McGill

Faculty of Medicine
Department of Epidemiology, Biostatistics and Occupational Health
Department of Diagnostic Radiology

October 13, 2020

Dear Editors,

We are very pleased to submit a research article titled "A Sparse Additive Model for High-Dimensional Interactions with an Exposure Variable" for consideration by Computational Statistics and Data Analysis. This work addresses a recurring challenge in the analysis and interpretation of high-dimensional data: which features interact with a key exposure or environmental variable to impact a response in a potentially non-linear fashion?

This work builds upon variable selection methods for interaction models. Much of the recent work has focused on all pairwise interactions, but in our particular application, we are interested in the effect of a key exposure variable, and its potential non-linear interaction effect with genes on a response variable. More specifically, we apply our method called `sail` to detect non-linear interactions between genes and a prenatal psychosocial intervention program on cognitive performance in children at 4 years of age. Results from our method show that individuals who are genetically predisposed to lower educational attainment are those who stand to benefit the most from the intervention.

We believe our work would be of interest to the readers of CSDA as it presents a novel way of analyzing high-dimensional data that can be influenced by a continuous or binary exposure variable; a scenario often encountered in applied domains such as genomics, neuroscience and finance. To make our method as accessible as possible to other researchers, we have published an R package on CRAN (https://cran.r-project.org/package=sail) along with detailed documentation and examples.

Preliminary results of our approach has been presented at several conferences, and there has been substantial interest in our findings. However, the manuscript is not being considered for publication by any other journal. We have posted a pre-print on bioRxiv.

We look forward to hearing from you, and note further that none of the authors have a competing interest to declare.

Sincerely,

Sahir Bhatnagar

Sahir Rai Bhatnagar, PhD
Assistant Professor
Department of Epidemiology, Biostatistics and Occupational Health
Department of Diagnostic Radiology
McGill University

Purvis Hall, 1020 Pine Avenue West, H3A 1A2, Montreal, QC, Canada
(514) 398-2711 • sahir.bhatnagar@mcgill.ca • https://sahirbhatnagar.com/