

# Tracking of objects in video streams using points of interest

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We are interested in the tracking of multiple objects in a video sequence in complex situations, where the objects can have different sizes, be of similar appearances, occlude each other or move with different velocities. Most current tracking systems do not deal well with these complex situations, in fact because the tracking is based on the difference between each image and a model of the background. A clue that this is not the right approach is that the human eye can detect objects moving across a “random” background.

The key idea of our work is to use the points of interest to robustly track multiple objects in complex situations. What are the points of interest? Sometimes called “corners” in the literature, these points are defined as any point in the image for which the signal changes two-dimensionally. Examples are “L-corners”, “T-junctions”, “Y-junctions”, black dots on white backgrounds and any location where the texture changes significantly. They are local features that is they are computed in a local neighborhood and are thus quite robust to partial occultation of the scene. Several detectors of points of interest have been proposed. The most popular is perhaps Harris’ detector. Points of interest detectors can be classified in three main categories [2]: contour-based, model-based and signal-based. Their classical applications are image matching, 3D modeling and object learning and recognition.

In our system, an object is defined via a set of points of interest and each point is characterized by the appearance of its neighborhood. The use of a set of interest points will allow us to track an object through partial occlusion as one or more points hopefully remain visible. In addition, we can also exploit potential relationships existing between the different points. For example, we can exploit the known spatial relationship between points located between the various parts of a football player: head, shirt, short, etc ...

## References

[1] J. Harris and M. Stephens “A combine corner and edge detector”, 4<sup>th</sup> ALVEY vision conference, 1988.

[2] C. Schmid, R. Mohr and C. Bauckhage, “Comparing and evaluating interest points”, ICCV, 1998.

[3] S.M. Smith, “Feature based image sequence understanding”, PhD thesis, Oxford University, Robotic Research Group, 1992.