ABSTRACT

Optical Flow is a movement that appeared because of the pattern of brightness of each pixel in a video sequence. Optical Flow can be used in a video motion detection system that can be applied to video observation system, monitoring of traffic video, the speed of a moving object computing system, etc.

In this Final Project, vehicle speed is calculated in a sequence of video frames that taken by an offline webcam then using Optical Flow to detect vehicle movement and mark it with a centroid, which then measure the speed. System testing was conducted on 72 videos taken from the high side with webcam almost parallel to the vehicle, the number of vehicles is only one, and the videos are taken in the morning, afternoon, evening. The details of the video are 24 videos on each of the conditions of light intensity and variation of vehicle speed is 10km/hr, 20km/hr, 30km/hr, 40km/hr, 50km/hr, and 60km/hr so that for each speed there are 4 different videos. Representation of the actual mileage through the pixels on the frame is also considered.

The result of the system in this Final Project is to detect motion vectors that are represented in the flow as determined by Lucas-Kanade algorithm, calculate the coordinates of centroids and then calculate the speed of a moving vehicle. The selection of vector density, the difference frame that is being compared, the kernel size of median filter also will determine the outcome of the system. And based on test results, the optimum results are while the vector density is 3 with an average MAE values for all conditions was 2.2, the difference between frame is 1 with the value of MAE in morning conditions were 2.27, 1.89 and 2.50 for the afternoon and evening, and kernel size of median filter is 3 for morning and evening conditions with MAE, respectively, are 2.25 and 2.04, while the median filter kernel size of 9 for the noon condition with the value of MAE is 1.36.

Keywords: *Optical Flow, Video, Lucas-Kanade Algorithm, Density, Frame, Speed of Vehicles, Centroids*