

AUTOMATIC DETECTION OF OVERSPEED VEHICLE

Kaviya M¹, Manasa M²

^{1,2}Electrical and Electronics Engineering, Kumaraguru College of Technology Coimbatore, India

Abstract- In India over 80% of road accident occur due to overspeed and careless driving of automobiles where many innocent people get affected due to careless driving of others. The necessity to check this is very essential thus, we are offering an automatic system that detects the overspeed automobiles which are driven above the given maximum speed limit in respective roads or highways. This project works on speed detection, image acquisition, transfer of image and image processing. Speed detecting device works at the precept of Doppler effect by using microwave Doppler radar sensor. The camera can be induced if speed limit exceeds the maximum speed limit. Transfer of image and acquisition is done through a HD camera that's interfaced with the raspberry pi. Server runs the image processing program and separates license plate which digitizes the characters from the plate and sends the records to the subsequent heading station through phone via message.

Keywords-ImageProcessing,Doppler Effect,DopplerRadar,Transfer,Acquisition

1. INTRODUCTION

Overspeed automobiles are the major problems of road safety and need proper addressing to reduce the accidents. Excessive Speed is a aspect in one third of all deadly crashes.

Vehicle speed detection is based on the usage of Doppler Radar to find the speed of the moving automobiles. Doppler effect may be exploited to measure the speed of vehicles and pick out the ones crossing speed limit. The shift in frequency between the transmitted and reflected high frequency wave is the key aspect used to calculate speed. The Doppler radar based speed detector can be interfaced to a

microprocessor based device for measurement and comparison. Raspberry PI camera connected to the system can be used to offer a real time view of the road. The system can be linked to the server through internet and the photos from the road may be transmitted to the server for processing. Automatic number plate recognition is an image processing technology that makes use of number plate to identify the vehicle. The goal is to isolate the number plate of the automobile from the image and use optical character recognition to perceive the characters of the number plate. Moreover, the digitize number plate could be transmitted to the subsequent station where it will be displayed in LCD panel.

2. METHODOLOGY

The block diagram of the system consists of HB100 device senses the moving vehicle and produces sine signal that is then amplified by electronic equipment. The output is fed to the digital pin of the Arduino. The microcontroller measures the frequency of the input and calculates the speed of the vehicle from the worth of frequency.

The speed worth is displayed within the liquid crystal display panel. It signals raspberry pi if the regulation is crossed. The raspberry pi triggers the camera hooked up to the board. The image is then sent to the server . The server processes the image to extract the characters within the car place. The extracted character is stored in database and message sent to the phone.

