

Classification of Traffic Signs/Signals using Deep Learning in PyTorch

Introduction:

Traffic Sign Recognition (TSR) is undoubtedly one of the most important problems in the field of driverless cars and advanced driver assistance systems (ADAS). TSR enables the front-facing smart cameras mounted on the car to recognize the signboards so that the car can act accordingly. Some examples include recognizing stop signs, speed limit, turn signs etc. The problem is mainly a classification task.

Current state-of-art:

Automobile companies like Tesla, Mercedes etc. has invested heavily on this technology for their self-driving cars but these are still work-in-progress, since these are proprietary technology, there is not any research publications available. Research organizations like Laboratory for Intelligent and Safe Automobiles and US National Institute of Health are involved in research projects to develop a Deep learning model to enable safe roads for everyone.

Project Requirements:

1. The dataset to be used in this project is put together by Laboratory for Intelligent and Safe Automobiles by University of San Diego and German Traffic Sign Recognition Benchmark (GTSRB) dataset by Institut für Neuroinformatik, Germany. The LISA dataset is maintained by University of San Diego and is published open source. The database consists of continuous test and training video sequences, totaling 43,007 frames. LISA contains just traffic lights images within seven categories: Go, Go Left, Go Forward, Stop, Stop Left, Warning and Warning Left.

Dataset can be downloaded in the following link: <http://cvrr.ucsd.edu/LISA/gallery.html>. GTSRB

Dataset is maintained by University of Copenhagen. The dataset contains about 40 classes spread over 50000 plus images. The data set can be downloaded here:

<https://sid.erda.dk/public/archives/daaeac0d7ce1152aea9b61d9f1e19370/published-archive.html>

2. Building a CNN Architecture:

- a. Build an architecture like one of the existing architectures like AlexNet, ImageNet etc.,
- b. Train and Test the network
- c. Classify traffic signs using network and perform transfer learning
- d. Build Confusion matrix

Deliverable:

The deliverables in the project are:

1. Video/Images of the output received from the trained model.
2. Code of the project.
3. Final Report.