Prof. R. Wattenhofer

Foundation Models for Decoding Brain Activity

Deep Learning is inspired by the intricate structure of our very own brains. But what if we told you that deep learning could, in turn, help us unlock the secrets of the brain's inner workings?

The human brain is a complex and mysterious organ, and understanding its inner workings has been a quest for scientists and researchers for centuries. Imagine having the power to peek into the brain's activity, decode its signals, and gain insights into cognition, health, and behavior. This is not science fiction; it's the exciting world of brain-computer interfaces.

Our project dives into the realm of brain activity decoding, where we'll harness the cutting-edge power of deep learning foundation models. These models have shown remarkable success in tackling various decoding tasks, and we aim to harness their potential to crack one of the most challenging puzzles: generalization.

Generalization is the key to making brain-computer interfaces truly effective. Often, models trained for one participant fail when applied to another. The data collected during one session might differ from the next due to variations in electrode placement. Even the hardware used can introduce discrepancies. It's like solving a new puzzle every time!

In this student project, we embark on a journey to explore how foundation models and transfer learning can help into decoding of brain activity. We'll delve into a multitude of scenarios: decoding brain signals as participants move, while they gaze at images, listen to sounds, and even when they experience different emotions.

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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