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Spatio-temporal motion estimation using the Wigner - Ville distribution and the Hough transform

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There is a lot of evidence that biological visual systems devote considerable resources to the processing of motion. In the mammalian visual system, motion analysis constitutes a key element for the perception of objects in our environment. Thus, computational approaches to motion estimation can be inspired by our knowledge of biological systems, providing potential and efficient models to be used in many applications. Many neurophysiological studies have shown that the well-organized cells in V1 exhibit spatial-frequency selectivity for moving and still sinusoidal gratings. Visual stimuli are processed in parallel by exploring data via spatial spatial-frequency channels. Thus, we present a new framework for optic flow estimation based on a spatiotemporal/feature detection approach. The method relies on the computation of the Wigner - Ville distribution of the sequences followed by a Hough transform for detecting the motion (eg Kawakami and Okamoto, 1996 *Vision Research* **36** 117 - 147). Experimental results have been shown to be accurate for detecting motion at edges and robust to noise degradations. A comparison with variational techniques is presented.

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