università di genova facoltà di ingegneria

dipartimento informatica sistemistica telematica

Conferenza

Perceiving and tracking objects in motion: experiments and model

Dott.ssa Anna Montagnini

Institut de Neurosciences Cognitives de la Mediterranée (INCM)
CNRS et Université de Aix-Marseille II, Marseille - France

The quality of the representation of an object's motion is limited by an intrinsic ambiguity produced by the spatial limitation of the biological analyzers of visual motion (*aperture* problem). Indeed, the local nature of the early analysis done by the lower visual areas of the brain (V1, MT) can lead to erroneous perception of motion. Oculomotor experiments have confirmed previous electrophysiological and psychophysical evidence, by demonstrating that motion processing of extended objects is initially dominated by the local unidimensional (1D) motion cues. Shortly after, bi-dimensional (2D) information takes progressively over and leads to the final correct representation of global motion.

We have analyzed the smooth pursuit eye movements of human volunteers while they were tracking *ambiguous* moving objects. In particular we have addressed the issue of whether experience and learning can help reducing the initial tracking error due to local motion processing.
In addition, we propose an extension of existing Bayesian models of motion perception, which is constrained by our oculomotor data and could account for the dynamical integration of 1*D* and 2*D* motion information.