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iEEG- MEG Data via Hidden Markov Model

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Intracranial electroencephalography recordings are used for clinical evaluation preceding to surgical resection of the seizer epileptic focus and also provide a window into brain function. These recordings afford information in detailed manner about brain activity. Non-invasive whole brain Magnetoencephalography would help translate iEEG in the overall brain activity.

In this method MEG-iEEG recordings were performed at rest on 11 patients with the usage of epilepsy. Pre-processed MEG sensor data was predictable to source space. The embedded time delay hidden markov model techniques applied to find recurrent means sub-second patterns of network activity in data-driven way completely. iEEG and MEG results correlations computed between iEEG power envelopes and HMM state time courses in equally spaced frequency bins, presented as correlation spectra for iEEG channels and respective states. As the placement of electrodes between patients was inconsistent, their modulation by HMM states might help group the contacts into functional clusters. It is the first time HMM was practical to concurrently recorded iEEG-MEG and our pipeline can use in future similar studies. As per the result of Five HMM states were incidental from MEG. Two of them corresponded to the right and left temporal activations and had a spectral signature primarily in the theta/alpha frequency band. The mainstream of iEEG contacts were also situated in right and left temporal areas and the theta/alpha power of the local field potentials recorded from these contacts correlated with the time course of the HMM state consistent to the time-based lobe of the respective hemisphere.

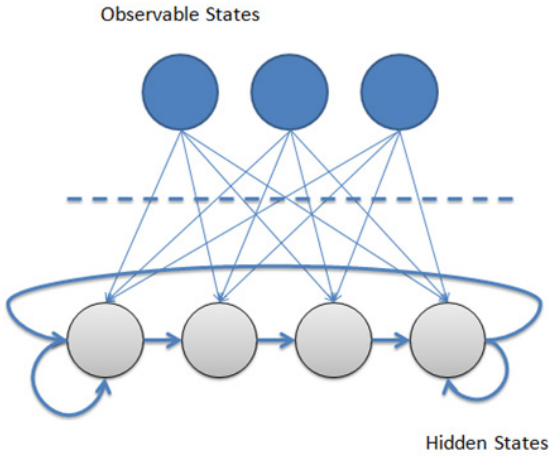

Figure 1: Different states of observable and hidden.