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Pyramidal Lucas-Kanade Optical Flow Based Moving Object Detection in Dynamic Scenes

Authors : Hyojin Lim, Cuong Nguyen Khac, Yeongyu Choi, Ho-Youl Jung

Abstract : In this paper, we propose a simple moving object detection, which is based on motion vectors obtained from pyramidal Lucas-Kanade optical flow. The proposed method detects moving objects such as pedestrians, the other vehicles and some obstacles at the front-side of the host vehicle, and it can provide the warning to the driver. Motion vectors are obtained by using pyramidal Lucas-Kanade optical flow, and some outliers are eliminated by comparing the amplitude of each vector with the pre-defined threshold value. The background model is obtained by calculating the mean and the variance of the amplitude of recent motion vectors in the rectangular shaped local region called the cell. The model is applied as the reference to classify motion vectors of moving objects and those of background. Motion vectors are clustered to rectangular regions by using the unsupervised clustering K-means algorithm. Labeling method is applied to label groups which is close to each other, using by distance between each center points of rectangular. Through the simulations tested on four kinds of scenarios such as approaching motorbike, vehicle, and pedestrians to host vehicle, we prove that the proposed is simple but efficient for moving object detection in parking lots.

Keywords : moving object detection, dynamic scene, optical flow, pyramidal optical flow
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