

Collective interaction filtering approach for detection of group in diverse crowded scenes

ABSTRACT

Crowd behavior analysis research has revealed a central role in helping people to find safety hazards or crime optimistic forecast. Thus, it is significant in the future video surveillance systems. Recently, the growing demand for safety monitoring has changed the awareness of video surveillance studies from analysis of individuals behavior to group behavior. Group detection is the process before crowd behavior analysis, which separates scene of individuals in a crowd into respective groups by understanding their complex relations. Most existing studies on group detection are scene-specific. Crowds with various densities, structures, and occlusion of each other are the challenges for group detection in diverse crowded scenes. Therefore, we propose a group detection approach called Collective Interaction Filtering to discover people motion interaction from trajectories. This approach is able to deduce people interaction with the Expectation-Maximization algorithm. The Collective Interaction Filtering approach accurately identifies groups by clustering trajectories in crowds with various densities, structures and occlusion of each other. It also tackles grouping consistency between frames. Experiments on the CUHK Crowd Dataset demonstrate that approach used in this study achieves better than previous methods which leads to latest results.

Keyword: Group detection; Clustering; Crowded scenes; Trajectory; Behavior analysis