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Title:

“Spectral and heritability analysis of EEG time series data using a nested Dirichlet process”

Abstract:

In this talk, we will analyze the spectral features of resting-state EEG time series data collected from twins enrolled in the Minnesota Twin Family Study (MTFS). Our goal is to calculate the heritability of the spectral features of the resting EEG data. Due to the twin design of the MTFS, the time series will have similar underlying characteristics across individuals. To account for this, we develop a Bayesian nonparametric modeling approach for estimating the spectral densities of the EEG data. In our methodology, we use Bernstein polynomials and a Dirichlet process (DP) to estimate each subject-specific spectral density. In order to estimate the spectral densities for the entire sample, we nest this model using a nested DP process. Thus, the top level DP clusters individuals with similar spectral densities and the bottom-level dependent DP fits a functional curve to the individuals within that cluster. We then extract relevant spectral features from the estimates of the spectral densities and estimate their heritability. This is joint work with Dr. Brian Hart (UnitedHealthGroup), Dr. Michele Guindani (UC Irvine), and Dr. Stephen Malone (Univ. of Minnesota).