

Image-Based Recognition for Sri Lankan Traffic Signs

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Abstract

This research describes the development of an image-based traffic sign recognition system specifically designed for Sri Lankan road environments. The objective is to enhance road safety by accurately identifying local traffic signs using deep learning techniques. The system also supports users unfamiliar with the country's unique signage styles. A custom dataset of Sri Lankan traffic signs was created to reflect local design patterns and contextual features, addressing the limitations of models trained on international datasets. A Convolutional Neural Network (CNN) was implemented for classification, supported by preprocessing techniques including normalization and data augmentation to improve robustness and generalization. The model was evaluated using three datasets: the created Sri Lankan dataset, a foreign dataset, and a combined dataset. Results showed that the system achieved a test accuracy of 98.58% on the Sri Lankan dataset, 97.87% on the foreign dataset, and 97.54% on the combined dataset, highlighting the superior performance of the localized approach. A web-based user interface was also developed, allowing users to upload an image of a traffic sign and receive instant classification results along with audio feedback using text-to-speech. This interactive feature enhances accessibility and user experience, particularly for individuals who may benefit from auditory assistance. This study demonstrates the importance of context-specific datasets in building accurate image-based recognition systems and provides a strong foundation for further development in localized intelligent transportation solutions.

Keywords: Traffic Sign Recognition, Convolutional Neural Networks (CNNs), Image Classification, Sri Lankan Traffic Signs, Intelligent Transportation Systems.