

Analysis of Traffic Sign Detection and Recognition Techniques

S. Shanmugam*, B. Tharmaratnam, T. Sandradeva and Y. Mehendran

Uva Wellassa University, Badulla, Sri Lanka

**Corresponding Author E-mail: ssajitha039@gmail.com, TP: +94772143941*

Automated Traffic Sign Detection and Recognition (ATSDR) is a trending research field in this current decade. It is a very important part of the intelligent transportation system as traffic signs assist the drivers to drive more carefully. This paper provides a review of three major steps in the ATSDR system; video segmentation, detection, and recognition. There are many techniques used for the detection and recognition process. However, those techniques are affected by different internal and external conditions like camera quality(fps), lighting conditions, time periods, etc. The main objectives are; to identify the different traffic sign detection and recognition techniques, develop the ATSDR system by using those selected technologies and analyze the performance of those techniques in different lighting conditions and time periods in Sri Lanka. Real time video sequences of traffic signs were collected and partitioned into single frames using video segmentation. The traffic signs were detected using shape-based and color-based features along with learning-based methods (Convolutional Neural Networks (CNN)). Subsequently, the signs were recognized using selected techniques such as Random forest method, CNN, and Support Vector Machine (SVM). Selected techniques were applied to the 10 varieties of traffic signs in Sri Lanka in different conditions, each having 1000 samples. Experimental results show that the approach obtained the desired results effectively. CNN method obtained 74.16% overall accuracy, SVM method obtained 63.5% overall accuracy and Random forest method obtained 58.6% overall accuracy. In the future, accuracy can be improved by testing the technologies in different internal factors like different camera quality (fps) and different computing power, as well as high-resolution images and a large number of training images should be used for the analysis. The experimental results showed that CNN is the most suitable technology to detect and recognize traffic signs based on the Sri Lankan traffic signs database

Keywords: Traffic sign detection and recognition; Convolutional Neural Network; Support Vector Machine; Shape based methods; Color based methods; Random forest