ABSTRACT

Camera usage for security system is a technology which has an important role that can support security and monitoring system from a remote place. Actual usage of a camera is also important as criminal evidence. However, the usage of camera is sometimes ineffective and inefficient if we use it just to record without tracking/marking that can follow the object's movements.

The object tracking is applied and developed in the recording camera for tracking object in order to follow the object's movements. Object tracking is a process to follow a desired object's position. This thesis develops a simulation or software that has the same function with CCTV. This simulation is using kernel particle filter (KPF) method. By using camcorder, an image is captured and the object is obtained. Then, the object will be processed by using KPF method to identify and track the object. After the object is tracked, then the next step is comparing the result with the actual data.

The result of this thesis is a system that is able to track some cars from the sum of frame inputs. After system testing, it can be concluded that the best parameters to detect the car are the threshold absolute parameter is 10, median filter parameter is 3, the type of element structure is line90°, elements structure size is 3, and the bwareaopen filter is 50. The average accuracy rate from 16 videos regarding to morning, afternoon, evening, and night light intensity is 74.8125%. The average rate of centroid distance of kernel particle filter is smaller than the detection result.

Keywords : *multiple object tracking*, *kernel particle filter*, *computer vision*, *tracking*