

Person Detection and Tracking using PTZ-Cameras

Dr.-Ing. Eduardo Monari
Dipl.-Inform. Jürgen Metzler

✉ eduardo.monari@iosb.fraunhofer.de
✉ juergen.metzler@iosb.fraunhofer.de

☎ +49 721-6091-411
☎ +49 721-6091-453

While for static cameras several background subtraction, segmentation and tracking approaches have been developed in the past, for non-static pan/tilt cameras efficient and robust motion detection and tracking are still challenging tasks. For this purpose, a key-frame representation of the panorama image is proposed and a strategy for fast global homography estimation in large panorama images is presented. In a subsequent step, a tracking method is applied to generate trajectories. Furthermore, additional techniques are developed in order to avoid confusions between different persons.

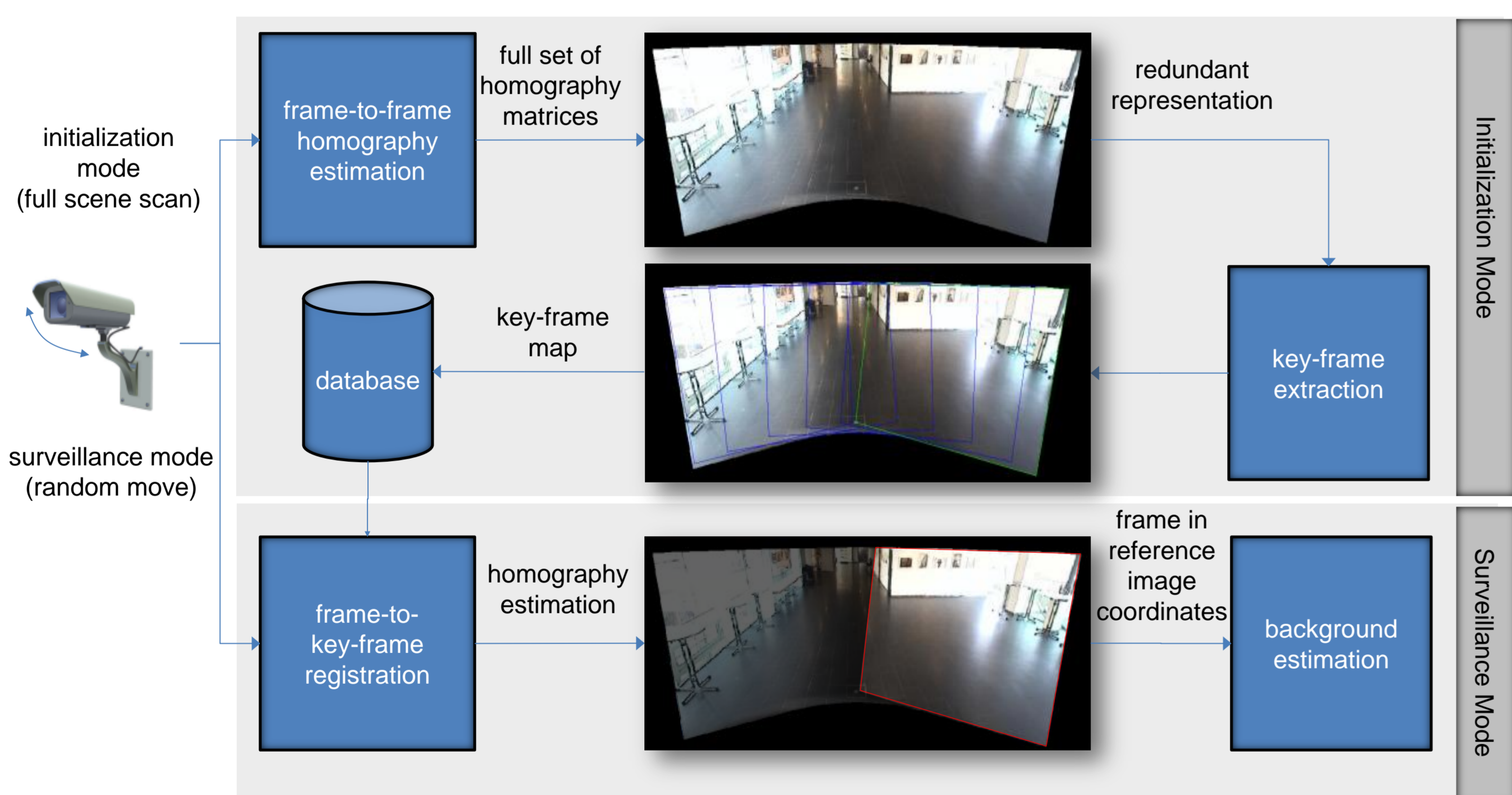
Motion Detection by Moving PTZ-Camera

