

1116-VP-2065

Rebecca Rachan* (rarachan@noctrl.edu), **Subodh Selukar**, **Trevor Adriaanse** and **Meshach Hopkins** (mhopk1@umbc.edu). *Statistical analysis of a case-control Statistical Analysis of a Case-Control Alzheimer's Disease: a Retrospective Approach with Sufficient Dimension Reduction.*

Alzheimer's Disease is a neurological disorder chiefly present in the elderly that affects functions of the brain such as memory and logic, eventually resulting in death. There is no known cure for Alzheimer's and evidence points to the possibility of a genetic link. This study analyzes microarray data from patients with Alzheimer's disease and disease-free patients in order to evaluate and determine differential gene expression patterns between the two groups. The statistical problem stemming from this data involved many predictor variables with a small sample size, preventing the use of classical approaches from being effective. We turn to a novel three-step approach: first, we screen the genes in order to keep only the genes marginally related to the outcome (presence of Alzheimer's); second, we implemented a sparse sufficient dimension reduction to retain only predictors relevant to the outcome; lastly, we perform a hierarchical clustering method to group genes that exhibit mutual dependence. We adapted this methodology from Adraghi et. al and expand on their work by optimizing the existing R code with parallel capabilities in order to enhance performance speed. Thus, our results reflect both an analysis of the microarray data and a performance study of the modified code. (Received September 21, 2015)