

## Abstract

In this final project, it's made a system using digital image processing based on visual sensor for detecting average traffic density on highway. Data for testing are 9 videos that taken 3 times in a day, morning, daylight and afternoon, using a camera with low position on the front side of the vehicle. The main components for detecting traffic density are the number of vehicle (*flow rate*) and average speed of vehicle.

Some digital image processing that be a subject in this final project are frame averaging to form a background image, frame differencing to find the different matrix and dilation to merge point with object.

There are 3 parameters tested in this final project, (*threshold*) value between background and foreground object, size of structure element (*strel*) to forming the morphology of the vehicle and open binary image (*bwareaopen*) to remove small object and influence of light intensity toward system accuracy.

From the test result in this final project using the best parameter threshold 40, strel 5 and bwareaopen 600, the system is capable of detecting the number of vehicle with 0% error rate, and average speed was detected with an accuracy of 91,7% for 9 tested video. While the influence of light intensity on the best accuracy was detected in video that was recorded in daylight.

**Keyword:** traffic density, flow rate, average speed, frame averaging, frame differencing, threshold, structure element (*strel*), *bwareaopen*.