Abstract

Traffic signs in general and speed limit signs in particular are considered one of the most important means of traffic safety, and the aim of the current research is to design a system that detects and recognizes speed limit sign with high accuracy and high processing speed. At the beginning, red color objects are detected from the image and after finding the red color signs the circle is determined using Hough’s transform then from inside the circle, the numeric part from the circle image is extracted. Digital circle images are segmented to extract the number alone, and then these numbers are recognized by a trained neural network. Neural network achieved a success rate in recognition reached to 98.9%. Parallel programming concept is used to reduce the execution time using OpenMP and OpenCL programming. The study showed that the total execution speed according to the designed scheme to run the speed limit sign detection and recognition by using a mix of central processing unit with multi cores and graphics processing unit is 65 frames/sec for complete images and 90 frames/sec when cropping the effective part from the total size of the image. Recognition system is capable of recognizing the sign even if the vehicle speed exceeds 120 km/h.
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Index Terms
Keywords

Road sign detection, neural network, number recognition, color space, OpenMP, OpenCL, multicore, graphics processors, color Segmentation.