ETH
Eidgenössische Technische Hochschule Zürich
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Distributed Computing

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EEG - Eye Tracking: Hybrid Model

Deep Learning is inspired by the brain structure. But can deep learning help us to advance our understanding of brain functions?

The collection of eye gaze information provides a window into many critical aspects of human cognition, health and behavior. Brain-computer interfaces can for example be used to decode locked-in patients' brain signals in order to facilitate communication.

The ability to predict a person's eye movement based on brain activity in the form of EEG data offers a variety of applications. In the medical field, it can build a better understanding of diseases; in the psychological domain, the findings and insights are relevant for behavioural researchers. Most generally, mature technology in this area will enable a new interface between humans and machines.

Recent research in this area has demonstrated the feasibility of predicting ET data with a high degree of accuracy from EEG data. The more complex the task under consideration, the limits of existing approaches are being reached.

This thesis will examine the question of how the continuous stream of data can be processed in a hybrid model. The data recorded with the eye tracker will serve not only as a target variable, but also actively as an input variable. According to a more realistic scenario, the data would be recorded by a camera with a significantly lower frequency. In addition to the fundamental question of how both modalities with different input frequencies can be integrated, it is essential to explore the general architecture of the model; questions such as early vs. late fusion or the choice of the appropriate hyperparameters could be approached with concepts from the field of neural architecture search.

Requirements:
Knowledge in Deep Learning, or solid background in Machine Learning.
Implementation experience with TensorFlow or PyTorch is an advantage.

Interested? Please contact us for more details!

Contact

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