THE UNIVERSITY OF CHICAGO

Department of Statistics

MASTER'S THESIS PRESENTATION

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Detecting Gene-Environment (G x E) Interactions with Sparse and Structured E

TUESDAY, February 6, 2018, at 9:30 AM
Jones 304, 5747 S. Ellis Avenue

ABSTRACT

It is known that both genes and environmental factors are playing important roles in human health. One natural question that researchers are trying to answer is whether there exist any interaction effects between these two categories of factors towards certain phenotypes. Recent advances in DNA sequencing technologies have enabled us to obtain information of microbes in human body, which is a special type of environmental factor with relative high dimensions and tree structure. In this paper, we first introduce a penalized regression model to utilize the information in tree structure and select associated microbial lineages in affecting the phenotype. Then we employ and modify some post-selection inference tools to obtain valid p-values for interaction testing problem. Simulations show the method has good performance, both in variable selection and in the testing step.