A real-time implementation of a neuromorphic optic-flow algorithm

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We have developed a real-time vision system for computing dense optic-flow fields. The system is based upon the multichannel gradient model of human motion perception (Johnston et al, 1999 *Proceedings of the Royal Society of London, Series B* **266** 509 - 518). The model employs a large number of space - time filtering operations with biologically plausible receptive fields. The implementation permits us to visually demonstrate, in real-time, the outputs from three temporally filtered channels and multiple oriented spatially filtered channels. Combinations of filter outputs can be seen to yield direction-sensitive and velocity-sensitive measures and the amalgamation of the outputs can be combined to produce optic-flow fields. Our demonstration uses a CCD camera for live-image acquisition and a dedicated image-processing engine to compute the filter responses and optic flow. The system is interactive and provides us with a graphic insight into the types of operations going on in the visual cortex.