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Sommario
Stroke is one of the leading causes of long-term motor disability and, as such, directly impacts on daily living activities. Identifying new strategies to recover motor function is a central goal of clinical research. In the last years the approach to the post-stroke function restore has moved from the physical rehabilitation to the evidence-based neurological rehabilitation. Brain-Computer Interface (BCI) technology offers the possibility to detect, monitor and eventually modulate brain activity. The potential of guiding altered brain activity back to a physiological condition through BCI and the assumption that this recovery of brain activity leads to the restoration of behaviour is the key element for the use of BCI systems for therapeutic purposes. To bridge the gap between research-oriented methodology in BCI design and the usability of a system in the clinical realm requires efforts towards BCI signal processing procedures that would optimize the balance between system accuracy and usability. The thesis focused on this issue and aimed to propose new algorithms and signal processing procedures that, by combining physiological and engineering approaches, would provide the basis for designing more usable BCI systems to support post-stroke motor recovery. Results showed that introduce new

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| | physiologically-driven approaches to the pre-processing of BCI data, methods to support professional end-users in the BCI control parameter selection according to evidence-based rehabilitation principles and algorithms for the parameter adaptation in time make the BCI technology more affordable, more efficient, and more usable and, therefore, transferable to the clinical realm. |
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