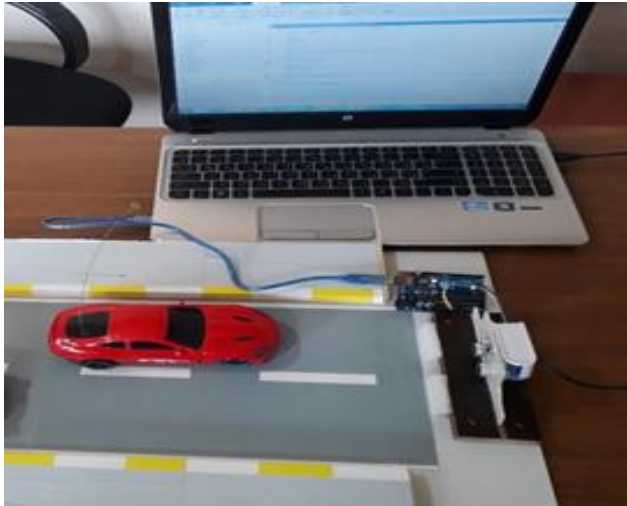


Figure 7: Practical Work.

4. FUTURE WORK (SUBSEQUENT DEVELOPMENT OF THE PROJECT)

• One of the problems that may be caused by the failure of the system is the driver's knowledge of the radar sites, which reduces the speed in the area of radar presence. To solve this problem radar devices should be install at close distances, for example at point A and point B when the vehicle passes at point A is calculated speed and send information to the data in point B and when the vehicle passes point B the rate of speed is calculated

$$\text{Avg} = \frac{B-A}{\text{time} (B-A)} \quad \text{eq.(2)}$$

The inclusion of image processing will automatically determine the owner of the car by analyzing the data of the registration plate without having to manually search for the owner of the car.

It is also possible to add the payment feature of the violation automatically through a special account for the driver in the bank and after payment of the offense is sending a text message to the user to cancel the value of the violation of the record of violations.

In addition, It is possible to alerte the driver before reaching the speed specified by a specific device in the car, and if there an accident in road can be alert the driver to change the way or ease the speed.

Another development is to determine the speed of motorcycles by placing subways or part of the main roads and developing cameras to monitor the motorcycle and record violations.

5: CONCLUSION

As a result of the implementation of the project (Safe Speed System), safe roads can be obtained by reducing accidents of excessive speed of vehicles in roads by imposing fines on the speeding driver. As well as reducing traffic congestion by giving low speed to roads containing vital facilities such as schools, hospitals, universities, health centers and others. And the determination of the speed of certain highways. This speed is higher than the speed given to roads containing public facilities. And alerting the driver as quickly as possible to the road and its limit speed in this road.

REFERENCES

- [1] Fred Wegman , Letty Aarts, Charlotte Bax ,“Advancing sustainable safety National road safety”, SWOV Institute for Road Safety Research, Safety Science 46 (2008) 323–343, 2008.
- [2] Zuhair Ebrahim and Hamid Nikraz, “Camera System Deployment for Speeding Control in Australia” ,Curtin University, International Journal of Transportation Science and Technology · Vol. 3, No. 4, 2014 – pages 353 – 364, 2014.
- [3] Lori Mooren, Professor Raphael Grzebieta, "Speed limit setting and the Safe System principle", University of New South Wales, Proceedings of the 2014 Australasian Road Safety Research, Policing & Education Conference12–14 November, Grand Hyatt Melbourne, 2014.
- [4] Merrill Skolnik, "Radar", <https://www.britannica.com/technology/radar>
- [5] Lambert Surhone, Miriam Timpledon, Susan Marseken “XAMPP” VDM Publishing, Jul 3, 2010.
- [6] Stormy Attaway, “Matlab: A Practical Introduction to Programming and Problem Solving”, Boston University, 28th July 2011.
- [7] Rajesh Singh, Anita Gehlot, Bhupendra Singh, Sushabhan Choudhury “Arduino meets MATLAB: Interfacing, Programs and Simulink”, Benthan Science publishers, Sharjah, UAE, 2018.
- [8] Fred Wegman, letty Aarts, “ Advancing Sustainable SaFTY “, National Road Safety Outlook for 2005-2020, SWOV Institute for Road Safety Research.
- [9] Alessio Carullo and Marco Parvis, Senior Member, IEEE, ” An Ultrasonic Sensor for Distance Measurement inAutomotive Applications”, IEEE SENSORS JOURNAL, VOL. 1, NO.2, AU02GUST 2001.
- [10] <https://ww2.mathworks.cn/help/deeplearning/ref/alexnet.html>