Vehicle tracking using particle filter for parking management system

Abstract

Increment of on-road vehicles has urged public venues to provide visitors with a larger area of parking space. As the parking area grew larger for example in a hyper mall, a well-organized parking management system is necessary to assist drivers in locating parking position. Besides, it can also help the management team to monitor vehicle flow in the parking lot. Vehicle tracking plays an important role to the parking management system, as accurate tracking result will lead to a more efficient management system. Among commercially available sensors, video sensor has been commonly deployed in the parking area due to its ability in obtaining a wide range of vehicle information. However, images captured using video sensors are limited under situations where vehicles are undergoing occlusion and maneuvering incidents. This will cause tracking error therefore affecting the performance of the parking management system. Particle filter has been proven as one of the promising techniques to track vehicle under disturbances. Therefore, particle filter is proposed to track vehicle under occlusion and maneuvering incidents in this study. Experimental results show that the particle filter is able to track a target vehicle under different disturbances.