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# Improvement of Muscle Contraction Measurement in Eye, Finger and Thumb Motion Using the g.Nautilus BCI [DA, PR]

## Background:

Guger Technologies OG, is one of the leading companies in the field of Brain-Computer Interfaces (BCI), Biosignal Processing and Analysis. Research centres, universities and hospitals in more than 60 countries use our hard- and Software for their research. We cooperate with various research partners and customers in developing new assistive systems. Within one of these developments we are able to propose the following

The Nautilus mouse is a wireless device which records EOG and EMG signals corresponding to one dimensional upward eye movements or contraction of single hand or arm muscles. The detected movements are converted into a simple mouse button click. The click signal is used to control Assistive Technologies (AT) like intendiX or Grid2 to control a scanning cursor.

## Goals and tasks:

- Feature extraction
  - Identify and characterize signal components generated by involuntary eye blinks.
  - Identify and characterize signal components generated by thumb muscles and muscles controlling the finger motion

  - Develop algorithms to identify and reject blinks from EOG eye motion signals
  - Extend existing EOG based algorithms to detect thumb and finger signals Integrate with algorithms within existing systems to detect eye movements
  - Evaluate resulting algorithm with at least 5 healthy subjects
  - Develop a module to integrate g.Nautilus into AsTeRICS, an open framework for AT implementation developed at KI-I and used at the institute Integriert Studieren

## Required Skills

- Knowledge in Matlab and Simulink programming
- Knowledge in Digital Signal Processing•
- Knowledge in software engineering and algorithms

## Kontaktperson

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