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# Frequency and Space Domain Classification Images for Motion Detection

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## Abstract

We used two variants of the classification paradigm to reveal features and strategies used to discriminate motion direction (left vs. right). The stimulus consisted of a moving, temporally-windowed luminance increment embedded in dynamic white noise. 2-D classification images were computed on both the space-time and spatio-temporal frequency planes, i.e. classification images and classification spectra, respectively (the spatial direction orthogonal to the target motion was ignored). The stimuli were divided into four groups based on the target direction and the observer's response. Two methods were used for the spectral classification: in one, the transforms were combined across groups in the complex domain; in the other, the average magnitudes were combined. The classification frequency spectra revealed two findings. 1) Both users seemed to be using off-velocity viewing. That is the orientation of the highest energy in their classification spectra was tilted slightly from the orientation of the maximum stimulus energy (this is puzzling since the task was a left-right discrimination rather than a velocity discrimination threshold). 2) One observer seemed to be attending to both directions, while the other was apparently making a right / not-right decision; there was no obvious template feature corresponding to rightward motion for this observer. The classification images revealed another curious finding: the noise masks that gave rise to incorrect judgments were not those that contained an excess of energy in the non-target direction, but rather those that contained a dearth of energy in the target direction.