The good placement

Propositions accompanying the thesis:

The Good Placement:

Information-driven choice of fNIRS optode location and its impact on brain-computer interface performance

1. Brain-computer interfaces (BCIs) can restore communication and control to people with severe neuromuscular disabilities who are unable to produce words, gestures and other motor actions.

2. Electroencephalography (EEG) is currently the most widely used modality for BCIs due to its cost-effectiveness, portability and high temporal resolution. However, its low spatial resolution and susceptibility to motion artifacts decrease its utility for real-world BCI applications.

3. fNIRS is more robust against motion artifacts and can reach higher spatial resolution than EEG, making it a promising alternative technique for BCIs.

4. The way optodes are arranged on the scalp influences their capacity to sample from the target brain region. Optode arrangements can be improved based on information collected from functional magnetic resonance imaging (fMRI).

5. The fNIRS signal is heavily influenced by physiological noise. The use of short-separation channels and knowledge about the location of vascular structures can help mitigate the impact of physiological noise.

6. Temporal information encoding and decoding techniques, combined with augmented-reality (AR) technology, can result in an effective and engaging paradigm for communication and control BCIs.

7. This dissertation progresses data analysis and acquisition techniques toward the ultimate goal of making BCIs applicable to everyday situations.

8. The practical benefits of BCIs should be studied in clinical cohorts outside of well-controlled laboratory settings to assess their impact in daily-life scenarios.