**Robust Motion Estimation for Qualitative Dynamic Scene Analysis**

Perception of motion plays an important role in vision tasks as diverse as objects tracking, depth perception, estimation of camera ego-motion and time-to-collision with other objects. It allows to distinguish stationary from moving objects and thus to detect and avoid obstacles. This makes it particularly useful for context of fully autonomous behavior for robot navigation. Moreover, motion patterns can be used to allow the interpretation of human mimics and gestures. The 2D apparent motion of a scene is define as the optical flow field and can be estimated using correlation-based, differential-based, discrete-optimization, or phase-based methods. Among all optical flow estimation approaches, differential-based using variational model provides the most accurate results. This model normally used the brightness constancy assumption, which assumes that the intensity of a pixel stays constant if a camera or objects move. Unfortunately, this assumption does not hold when illumination changes, for objects that move into a part of the scene with different brightness conditions, and fast moving camera or objects.

This presentation discusses robust methods for 2D motion estimation and analysis for dynamic scene environment from image sequences using texture constraint. Such constraint describes edges, gradient, or orientation of image features and assumes that object texture stays constant if an object or a camera moves. Moreover, an approach for improving the estimation of fast camera and fast objects using multi-resolution processing technique will be presented. Finally, a method for real-time detection and tracking of moving objects will be highlighted.