

Traffic Sign Classification using CNN

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Description

The convolutional neural network (CNN) is a class of deep learning neural networks. CNNs represent a huge breakthrough in image recognition. They're most commonly used to analyze visual imagery and are frequently working behind the scenes in image classification. They can be found at the core of everything from Facebook's photo tagging to self-driving cars. Image classification is the process of taking an input (like a picture) and outputting a class (like "cat") or a probability that the input is a particular class ("there's a 90% probability that this input is a cat").

A typical CNN consists of - Convolution layers, activation functions, pooling layers, and fully connected layers.

In this project, I used a readily available dataset on Kaggle and deployed a Convolutional Neural Network model to act as a classifier for 43 different classes of traffic signs. My neural network architecture:

Input image - (Conv - > Max Pooling) (Conv - > Max Pooling) (Conv - > Max Pooling) Dense - > Dense - > DenseLayer(*softmax function*).

After the first training and testing session, the testing accuracy wasn't satisfactory and the network seemed to overfit the given dataset. To rectify this, I changed the architecture by introducing a Dropout layer with "40%" as chosen value and a fresh convolution + pooling pair. This led to a significant change in the testing accuracy and the problem of overfitting was rectified. I tested the framework over about 12,000 test images and obtained an accuracy of about "94%".