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MOVING OBJECT TRACKING – AN EDGE SEGMENT BASED APPROACH

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Abstract. *In this paper, an edge segment based tracking algorithm, which is capable of identifying moving objects in image sequence, is proposed. Since segmenting objects from a sequence image are not easy, traditional object tracking algorithms fetch difficulty due to large variation of object shape, orientation, motion and size among frames. One object may consist of several parts with different motion. Additionally, objects' motion and shape are less consistent within frames. To cope with these difficulties, our algorithm makes efficient use of edge segments based on the Canny edge map by utilizing the edge structure in the moving object region. Curvature-based features are used for moving edge registration due to its transformation invariance nature. We use the maximum curvature correspondences between two edge segments to define the 2D affine transformation that relates the two segments by solving a linear system. The edge segment registration error is also minimized. A Kalman filter based predictor is used for tracking each individual edge segments. Edge segments are clustered by using a weighted mean shift algorithm. Finally, a group motion tracker is used for tracking moving object from each cluster. Experiments show that our edge-segment based tracking algorithm can track moving objects or part of the object efficiently under varying illumination conditions and partial occlusion.*
Keywords: Edge segment based moving object tracking, Affine transformation, Kalman filter, K-means clustering

1. **Introduction.** Moving object segregation and tracking is an important research interest for many years covering widespread applications in diverse disciplines. Object tracking shows the trajectory of a moving object in image sequence over time by locating its position in every image. Traditional approach to moving object tracking focuses mainly on tracking the whole object from the scene [1]. Here, the background area is relatively larger than the object being tracked. The tracked object shows its trajectory throughout the sequence. This approach benefits by utilizing motion consistency within frames. However, in a sequence image of arbitrary shaped human-like objects, there are large variations in the movement of the moving object. A number of potential applications need to use these image sequences such as intruder detection and tracking, moving object analysis for the parking-lot surveillance, human detection and tracking in the indoor environment, body part detection, tracking and segmentation for gesture and behavior recognition. These applications suffer from the variation of object shape, orientation and size. In gesture analysis, one object may consist of several parts with different motion, which, thus, makes the problem more complicated to establish the spatial relationship among features.