

Combining Images Across Multiple Subjects: A Study of Direct Cortical Electrical Interference

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In this talk, I will introduce a hierarchical approach for combining information across multiple images. Our work was motivated by a functional brain mapping technique called direct cortical electrical interference (DCEI) that gives binary observations of an underlying “true” region at multiple sites throughout the brain. To model region shapes that may vary widely across individuals, we use mixtures of simple templates (e.g., circles). These subject-specific templates are treated as random effects, governed by a set of population templates that make up a population region. The numbers of subject-specific and population templates are treated as unknown variables to be estimated from the data, and inference is made using reversible jump Markov chain Monte Carlo. The approach will be illustrated with two examples using DCEI data collected at the Johns Hopkins Medical Institutions on motor and language functions.