

BSc/MSc-project

Title: Brain Computer Interface (BCI) and Eye Tracking (ET) Systems as Assistive Technologies in Smart Home Environments

Description:

It is difficult for the severely paralyzed patients to interact with their environment. For example, late stage Amyotrophic Lateral Sclerosis (ALS) patients may not be able to move any muscle except their eyes. Caregivers and assistive technologies can help these patients communicate and interact with their surroundings. Brain-Computer-Interface (BCI) and Eye-tracking (ET) are two examples of already existing assistive technologies. Non-invasive BCI devices' control strategies typically involve EEG analysis of motor imagery, visually and auditory evoked potentials, as well as fMRI, NIR etc. ET tracks the user's gaze on the computer screen with a camera.

ET and motor imagery BCI can be combined to create a hybrid ET-BCI that is fast and intuitive to use. ET allows the user to control a mouse cursor with his gaze, and then the user can perform a click using the following methods: Dwell time: a click is performed if gaze is constant for a period set threshold time BCI motion imagery: a click is performed if an imagined movement is detected

This thesis is to create the hybrid ET-BCI, improve its classification accuracy, and compare the clicking methods in a Fitts' Law experiment.

Prerequisites: Knowledge in signal processing, programming skills and experience with MATLAB

Responsible institution: DTU Elektro

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Allowed no of students per project: 1-2

The project description may be published on the website (yes/no): Yes

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