- Friday, October 6, 1995
  Various Projects

1.0 Here are the minutes for YORKVIS (Nov) meeting. The meeting was given by DM Regan and his students, Rob Gray and Christine Portfors-Yeomans.

1.1 The next meeting is by Demetri Terzopoulos, from U of T and will be in 061, Behavioural Sciences Building, York University on the first Friday in Dec (1 Dec) at 10am.

1.2 It saddens me to announce the death of Prof. Dr. med Otto-Joachim Grusser, working at the Free University of Berlin, on 17th October, 1995.

2.0 Some of the projects going on in DM Regan's labs.

2.1 Project 1: (with Marian Regan) Using the SQUID to identify areas of active human brain, an area has been identified, distinct from the primary auditory and visual cortices, where auditory and visual interactions occur.

2.2 Project 2: (with Marian Regan) Biomathematical modelling has been applied to the early stages of the auditory system. This allows us to describe the non-linearities of the periphery of the auditory system and to predict the form in which auditory information arrives at the brain.

2.3 Project 3: We know from the work of Hubel and Wiesel, that much of the visual system is concerned with the processing of orientation: there a special sensitivity for visual angles? Psychophysically there seems to be.

2.4 Project 4: There are only 5 ways of visually defining objects: by contrast, colour, motion, texture or depth. What are the general properties of TEXTURE that allow it to do this? A model in which texture edges are enhanced by lateral interactions between orientation tuned neurons can account for the humans' ability to detect and discriminate texture-defined letters.

2.5 Project 5: (with Rob Gray) Fred Hoyle pointed out that time-to-collision of an object can be assessed theoretically by the ratio of its size to its rate of change of size. Earlier experiments by Regan (and others) have shown that changing size information can indeed be used by humans. Another source of information (which will only work when instantaneous distance information is available and which would be no use for predicting the motion of space-travelling clouds) is related to the rate of change of disparity. Psychophysical studies have shown that you can use this information too, although there is a tendency, especially for larger objects, to react as if they were travelling faster than they really are. When BOTH are present, you are more accurate than for either alone and this tendency to misjudge larger objects is corrected.

2.6 Project 6: (with Christine Portfors-Yeomans) How good are you at judging the direction (relative to you) in which an object moving in depth is travelling? Two of the possible ways of deriving this information are (1) from the ratio of translational velocity to rate of change of disparity or (2) from the ratio of translational velocities in the two eyes. By making an object invisible monocularly but visible binocularly (by using dynamic random dot stereograms) only the former cue is available (normally they are confounded). It turns out the first cue can be used and visual direction is processed independently of the actual speed of the object (within limits). Disparity excursion (working from discrete samples rather than an estimate of rate of change of disparity) and translational speed are also processed independently.

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