- Friday, January 16, 1998
  Binaural Sound Localization

1.0 These are the minutes for YORKVIS 16 Jan 1998 which was given by two students of Evangelos Milios.

1.1 At the moment we have no talks scheduled -- I will be twisting people's arms shortly. In the meantime, if you would LIKE to give a seminar, please volunteer!

2.0 Evangelos Milios gave a few words of introduction and then handed over to the first of his two students:

2.1 Greg Reid gave a talk on "Binaural Scene Analysis"

How to retain directional information during recording?

2.2 Cues that humans can use but which are difficult to record include

interaural time differences (if one ear is closer)
interaural intensity differences (if one ear is closer)
various spectral cues 2.3 Sound direction can be reconstructed from the responses of
a fixed array or speakers 2.4 but the approach needs special computing hardware and a lot of computation. Alternate methods being developed in the Milios lab involve off-the-self microphones and computing hardware
one omni-directional and one directional microphone
two directional microphones
two omni-directional microphones plus movement 2.5 interaural differences can be difficult to interpret
echos can often give misleading peaks to intensity measurements
there are 'cones of confusion' since sounds from several locations can have the same difference in distance between the two ears. 2.6 These cones can be disambiguated by creating two of them by moving one or both speakers and then detecting the intersections between the cones.
3.0 The second talk was by Bill Kapralos.

He described a design that uses a laser range finder to measure distance and then converts it into sound. The idea is that a blind person could use such a device to scan the space ahead of them. The problem is how to present the data to the people who were trying to identify surface structures from sounds?

3.1 Translate 'distance' into 'sound frequency'. Various mappings were tried including linear, piano-scale, log or an inverse square law.

3.2 The log turned out to be best but there were problems with coding discontinutities of surfaces (edges). It was difficult to make them as obvious as they should have been.

3.3 Various possibilities and lines of research were raised and discussed.

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