Motivation: Pan/Tilt/Zoom cameras are widely-used devices, but motion detection and segmentation is still quite challenging, due to

- missing spatial pixel registration
- higher needs for computational resources

Our approach aims to

- providing a real-time image-to-panorama registration
- robust sub-pixel-accuracy for background modeling

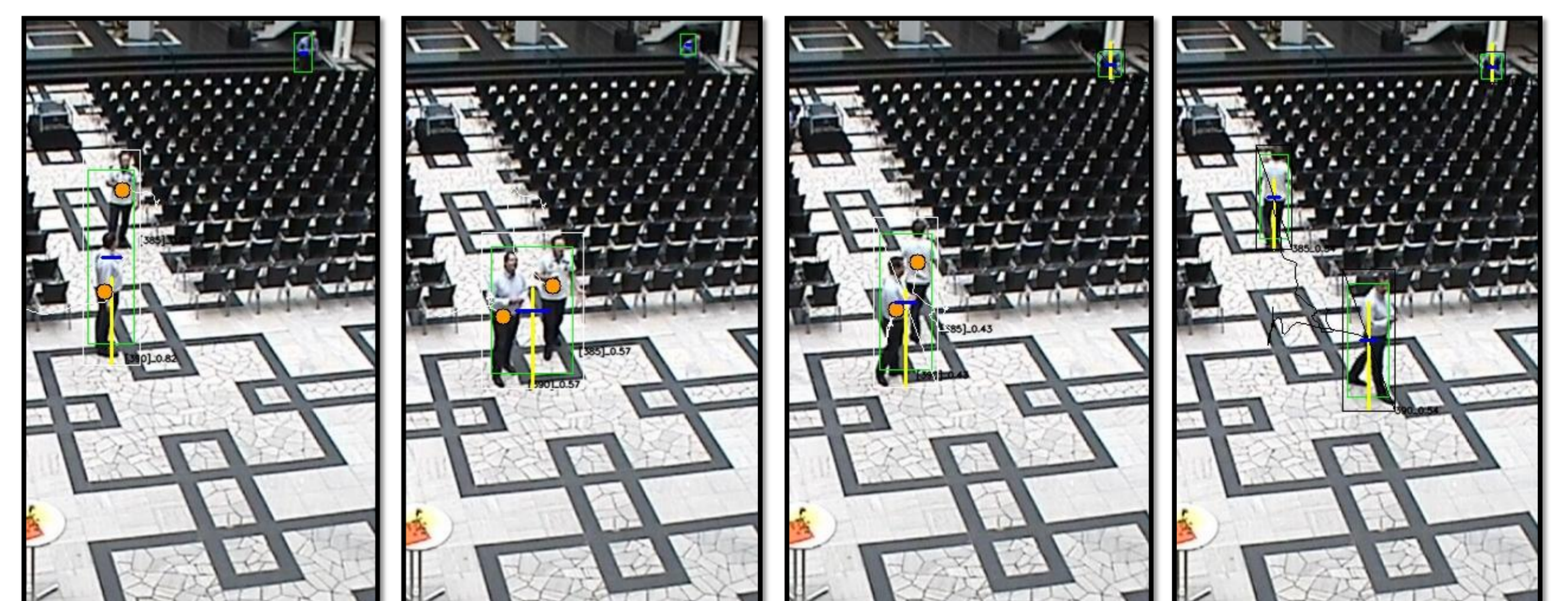
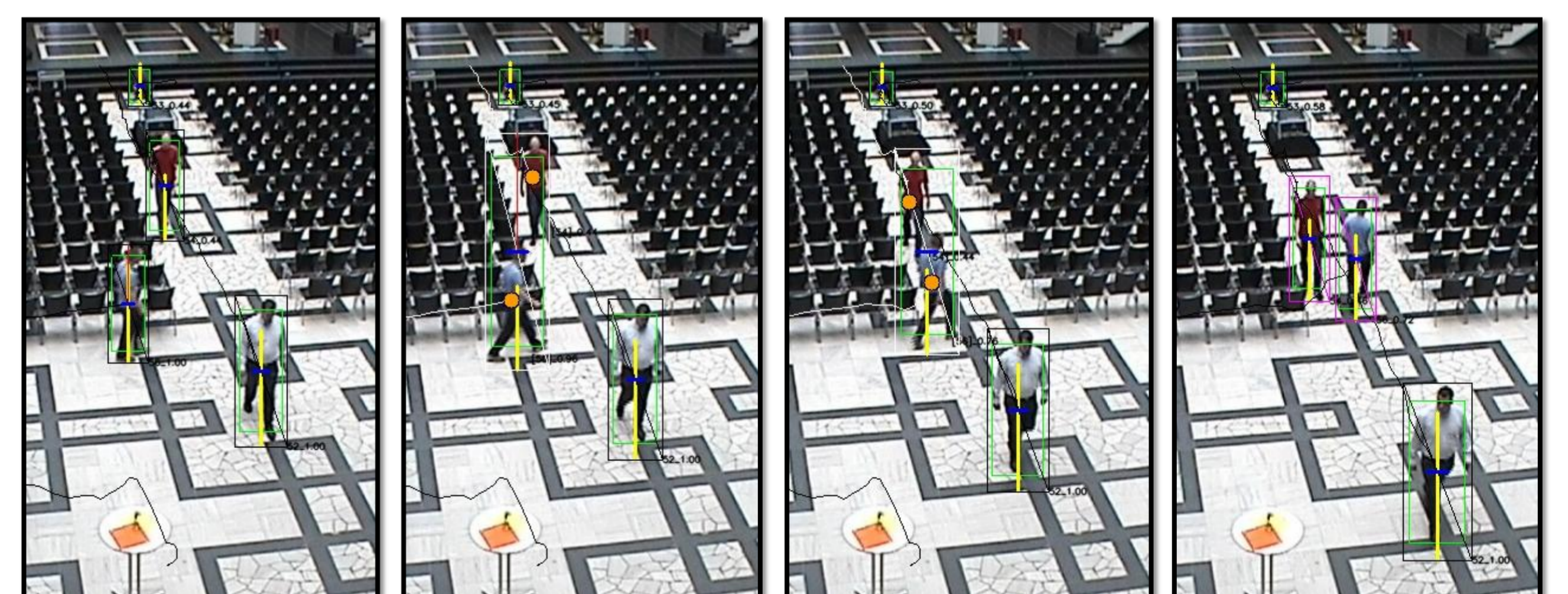


Tracking

The aim of tracking is to generate movement trajectories of all persons visible in the camera's field of view. The trajectories are used by analysis techniques which look for abnormal trajectories. Hence, it is important to gather all person movements to generate gapless trajectories as well as to retain the "anonymous" identity of persons. To achieve gapless tracking, approaches for person re-recognition may be necessary - in particular in cases of occlusions and in situations with high densities of persons. However, this can be regarded as one of the most challenging tasks in video analytics research.

Our approach addresses this problem as follows:

- 1.) detections of persons who approach each other or form a group,
- 2.) estimation of the number of persons within a group,
- 3.) partitioning of persons in the image based on individual-related features such as clothing color, appearance etc. and
- 4.) re-recognition of persons after leaving a group (confirmation of hypotheses from step 3)



Panorama-based Background Subtraction

Preliminary tests on background subtraction show promising results in indoor and outdoor scenarios. The results show a near real-time performance (approximately 30 ms per frame) even for very large reference panoramas.

However, there is still room for improvements. In particular, changing illumination conditions which depend on camera orientation and camera AGC compensation are still challenging tasks. Future work will focus on compensation methods for AGC and vignetting artifacts.