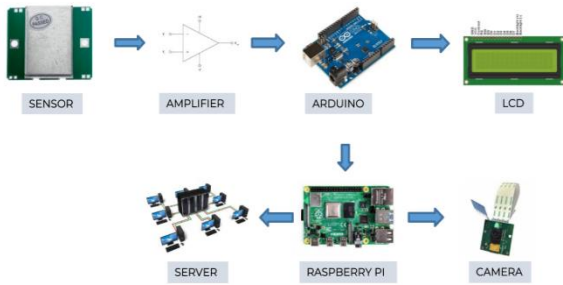


Fig 1: Block Diagram of Automatic Detection of Overspeed Vehicle

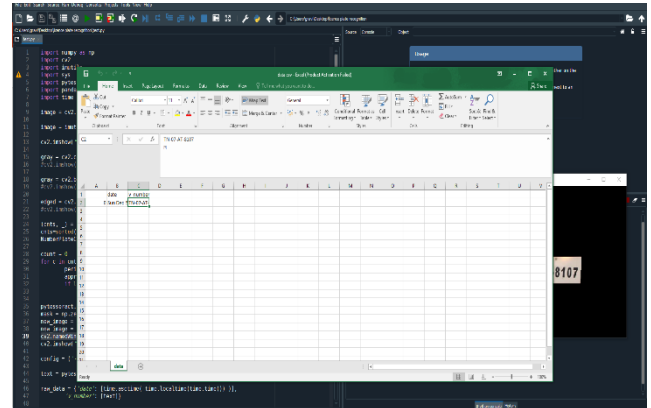


Fig 4.2 Extracted Data is stored in Database

3. ANPR SYSTEM PROGRAM FLOW

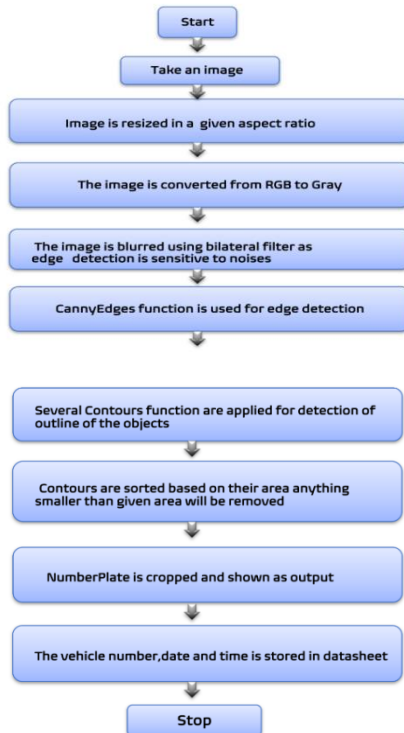


Fig 3: Program flow of ANPR system

CODE FOR ANPR SYSTEM:

```
import numpy as np
import cv2
import imutils
import pytesseract
import pandas as pd
import time

image = cv2.imread('2-Figure2-1.png')
image = imutils.resize(image, width=500)
cv2.imshow("InputImage", image)
gray = cv2.cvtColor(image, cv2.COLOR_BGR2GRAY)
cv2.imshow("Grayscale Conversion", gray)
gray = cv2.bilateralFilter(gray, 11, 17, 17)
cv2.imshow(" Bilateral Filter", gray)
edged = cv2.Canny(gray, 170, 200)
cv2.imshow(" Canny Edges", edged)

(ct, _) = cv2.findContours(edged.copy(),
cv2.RETR_LIST, cv2.CHAIN_APPROX_SIMPLE)

ct=sorted(ct, key = cv2.contourArea, reverse =
True)[:30]
```

```
NumberPlate= None
count = 0
for i in ct:
    peri = cv2.arcLength(i, True)
    approx = cv2.approxPolyDP(i, 0.02 * peri, True)
    if len(approx) == 4:
        NumberPlate = approx
        break
pytesseract.pytesseract.tesseract_cmd =
'C:\\Program Files\\Tesseract-OCR\\tesseract.exe'
ask = np.zeros(gray.shape,np.uint8)
new_image =
cv2.drawContours(mask,[NumberPlateCnt],0,255,-1)
new_image =
cv2.bitwise_and(image,image,mask=mask)
cv2.namedWindow("Output_img",cv2.WINDOW_
NORMAL)
cv2.imshow("Output_img",new_image)
config = ('-l eng --oem 1 --psm 3')
text = pytesseract.image_to_string(new_image,
config=config)
raw_data = {'date': [time.asctime(
time.localtime(time.time()))],
'v_number': [text]}
df = pd.DataFrame(raw_data, columns = ['date',
'v_number'])
df.to_csv('data.csv')
print(text)
cv2.waitKey(0)
```

5. SIMULATION DESCRIPTION

LCD LM016L:

LCD LM016L is a display device. The 16L in its name describes it has a 16 Columns and 2 Rows. The term LCD stands for liquid display. It is one reasonably electronic display module utilized in an intensive range of applications like various circuits and devices like cellular phones, calculators, computers, TV sets, etc. These displays are particularly favored for multi-segment light-emitting diodes and seven segments. The most benefits of using this module are inexpensive; easily programmable, animations, and there are not any limitations for displaying custom characters, unique and even animations, etc.

Raspberry Pi:

The Raspberry Pi, a low cost, credit-card sized computer that plugs into a computer monitor or TV, and uses a typical keyboard and mouse. It's a capable little device that allows people of all ages to explore computing, and to learn a way to program in languages like Scratch and Python. It can do everything you would expect from a personal computer, from browsing the web and playing high-definition videos, to creating spreadsheets, word-processing, and playing games.

MCP3208:

MCP3208 is a 12-bit Analog to Digital Converter, it has eight channels. It is programmed to offer four pseudo-differential input pairs or eight single-ended inputs. Communication with the devices is done with the help of a simple serial interface compatible with the SPI protocol.

