

Machine-learning the brain

Prof. Lauri Parkkonen
Aalto University

Many functional neuroimaging methods produce a wealth of data about brain activity but picking up the bits relevant for the experimental question can often be a daunting task. Machine-learning techniques, also referred to as multivariate pattern analysis or ‘decoding’ in the neuroimaging context, have created information-based brain mapping to support the traditional activity-based mapping. In this talk, I will first review the mathematical basis of some widely applied machine-learning methods and illustrate how they can facilitate the analysis of magnetoencephalographic (MEG) recordings. I will provide examples of classifying brain activity to visual and auditory stimuli as well as to continuous, naturalistic stimuli and to motor imagery in real time; I will discuss the motivation and technical requirements of these ‘closed-loop’ experiments.