Proposal for a course project on

"Advanced topics in physiological signal processing"

Sol Amara ,solamar@post.bgu.ac.il

- Name of article:

"Paroxysmal slow wave events predict epilepsy following a first seizure."
Published at 'Epilepsia'

- Data source: TUH data

26,846 clinical EEG recordings collected at Temple University Hospital (TUH) from 2002 – 2017
https://isip.piconepress.com/projects/tuh_eeg/html/downloads.shtml

For this project, I intended to utilize 'The TUH EEG Epilepsy Corpus' (TUEP), which includes 100 subjects diagnosed with epilepsy and 100 subjects without epilepsy, as determined by a certified neurologist.

- The main idea in the method:

This article focuses on characterizing a novel form of pathological cortical slowing termed paroxysmal slow wave events (PSWEs). These events have been observed in epilepsy, Alzheimer's disease, and various other brain disorders. The primary objective of this study was to identify a new biomarker for epilepsy that could predict the likelihood of epilepsy following an initial seizure. To achieve this, researchers examined four distinct characteristics of PSWEs (1. Occurrence per minute; 2. Mean MPF; 3. Event duration in precent of the total time; 4. Average num of channels that pick up PSWEs) and compared their differences between an epilepsy group and a control group. Employing a logistic regression model, they demonstrated that the occurrence of PSWEs per minute significantly increased the risk of future seizures among patients experiencing their first seizure, with an odds ratio (OR) of 3.56 (p=0.009). Additionally, the researchers incorporated demographic variables and comorbidities into the model, but it did not enhance its predictive accuracy. Furthermore, they attempted to refine the model by exclusively using early EEG tests conducted within 72 hours post-seizure, resulting in an increased odds ratio of 5.73 (p=0.02).