Object segregation and local gist vision using low-level geometry

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Multi-scale representations of lines, edges and keypoints on the basis of simple, complex and end-stopped cells can be used for object categorisation and recognition (Rodrigues and du Buf, 2009 BioSystems 95 206-226). These representations are complemented by saliency maps of colour, texture, disparity and motion information, which also serve to model extremely fast gist vision in parallel with object segregation. We present a low-level geometry model based on a single type of self-adjusting grouping cell, with a circular array of dendrites connected to edge cells located at several angles. Different angles between active edge cells allow the grouping cell to detect geometric primitives like corners, bars and blobs. Such primitives forming different configurations can then be grouped to identify more complex geometry, like object shapes, without much additional effort. The speed of the model permits it to be used for fast gist vision, assuming that edge cells respond to transients in colour, texture, disparity and motion. The big advantage of combining this information at a low level is that local (object) gist can be extracted first, i.e., which types of objects are about where in a scene, after which global (scene) gist can be processed at semantic level.

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