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**Abstract:** Estimation of neuromuscular intention using electromyography (EMG) and pattern recognition is still an open problem. One of the reasons is that the pattern-recognition approach is greatly influenced by temporal changes in electromyograms caused by the variations in the conductivity of the skin and/or electrodes, or physiological changes such as muscle fatigue. This paper proposes novel features for task identification extracted from the high-density electromyographic signal (HD-EMG) by applying the mean shift channel selection algorithm evaluated using a simple and fast classifier-linear discriminant analysis. HD-EMG was recorded from eight subjects during four upper-limb isometric motor tasks (flexion/extension, supination/pronation of the forearm) at three different levels of effort. Task and effort level identification showed very high classification rates in all cases. This new feature performed remarkably well particularly in the identification at very low effort levels. This could be a step towards the natural control in everyday applications where a subject could use low levels of effort to achieve motor tasks. Furthermore, it ensures reliable identification even in the presence of myoelectric fatigue and showed robustness to temporal changes in EMG, which could make it suitable in long-term applications.

**Keywords:** high-density electromyography; pattern recognition; myoelectric control; mean shift; prosthetics

## 1 Introduction