They are capable of conversion a rate of as much as 100 ksp/s. It is performing at a voltage variety 2.7V to 5.5V. MCP3208 is used in Sensing Interface, Process Control, Data Acquisition and Battery Operated System.

Potentiometer:

A Potentiometer, a three terminal resistor with a rotating contact that works as an adjustable voltage divider. If only two terminals are used, one end and also the wiper, it acts as a resistor or rheostat. The device referred to as a potentiometer is basically a potential divider used for measuring electric phenomenon (voltage).The component is an implementation of the same principle, hence its name. The principle application of potentiometer include Television, musical , Instruments and Industrial Controls.

6. SIMULATION RESULTS

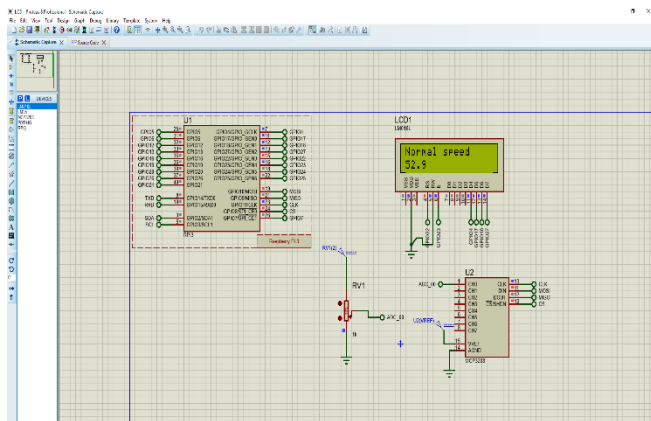


Fig 5.1 Simulation Results for Normal Speed

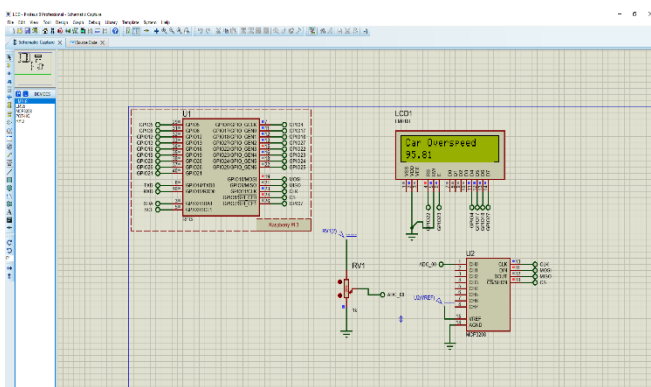


Fig 5.2 Simulation Results for Over Speed

7. CONCLUSION AND FUTURE SCOPE

The outlined speed detection framework was able of ceaselessly check the speed of the approaching vehicle. The sensor worked well for the vehicle at a near extend of few meters. The yield was more precise with no other moving objects within the encompassing. The esteem of speed of each passing vehicle was shown within the LCD show. With each over speeding vehicle passing by the sensor, the camera was activated and the picture was spared within the SD card. The picture was too exchanged to the server through web where the picture was processed for the extraction of the characters from the number plate. The Number Plate Recognition system was not idealized and requires alteration. It precisely distinguished a few of the characters but not all. The character extraction too depended on the textual style and measurement of the character as well. The framework was more precise in recognizing the characters that were composed in a style comparable to the one utilized in our format.

FUTURE SCOPE:

Road security: The frequent checking of overspeed vehicles will diminish the high percentage of road accidents.

Mechanization in law requirement: The framework being totally programmed decreases the number of activity police officers required to send within the genuine field for checking speeding vehicles.

8. REFERENCES

HB100 device explanation - https://www.rhydolabz.com/documents/H100_H20_0A.pdf

Doppler Effect - http://en.wikipedia.org/wiki/Doppler_effect

Range plate recognition - https://www.researchgate.net/publication/283162801_Building_an_Automatic_Vehicle_License

Raspberry-pi -

[http://en.wikipedia.org/wiki/Raspberry Pi](http://en.wikipedia.org/wiki/Raspberry_Pi)

Ji Ho Song, Dongkyun Kim "An FPGA-based vehicle speed measuring mistreatment associate in nursing an uncalibrated camera", IEEE, Oct. 2010.