Road Signs Detection, by building a Deep Neural Network Model

1. Abstract

Speed limits, no entry, stoplights, turning left or right, minors crossing, heavy trucks not passing, and many more sorts of road signs exist. On the road, objects such as trees, automobiles, people, bikes, and so on are spotted. In this project, a deep neural network model is developed that can identify traffic signs in photos using the GTSRB (German Traffic Sign Database) dataset [1], and items such as bikes, pedestrians, and vehicles are spotted using the COCO dataset [7]. The goal of this research is to train the CNN model to examine more traffic signs in potentially adverse settings such as bad weather and blurred images. To achieve maximum accuracy compared to existing models and to optimize anti-error recognition, the LeNet-5 CNN model is used. Finally, the project findings are presented on a visualization dashboard.

2. Introduction

There are self-driving cars on the market, and passengers may rely on them mostly for transportation. To achieve level Five automation, automobiles must understand and follow all road laws. In the sphere of artificial intelligence and technical innovation, several specialists, and significant organizations, such as Tesla, are focused on automated driving and self-driving autos [4]. Cars must be capable of comprehending road signs and making suitable decisions in order for this invention to be efficient. Speed restrictions, no entrance, stop signals, turning left or right, minors crossing, and no passage of large vehicles are all examples of road signs. In this project, a deep neural network model is developed to categorize traffic signs using the GTSRB (German Traffic Sign Database) dataset, while neural networks such as R-CNN and Mobilenet are used to recognize objects using the COCO dataset. This study also employs Tensorflow for image classification and one hot encoding approach to properly forecast traffic signs in adverse weather situations. This model can read and interpret traffic signs and objects, which is a vital function for all autonomous vehicles. Thousands of items such as vehicles, motorcycles, and people are included in the dataset, while the dataset has a collection of 39209 pictures from 43 different classes. The photographs are divided unequally across the courses. This project employs the LeNet-5 CNN model to provide effective recognition with a near-perfect relative probability and optimizes anti-error recognition, which is currently absent in existing models. Finally, an interactive visualization design is produced to convey the project's findings.