Task & Data Analysis

Name of Dataset: Ultra Wide Band Wave Propagation
Date: 12.3.2005
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File: data files: data01_ascii_b_9-3-06 / data11_ascii_b_9-3-06

Format:

Matlab format of matrices for 23 multipath reflections. The following is included:
p_angle: the incoming angle of the wave front (0..2pi)
p_delay: delay in seconds of the wave front (0..70ns)
p_magn: magnitude of the wave
p_shape: 26 values for each reflection for the wave form (48 GHz sampling rate)
All data is stored in ascii format like
name
    value1   value2   .....   value23

raw data:
los.mat / nlos.mat:
Each contains two vectors of 4000 samples of raw data at 48 GHz sampling rate.

Scenario

The Story:
This data set is describing the propagation of an ultra wide band signal in an office environment. On a rectangular grid, the incoming waves have been measured. (See http://www.whyless.org/files/public/uwbw/wp5_uwbw.php). Using data post-processing, the incoming angle, delay, magnitude, and the waveforms of dominant, deterministic reflections have been extracted. Raw impulse response measurements are available as well.

Ultra-wideband (UWB) communications systems transmit data through signals with an extremely large bandwidth. Due to this large bandwidth, a very high timing resolution of the incoming waves can be achieved, such that individual reflections from walls or other objects in the environment can be distinguished. Therefore, a UWB communication system could potentially "sense" its surroundings through analysis of the received signal reflections, similar as a radar system.

Can sonification be used to obtain more/other information out of this data? For instance, the distortion of individual reflections could be sonified. Is it possible to sonify the characteristics of an environment?

The Keys:

Question:	Can we make audible the vast amount of information contained in UWB channel impulse responses?
Answers:	Spatial information (angle of incidence) of wavefronts is probably crucial to get a "natural" feeling of one's surroundings.

Subject:	UWB channel impulse responses.
Sounds:	Which sounds could be associated (this is most often empty)?

TaDa

The Task:

Generic question:	Local Questions subject {it} (e.g. what ist it?, where is it? etc.) Intermediate Questions subject {they, which, what} (e.g. where are they?, which is more?) Global Questions subject {anything, everything} (e.g. whats going on?, is everything ok?)
Purpose:	What for? One of {analyse, confirm, identify, judge, compare, navigate, track, alert, relax, remember, engage}
Mode:	Attention needed. One of {interactive, focus, background}
Type:	Temporal type of task. One of {discrete/procedural, continous, branching/decision}
Style:	Style of information processing task. One of {exploration, presentation}

The Information:

Level:	Concerning single elements, groups or the elements as a whole. One of {local, intermediate, global}
Reading:	Level of metaphors regarding the necessisity of learning. One of {direct, conventional}
Type:	One of {none, boolean, nominal, ordinal, ordinal-with-zero, ordinal-bilateral, interval, ratio, unknown}
Range:	Possible range of information
Organisation:	One of {category, time, location, alphabet, continuum}

The Data:

Type:	One {none, nominal, ordinal, interval, ratio}
Range:	Possible range of data
Organisation:	One of {category, time, location, mnemonic, continuum}