

Traffic Sign, Traffic Signal& Lane Detection Using CNN

Manasa K N¹

Priyanshu Raj²

Rounak Jaiswal³

Sachin R Patil⁴

R S Sai Naveen⁵

School of Computer Science and Engineering, REVA University

ABSTRACT

This Project acknowledges the road, alerts, prevent signs, responding and making decisions, consisting of converting the path of the vehicle, preventing crimson alerts, preventing signs, and shifting on go alerts with the usage of Neural Network. The software program tracks visitors via hard-coded regulations, preventive algorithms, predictive modeling, and "smart" separation of objects, to assist the software application to follow regulations on transport. The Main Objective of Building this Project is to reduce Road Accident by Giving Assistance to Drive so that Driver can get alert of Turn, Sign, Signal etc. in addition to their own Presence.

INTRODUCTION

The Driver needs to monitor signals, road safety signs, barriers, and lanes for traditional cars and make decisions accordingly. Though autonomous driving can be dangerous to some yet it also has its advantages. This would conclude in reducing traffic congestion, reduced emissions, lower travel costs for all, and a reduction in the cost of new roads and services. It would also result in improving the mobility of people with old and physical disabilities. The way of achieving the autonomy of cars is to model it on RC cars on the 1/10 scale. With the aid of the pi camera and the ultrasonic sensor, the car can sense its environment, and could collect data and transmit on the server through the Raspberry Pi.

In this System we will give Driver an Assistance which will guide them on where to turn left, right, or straight and what type of signal will come in a short span of time, so that Driver can Precisely right decision in each time and eventually this will reduce the road accident which nowadays occurs in the large amount due to the negligence of the driver.

OBJECTIVES

The main working model of the project are as follows:

- To design a model for using the lane detection with the help of CNN
- To design a model for using the traffic signal with the help of Haar cascade
- To design a model for using the sign boards with the help of+ CNN

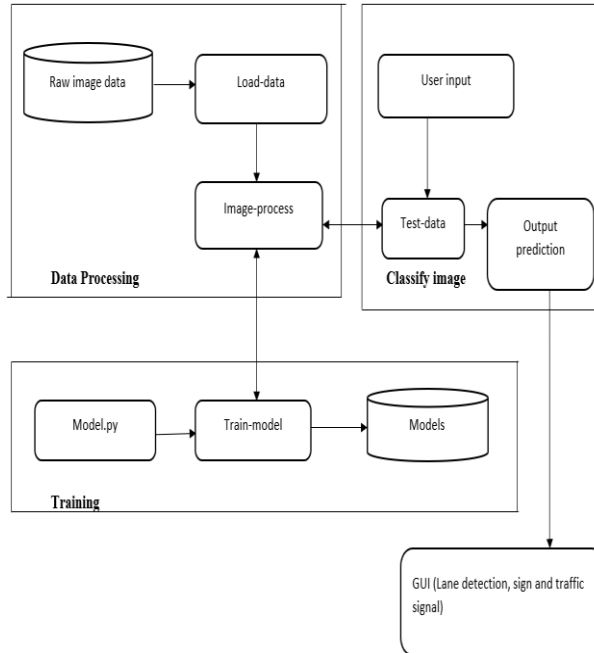
LITERATURE SURVEY

- [1] **Working model of Self-driving car using Convolutional Neural Network, Raspberry Pi and Arduino in year 2018.** The proposed model takes an image with the help of Pi cam attached with Raspberry Pi on the car. The Raspberry Pi and the laptop is connected to the same network, the Raspberry Pi sends the captured image to the Convolutional Neural Network. The image is gray scaled before passing it to the Neural Network. Upon prediction the model gives one of the four outputs i.e., left, right, forward or stop.
- [2] **Self-Driving Cars: A Peep into the Future in year 2017.** This paper elaborates about a unique technique embedded controller design of a self-driving, electrified, accident proof and GSM destination guided vehicle.
- [3] **Self-Driving and Driver Relaxing Vehicle in year 2016.** This paper focuses on modified concept of Google car, the Google car has to reach the static destination automatically.
- [4] **The Issues and the Possible Solutions for Implementing Self Driving Cars in Bangladesh in 2017.** Some of the issues of Bangladeshi roads and traffic Conditions and their solutions are highlighted in a paper.
- [5] **Real-time multiple vehicle detection and tracking from a moving vehicle in 2000.** The project uses the Rapidly Adapting Lateral Position Handler to determine the coordinates of the road ahead and the appropriate steering direction modules for detection of other vehicles on the road.

Problem Definition

Autonomous vehicles are the development of technology in the field of automobiles. Due to increase in vehicles, the frequency of traffic is more. To solve this traffic problem, traffic rules are made. But as the people neglect traffic rules, accident occurs and the reason behind the accidents is due to human carelessness. To suppress these accidents and to improve safety transportation we require Autonomous Vehicle. The driver's mistake is one of the most common causes of road accidents. As the number of accidents rose from day to day, it became important to correct human mistakes and helping humanity for their easy lives.

