



## Detecting consciousness in locked-in syndrome patients with entropy-based methods

Locked-in syndrome (LIS) patients are fully conscious, but except for eye movements, they are unable to produce any speech or perform any muscle movements. When the patient later enters Complete Locked-In Syndrome (CLIS), there are no eye movements anymore. Consciousness detection by brain-computer interfaces is currently studied by non-invasive electroencephalography (EEG) signals to analyze the depth of anesthesia during surgery.

The goal of this project is to detect consciousness from EEG signals using entropy-based methods. There is, however, no "ground truth" whether CLIS patients have consciousness or not. Entropy-based methods are frequently applied in the analysis of the level of consciousness in anaesthesia. It is possible to be an effective method to establish communication with CLIS patients.

In this work, EEG data from 10 Patients will be analyzed using entropy-based methods, e.g. fuzzy entropy, dispersion entropy, etc. to uncover the conscious states in CLIS patients. Finally, the calculation time of each entropy-based approach will be compared in order to evaluate potential for application in a real-time system in the future.

### Requirements:

- Basic knowledge of signal processing
- Programming experience in Matlab

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