



The activity concerns the analysis, design and implementation of machine learning methods for the detection, tracking and real-time recognition of objects in motion sequences, also in mobile environments.

Concerning real-time support, extensions of a video surveillance system have been proposed to make possible to guarantee speedup very close to the ideal, while improving the accuracy of the results detection. The extensions include the design of parallelization techniques at instruction-level, by SSE2, of the main computational cores and the real-time support to the operating systems to reduce jittering in video mobile transmission.

Detection is dealt by proposing an approach based on self organization through artificial neural networks, widely applied in human image processing systems and more generally in cognitive science. The approach, adopted as basis to model either background and foreground, can handle scenes containing moving backgrounds, camouflage and gradual illumination variations, can include into the background model shadows cast by moving objects, and achieves robust detection for different types of videos taken with stationary cameras.

Moreover, for object tracking we propose an Artificial Intelligence approach to improve correct estimates, that suitably combines Particle filtering and a matching model belonging to the class of Multiple Hypothesis Testing.