

**Subject**

Deep network-based solution for non-supervised classification of surface motor unit potentials using training data.

**Supervisors, contact, place of research**

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**Project Description**

The analysis of motor unit (MU) potential (MUP) trains is a common practice in studies of human motor control, since it gives insight into processes of neural control. Until recently, single MUPs were recorded by indwelling electrodes from inside of a muscle. Such studies were limited to the small samples of simultaneously active MUs and to the low levels of muscle activity. Recent advances in surface EMG technique allow non-invasive recording from several simultaneously active MUs on any level of muscle force, which potentially widens substantially the amount of useful information.

However, the identification of potentials of single MUs from surface MUP recording is challenging, since the potential shapes are less diverse than those from indwelling electrodes and their superpositions are more frequent. That is why the problem of successful MUP classification on higher levels of muscle force still is not satisfactorily solved [1-4].

The PhD candidate is expected to apply novel methods of data preprocessing and advanced deep artificial neural networks algorithms which may eventually solve this problem.

It should be noted that there was no previous attempt in employing this technique in solving the problem of classification of surface MUPs.

**Bibliography**

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- [4] Holobar A, Farina D (2014). Blind source identification from the multichannel surface electromyogram. *Physiological Measurement*, 35:R143.

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