TOWARDS FULLY UNSUPERVISED ALGORITHMS FOR MYOELECTRIC PROSTHETIC CONTROL

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Myoelectric prosthetic control algorithms have been advanced substantially in recent years. However they still heavily rely on supervised training and need for frequent re-training. This implies the (time-consuming) recording of well-defined, user-specific EMG training data sets. In order to eliminate the need for time consuming and tedious process, we explored a global cross-subject mapping model based on a regression of forearm EMGs to wrist kinematics. The controller stems from a previously introduced user-specific synergy driven estimator that provides simultaneous and proportional control over multiple degrees of freedom (DoFs). We extend and test this approach by generating a global set of synergy inspired mappings as an average from a pool of subjects. Following a familiarization session, ten able-bodied participants performed target-hitting myocontrol tasks over two DoFs with subject specific mapping (SM) and global mapping (GM). The GM does not require any training since the controller is generated from the database of subjects. On average, the subjects reached 86.0 ± 10.2% of all targets using SM and 86.5 ± 14.5% using GM (not statistically different). These preliminary tests indicate that, through user adaptation and natural control, the proposed approach might be able to completely eliminate the need for system training without compromising performance.