Algorithms for on-line Differentiation of Neuroelectric Activities

Prof Dr. Klaus-Robert Mueller
Intelligent Data Analysis Group
Fraunhofer FIRST, Berlin, Germany
and
Neuroinformatics group, Department of Computer Science,
University of Potsdam, Germany

Brain Computer Interfacing (BCI) aims at making use of brain signals for e.g. the control of objects, spelling, gaming and so on. This talk will first provide a very brief overview of Brain Computer Interface from a machine learning and signal processing perspective. In particular it shows the wealth, the complexity and the difficulties of the data available, a truely enormous challenge: In real-time a multi-variate very strongly noise contaminated data stream is to be processed and neuroelectric activities are to be accurately differentiated.

Finally, I report in more detail about the Berlin Brain Computer (BBCI) Interface that is based on EEG signals and take the audience all the way from the measured signal, the preprocessing and filtering, the classification to the respective application. BCI as a new channel for man-machine communication is discussed in a clincial setting and for gaming.

This is joint work with Benjamin Blankertz, Guido Dornhege, Matthias Krauledat (Fraunhofer FIRST, Berlin) and Gabriel Curio (Charite, Berlin).