

MEASUREMENT SETUP FOR DIRECTIONAL HEARING

Human specimens and most animals have two ears for the perception of sound. Due to this it is possible to localize the direction of the sound source with a quite good accuracy. The difference of the incoming sound waves is analyzed in the brain and makes it possible to guess the direction. There are also some effects such, as the precedence effect, which do not behave as described above. This effect can be described as: if a person hears at the same time shifted acoustic signal from different directions it seems that the signal comes just from one direction, the direction from the first signal.

For persons with hearing aids its sometimes difficult to localize the sound source. It gets even more difficult for them with increasing hearing loss or in noisy environment.

The purpose of this master thesis is the development of a system (*hardware and software*) which measures the localisation abilities of a patient with a hearing aids. Figure 1 shows the setup for such an experiment. From the green loudspeaker the patient should hear a word or a sentence whereas the red ones produce a defined noise. The patient capability to understand speech in noise under different noise conditions can than be tested.

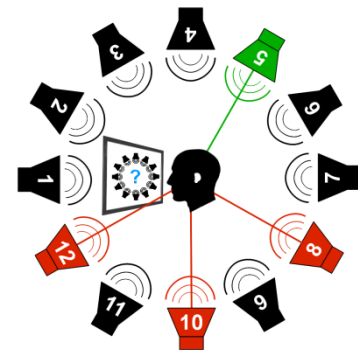


Figure 1: Test setup with 12 loudspeakers and a touch screen for patient feedback.

Another test would be to define tests to localize the origin of a sound source. Which includes also an automated the analysis and graphical presentation of the results.

At the end the examiner should be able to use different predefined speech understanding test with automatically recorded results. A pilot study could also be made for the clinical evaluation of the system.

Nature of the Thesis

Software development: 60%
Experimental: 20%
Analytical: 10%
Mechanic development & fabrication: 10%

Specific Requirements

Programming in C++

Examinator

Prof. Dr. Ch. Stieger

Supervisor

Prof. Dr. U. Brugger

Contact

Prof. Dr. Christof Stieger, Artificial Hearing Research, Department of ENT, Head and Neck Surgery, Inselspital, christof.stieger@artorg.unibe.ch, 031 632 87 89