Online Multi-Person Tracking-by-Detection Method Using ACF and Particle Filter

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Abstract

Automatically detecting and tracking multiple persons in videos is one of the main research interests in computer vision based applications. This paper presents a tracking-by-detection approach for tracking people in dynamic backgrounds with frequent occlusions by combining pre-trained generic person detector, online trained person-specific detector and a motion tracker. The popular aggregate channel features (ACF) are used to train the detectors and target specific particle filter is used as motion tracker. In order to learn right appearance of a target person, person-specific detector learns positive samples from prior frames which are detected by both generic person detector and person-specific detector. Data associations among the coincident detections of the detectors and tracker are used to update the person-specific detector and motion tracker. The person-specific detector searches the target person in a reduced region, which is defined by the associate motion tracker. A careful combination of detections of both detectors and tracker are used to locate the correct target person in the video sequence. Experiments have been carried out on Caltech pedestrian benchmark dataset. The proposed method shows better performance against state-of-the-art tracker while maintaining the tracking speed in real-time.

Author Keywords

Aggregate channel Features, particle filter, tracking-by-detection, Multi-person tracking