Institute for Advanced Simulation
Jülich Supercomputing Centre

IAS Seminar

Topic: Automatic Tracking of Pedestrians

Speaker: Dr. Mubarak Shah, Department of Electrical Engineering and Computer Science, University of Central Florida, Orlando, USA

Contents: I will give an overview of recently developed methods for tracking pedestrians in medium and high density scenes. Tracking involves two main steps: object detection and correspondence or data association. The majority of current data association methods are based on incorporating a limited-temporal-locality of the sequence into the data association problem which makes them inherently prone to long-term occlusions, ID-switches and complex scenarios. I will present a global approach to data association which incorporates both motion and appearance in a global manner. We shift the approximation from temporal domain to object domain, while incorporating the full object domain into the data association problem implicitly. In our proposed data association method, we utilize Generalized Minimum Clique Graphs in formulating the optimization problem.

Above method assumes reliable detection of pedestrians, which is a reasonable assumption for low to medium density scenes. However, for high density crowds e.g. political rallies, religious festival, sports event etc it is very difficult to detect individual objects reliably. Tracking in such a scene is extremely challenging due to the small number of pixels on the target, appearance ambiguity resulting from the dense packing, and severe inter-object occlusions. Next, I will present a novel tracking algorithm, to overcome these challenges using a scene structure based force model. The key ingredients of the force model are three floor fields, which are inspired by the research in the field of evacuation dynamics, namely Static Floor Field (SFF), Dynamic Floor Field (DFF), and Boundary Floor Field (BFF).

Finally, I will present a novel tracking method tailored to dense crowds which does not require modeling the crowd flow and is less likely to fail in the case of dynamic crowd flows and anomalies by minimally relying on previous frames. Our method begins with the automatic identification of prominent individuals from the crowd that are easy to track. Then, we use Neighborhood Motion Concurrence to model the behavior of individuals in a dense crowd; this predicts the position of an individual based on the motion of its neighbors.

Time: Wednesday, 31 October 2012, 14:30

Venue: Jülich Supercomputing Centre, Hörsaal, building 16.3, room 006

Anyone interested is cordially invited to participate in this seminar.

sgd Prof. Dr. Stefan Blügel