- Friday, December 12, 1997
  Spatial Attention and Saccadic Eye Movements

1.0 These are the minutes for YORKVIS 12 Dec 97 which was given by Jim Clark from Montreal

1.1 Next meeting is by Evangelos Milios on Auditory Localization which will be on Friday 16 Jan 1998

1.2 I WOULD LIKE TO TAKE THIS OPPORTUNITY TO POINT OUT THAT WE HAVE NO OTHER SPEAKERS PENDING AT THIS TIME. I AM LOOKING FOR VOLUNTEERS FOR FEB 6th; MAR 6th and APRIL 3rd or indeed, any FRIDAY!

1.3 A happy and a merry to all our readers...

1.4 I have updated the "links page" with loads of new conferences - if you know of any more, please let me know!

2.0 Jim Clark's talk was entitled "Spatial Attention and Saccadic Eye Movements"

2.1 Ignoring change detection, vision (and all sensory processing) can be viewed as a series of tasks: 2.1.1 Sensing (which part of scene?)

2.1.2 Receptive Fields (which part of the visual field?)

2.1.3 Processing (which features?) 2.1.4 Memory (what is for future use?) 2.2 Attention is important for all these things and for the control of eye movements (EMs) 2.2.1 OVERT attention (where the eyes are looking)

2.2.2 COVERT attention (the region of the visual field actually processed) 2.3 Possible links between OVERT and COVERT (in the control of eye movements): 2.3.1 EMs follow attention

2.3.2 CAN be independent (but not always)

2.3.3 ALWAYS independent 2.4 An area that is being attended to can be experimentally identified because it is associated with reduced reaction times to targets presented at the attended location.

3.0 THE MODEL

The model proposed is a "winner takes all" model in which features are (i) coded, (ii) assigned salience and then passed through (iii) a spatial averaging procedure and, in parallel, (iv) a maximum detection procedure. The results of the spatial averaging and detecting the maximum are then used selectively to inhibit less salient features.

4.0 Evidence was presented to support this model. Basically the model simulated the following, previously reported findings very nicely.

4.1 Saslow's gap effect (JOSA 1967 57 (8)) 4.1.1 If there is a gap between the fixation light going out and a target light coming on, eye movement latencies (time between target onset and eye movement to the target) are shorter than if the target comes on right as the fixation light goes out. If there is an overlap (target on before fixation off), latencies are slowed.

4.1.2 At short latencies (that is for large gaps), eye movements show a 'global effect' (Coeffe and O'Regan, 1987 VIS RES 27 227-240) in which they tend to land in the middle of a complex target. This demonstrates spatial averaging in the guidance system for saccades.

4.2 For long latency eye movements (overlapping fixation and target on periods), the latency depends on target eccentricity out to about 5 degs, for short latency ones (long gaps) it doesn't. 4.2 Becker & Jurgens (1979; Vision Research, 19 967-983) double step paradigm 4.2.1 If a target jumps unpredictably TWICE and your job is to fixate the final position, then your ability to ignore the first, intermediate position, and go straight to the final position depends on the eye movement's latency from the time of the second jump. If your latency is short, you tend to go initially to the target's first position and if it is long, then you tend to go to its second position. In between there is a smooth "amplitude transition function" which is well simulated by the present model. 5.0 Discussion centred on two main topics. 5.1 The connection between eye movements and attention and whether one can state things about attention control from a study of eye movements.

5.2 Whether a "winner takes all" model can select several targets from a scene (to allow for "divided attention" such as Triesman's claim that you can attend to seven sites (but no more) at the same time.

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