University of Cyprus — Πανεπιστήμιο Κύπρου

School of Engineering
Department of Electrical and
Computer Engineering

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Title: « **Automatic Detection and Removal of Muscle artifacts from Scalp EEG Recordings in Patients with Epilepsy** »

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Room KENTP. A019, Old Campus – University of Cyprus

Abstract:
The Electroencephalogram (EEG) is one of the most common recording techniques of brain activity. However, EEG does not only record brain activity but is frequently contaminated by non-cerebral electrical activity such as line noise, cardiac signals, eye blinks and movements and muscle contraction due to biting, chewing and frowning. Muscle artifacts, also known as Electromyographic (EMG) artifacts, have presented a real challenge over the years, since they overlap with brain activity over a wide frequency range. EMG contamination is particularly problematic in epilepsy where muscle artifacts are prevalent and also overlap the EEG signal and complicate its interpretation, often making this interpretation infeasible. Thus, EMG artifacts are a major obstacle in the characterization of electrophysiological properties. The detection and removal of muscle artifacts from the EEG signal poses a real challenge and is crucial for the reliable interpretation of EEG-based quantitative measures. In this work, an automatic method for detection and removal of muscle artifacts from scalp EEG recordings, based on canonical correlation analysis (CCA), is introduced. To this end we exploit the fact that the EEG signal may exhibit altered autocorrelation structure and spectral characteristics during periods when it is contaminated by muscle activity. Therefore, we design classifiers in order to automatically discriminate between contaminated and non-contaminated EEG epochs using features based on the aforementioned quantities and examine their performance on simulated data and in scalp EEG recordings obtained from patients with epilepsy.

Biography:
Maria Anastasiadou received her undergraduate degree in Physics from the University of Athens in 2009. She then joined the Faculty of Engineering and Physical Sciences at the University of Surrey, UK, where she earned a M.Sc in Medical Physics (2010). In 2011 she joined the KIOS Research Center for Intelligent Systems and Networks at the University of Cyprus as a graduate level researcher (Ph.D student). She is currently working on a funded project for the study of epilepsy, multimodal detection and prediction of epileptic seizures. Her current research interests include system identification, pattern recognition and mathematical models than can be used for the detection and prediction of epileptic seizures by using EEG signal.