Detection and classification of traffic signs from video sequences

P.M. Gunawardana and D.U.J Sonnadara
Department of Physics

Automated traffic sign recognition is an important part of a driver assistance system for future automobiles. In this work, algorithms were developed in a MATLAB environment to recognize traffic signs from recorded video sequences while the vehicle is in motion. The work focused mainly on the development of a fast algorithm to recognize traffic warning signs placed on local roads.

In general, the detection of an object in a video scene in a natural environment has two major obstacles: (1) Locating the desired object when the traffic scene is composed of many objects such as vehicles, buildings, pedestrians, name boards, etc., and (2) Varying illumination due to changing weather conditions, brightness conditions and shadows. The method adopted in this work detects the location of the sign in a single image frame based on its color information. Samsung digital camera having standard definition video recording (640x480) at 30 frames per second was used to collect short video clips required for this work. In order to avoid the effects due to brightness variation, color space conversion, from RGB to normalized RGB, is used. Morphological operations were used to remove the noise from image frames to improve the sign extraction process. To classify the warning signs, a simple technique based on the geometrical characteristics of the signs were adopted.

The results of this work showed high performance in the extraction and recognition of traffic signs on local roads. The algorithm was tested on a variety of video segments and showed 98% accuracy in extracting and recognizing selected traffic warning signs during the daytime.