

Traffic Sign Detection with Machine Learning and Artificial Intelligence

Darshan K. Koli, Vaibhav N. Rajput, Sachin S. Badgujar, Sujitkumar V. Chaudhari

Professor, R. C. Patel Institute of Technology, Shirpur, India

UG Students, R. C. Patel Institute of Technology, Shirpur, India

kolidarshan890@gmail.com

Abstract: Traffic sign recognition is vital in enhancing road safety and enabling intelligent autonomous systems. This study introduces an efficient and accurate deep learning-based framework that utilizes convolutional neural networks (CNNs) to classify and detect traffic signs in real time. The proposed model is trained on the German Traffic Sign Recognition Benchmark (GTSRB) dataset, which comprises over 35,000 labeled images spanning 43 distinct traffic sign classes. The data is subjected to preprocessing techniques including resizing, augmentation, and normalization to enhance generalization. The CNN model incorporates convolutional, batch normalization, dropout, and fully connected layers, achieving a validation accuracy of more than 99.

Keywords: Convolutional Neural Networks (CNNs), Deep Learning, GTSRB Dataset, Intelligent Transportation Systems, Real-Time Image Processing, Traffic Sign Classification