PROPOSED SYSTEM

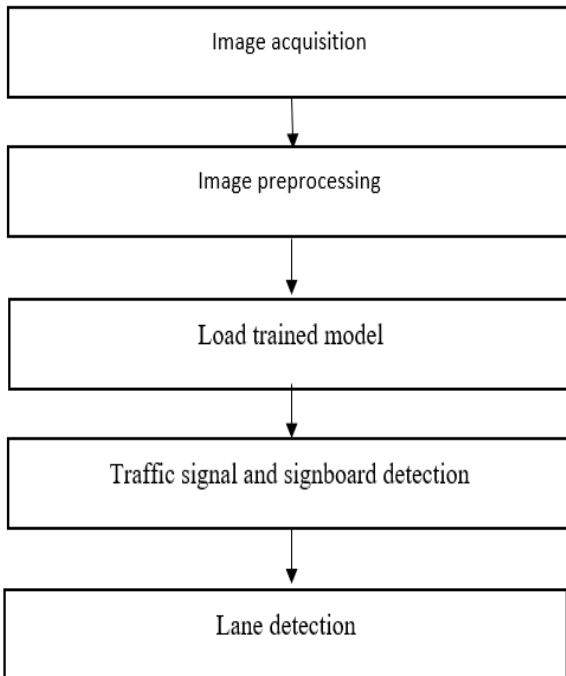


Data Filtering: The loaded data.py script includes functions for loading unprocessed picture data and saving it as numpy arrays in the local storage. The process data.py script imports picture input from data.npy and preprocesses it by reformatting it, implementing filtration, and ZCA brightening to improve characteristics.

Training: The classifier is constructed using hyper - parameters from a config file that includes the learning rate, block size, imagery filtering, and epochs. The calibration and validation datasets are equipped as Data loaders within the training loop, and the classifier is designed using the Adam Optimizer with Cross Entropy Loss.

Classify:After a classifier is trained, it may be used to identify images that are stored as files on the file system. The user specifies the picture's file location, which the test main.py script passes to process main.py, which loads and preprocesses the file.

METHODOLOGY

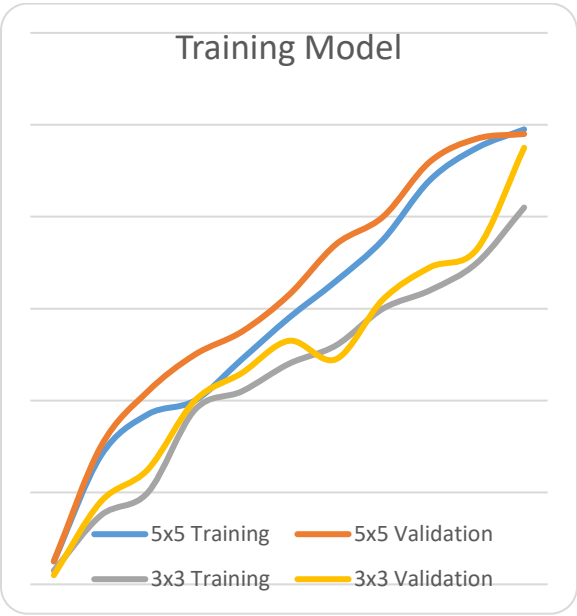
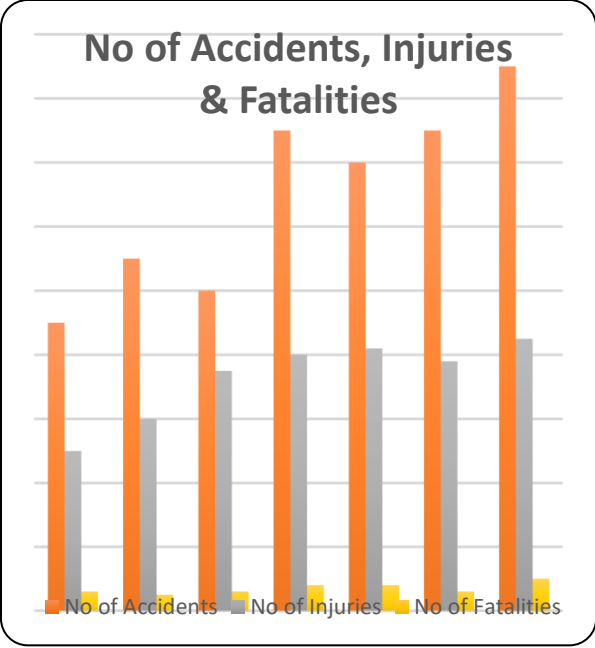


In the working Methodology, first, we capture the Image which is ocated on the roadside and then we crop out all unnecessary parts then we send that image for Processing. After that we have already trained the model and then comparison occurs, and best suits results are displayed on screen and then appropriate action will be taken based on Results.

EXPECTED OUTCOME

Deep learning algorithms like CNN (Convolution neural networks) is assigned to make real time decisions for the self-driving car. This project will make use of lane detection and traffic sign detection.

RESULT



This is the result we got after the training and testing with the data to achieve nearly 98% accuracy.

CONCLUSION

Many automobile firms are attempting to develop their own self-driving vehicles, which is the way of the future. The most significant components of automated vehicles are the lane, traffic, and road sign detection and recognition systems. The presented technology can be installed in just about any vehicle and therefore can identify and recognize objects. Additionally, drivers could use this to be awake and aware of road conditions. As a result, both the driver and the passengers will be safe.

REFERENCES

- [1]“Traffic Light Detection and Recognition for Self Driving Cars using Deep Learning” in 4th International Conference on Computing Communication Control and Automation(ICCUBEA), IEEE, 2018
- [2] Dong, D., Li, X., &Sun, “A Vision-based Method for Improving the Safety of Self-driving”, 12th international conference on reliability, maintainability and safety (ICRMS),2018, pp: 167-171.
- [3] Basha, Syed Muzamil, Syed Thouheed Ahmed, N. Ch Sriman Narayana Iyengar, and Ronnie D. Caytiles. "Inter-Locking Dependency Evaluation Schema based on Block-chain Enabled Federated Transfer Learning for Autonomous Vehicular Systems." In *2021 Second International Conference on Innovative Technology Convergence (CITC)*, pp. 46-51. IEEE, 2021.