

EXTRACTION OF MOTION-INFORMATION BY VISUAL CORTICAL NEURONS :

A NEW METHOD WITH A TWO-DIMENSIONAL STOCHASTIC STIMULUS

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Visual stimuli moving randomly relative to the retina are highly relevant for perception under normal viewing conditions. However, the ability of visual cortical neurons to signal stochastic movement has not been analyzed up to now.

We recorded single cell impulse activity from the visual cortex (V1,V2) of the cat while presenting different types of stimulus patterns. Our stochastic movement stimuli were chosen so as to cover a broad range of actually occurring picture movements on a cat's retina, including those initiated by eye movements. The "preferred dynamic motion course" of a particular neuron was determined by calculating the stimulus-response crosscorrelations.

For different types of cortical neurons the two-dimensional dynamic motion courses were calculated; their relevance with respect to eye movements should be discussed.

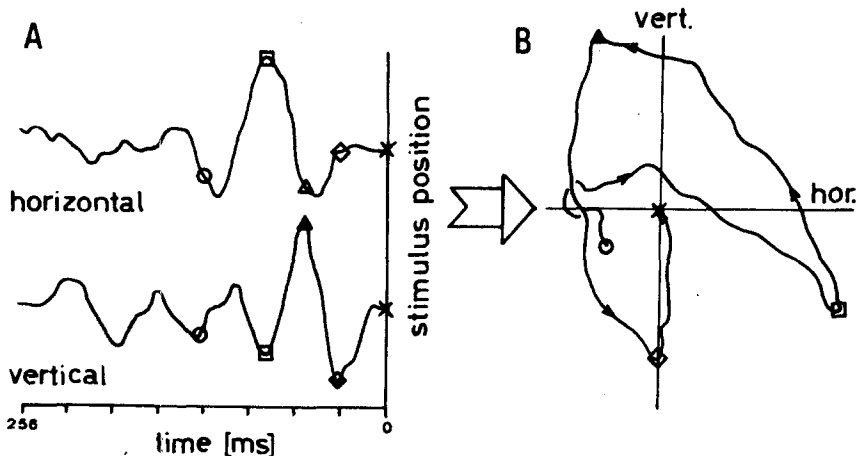


Fig.:Coupling between 2-dimensional picture motion and response of a cortical neuron in V2 of the cat.

Picture: randomly oriented bars, evenly distributed

A : Crosscorrelations between neuronal impulse activity and horizontal and vertical stimulus movements, respectively.

B : "Preferred dynamic motion course" obtained by combination of the crosscorrelations of A.

Open symbols mark identical points of time in A and B.

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