Enhancing Road Safety through Intelligent Systems

Computer Vision

Domain

Automobile Industry

Context

Efficient road safety measures are crucial for minimizing accidents and ensuring smooth traffic flow. One key element in this regard is the effective use of traffic signs, which play a vital role in guiding drivers according to established rules and regulations. The absence of clear instructions, such as warnings about over speeding, ongoing roadwork, or potential accidents, can lead to increased risks on the road. Recognizing the significance of traffic signs, there is a need for intelligent systems that can contribute to road safety by understanding and responding to these essential cues.

Objective

Develop a Convolutional Neural Network (CNN) model to recognize traffic signs, aiming to enhance road safety through intelligent systems. The primary goal is to create a robust system that can accurately classify and interpret various traffic signs.

Dataset

Traffic Sign Benchmark is a multi-class, single-image classification challenge held at the International Joint Conference on Neural Networks (IJCNN) 2011. They cordially invite researchers from relevant fields to participate: The competition is designed to allow for participation without special domain knowledge. Their benchmark has the following properties:

- Single-image, the multi-class classification problem
- More than 40 classes
- More than 50,000 images in total
- Large, lifelike database

Note: For this project, we have reduced the number of images. There are around 16,500+ images in the dataset provided. You can check the “label_details” folder for getting information about the classes.

Steps & Approach

- Split the dataset into training and validation (75% training / 25% validation)
- Define model
- Get validation accuracy more than 90%

Details about questions and marks are given in the question notebook.

Note: If the model is taking too much time to get trained then you can reduce the number of classes. There are around 43 classes in the dataset, the model should be trained on a minimum of 15 classes.