

How Data from Combined Neuroimaging Help Neural Networks Decoding

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Abstract

Neuroscience has focused on the implementation of computation, studying multi complex dynamic neural networks. In machine learning (ML), however, artificial neural networks tend to find each single pattern and decode this dynamics or circuits in favor of brute force optimization of a cost function, often using simple and relatively uniform initial architectures. However there are some challenge need to be addressed in neurocincence such as, the very dense and overlapping interconnectedness among 302 neurons of *C. elegans* which are mapped the "wiring diagram," or connectome. Plus their ability to signal each other via chemicals called neuromodulators, means that one can hardly just look at the connectome and discern how it switches between different states of behavior. One more example is an algorithm based on machine learning could help predict whether patients will develop delayed cerebral ischemia (DCI) with aneurysmal subarachnoid hemorrhage (aSAH), according to findings presented at the Neurocritical Care Society annual meeting. Furthermore, due to spatial information about changes in cortical activation patterns and the rapid temporal resolution of bioelectrical changes, more features correlated with brain activation and connectivity can be identified when using fused EEG-fNIRS, thus leading to a detailed understanding of neurophysiological mechanisms underlying motor behavior and impairments due to neurological diseases.

Biography

Maryam is an MSc applied neuroscience student at King's College London. Her research focuses on combined neuroimaging such as EEG-fNIRS based detection of brain functions. She is particularly interested in analysing and designing machine learning algorithms to analyse database systems, to understand the pattern of neural networks. Alongside her MSc, she develops her machine learning development skills using Python. Before her MSc,

she successfully completed courses at Oxford University college related to critical thinking and problem-solving, which helped her to enhance her analytical skills, value, and worthiness of information to integrate and create a new pattern for research. In 2018 she has supported an initiative of the UK Government through the All-Party Parliamentary Group (APPG) related to mental health in the workplace. Here the aim was to study how Mindfulness can support employees with their cognitive and mental capabilities.