

# Real-Time Traffic Sign Detection and Recognition System using Computer Vision and Machine Learning

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**Abstract:** *The use of computer vision technology for our system has taken a huge leap and has revolutionized the way in which road safety is managed and maintained. This part of the paper represents the key components and functionalities of such a system which helps in enhancing the road safety and also in traffic management.*

*The proposed system is meant to contain computer vision algorithms and some machine learning techniques. These will help in detecting and recognizing the traffic signs in real time video streams. With the help of deep learning models like convolutional neural networks, the proposed system can precisely identify various traffic signs present on roads. The major components of the proposed system include a camera interface which will capture real time video frames from the road, image processing modules for colour space conversions, binary thresholding, contour detection and a classification module for the purpose of sign recognition. Deep learning frameworks like TensorFlow and OpenCV libraries are used for image processing and model training in the proposed system. The real time nature of this system allows the spontaneous detection and recognition of traffic signs enabling us to change the road conditions. Hence, the system contributes to prevent accidents and provide timely warnings to drivers. In addition, this system offers potential applications in traffic management and for autonomous driving system. With the help of accurate information, the system can contribute towards more efficient traffic flow and reduce congestion on roads.*

*Overall, the system has very good impacts in road safety and efficiency. It shows advancement in road safety and traffic management.*

**Keywords:** Computer vision, TensorFlow, Keras, OpenCV, real time video, colour space conversion, binary threshold, contour, streamlit, object detection, classification

