463-663: Hierarchical Models

After linear regression and generalized linear models, hierarchical models are probably the most widely used models in applied statistics. They are especially useful when data come in groups, and the relationships between variables are similar but not identical across the groups, or when there is more dependence between observations within groups than between groups. When they are appropriate, hierarchical models can capture more subtle information about the data than the split-apply-combine strategy common in data science. In the first part of this course we will look at hierarchical linear models and practical applied Bayesian statistics (which is a key tool for understanding, estimating and generalizing hierarchical models). In the second part of the course we will look at a variety of applications and generalizations of hierarchical modeling, depending on interest and time – for example, growth curve models, clustered survey data, producing student scores on large scale standardized tests, interventions on groups of social networks, etc. – and see strengths and weaknesses of this approach. The course will end with student presentations of journal papers, and/or data analysis projects, of interest to the students.

Note for 617 students:

Roughly the first week or two will overlap with material from 36-617. After that, it's off to the races!