Eye-tracking + EEG
WORKSHOP

April 15, 2024
(Monday)
2 pm – 5 pm
MW401, HKU

Introduction to eye-tracking and EEG integration technology and research

Traditionally, electrophysiological and neuroimaging studies have required participants to maintain a fixed gaze to prevent signal distortion, a requirement that starkly contrasts with the dynamic nature of how we explore our visual environment in daily life, by making 2-4 eye movements per second. A promising approach for studying attention and cognition in more naturalistic settings is the combined recording of eye-tracking and EEG data while allowing participants to freely make eye movements. This workshop will introduce researchers to this relatively novel method combination, with an emphasis on data analysis.

Speaker: Dr Olaf Dimigen
Moderator: Prof Guang Ouyang

The workshop is structured into two parts:
Theoretical Foundation (from 2:00 to 3:00 + 30 mins Q&A)
The first session offers an introduction to the potential advantages, applications, and challenges of integrating eye movement and EEG recordings. I will show some examples of how this technique can lead to new insights in the areas of reading, face perception, and natural scene viewing. A special emphasis will be on the methodological challenges of co-registration, including the practicalities of setting up a laboratory and integrating the data, as well as strategies for removing ocular artifacts from the EEG. Finally, I will cover recent advances in regression-based deconvolution techniques (Dimigen & Ehinger, 2021), which are instrumental in deriving clean and interpretable brain signals during natural vision.
Hands-On Analysis (from 3:30 to 5:00)
The second session will be hands-on. Together, we will analyze simple EEG/eye-tracking datasets using two freely available Matlab toolboxes developed in my lab: EYE-EEG (www.eyetracking-eeg.org) and UNFOLD (www.unfoldtoolbox.org). This part is designed to be interactive, and while some prior knowledge of Matlab and EEG/ERP analysis basics is beneficial, it is not mandatory. Participants are required to bring their own laptops with Matlab installed (version R2018 or newer). All necessary toolboxes and datasets will be provided during the workshop.

Dr Olaf Dimigen is currently an Assistant Professor from Experimental Psychology Unit, Faculty of Behavioural and Social Sciences, University of Groningen, The Netherlands. He received his PhD degree from Department of Psychology, Humboldt-Universität zu Berlin (Germany) based on his focused research on neural cognitive processes combining eye-tracking and EEG (Electroencephalography) technologies. His current research interests cover active visiual perception and cognition, attention, co-registration of eye movements and EEG, multimodal neuroimaging, parafoveal and peripheral vision, microsaccades, reading, face and scene perception, semantic processing, and more naturalistic applications of psychophysiological methods. Dr Dimigen has developed several highly used software packages for the research community, including 1) EYE-EEG, a MATLAB toolbox for simultaneous EEG and eye tracking, 2) OPTICAT, an optimized ICA training and ocular correction method, and 3) unfold: an integrated toolbox for overlap correction, non-linear modeling, and regression-based EEG analysis.

All are welcome
Register here: