Applications of the Learning Mutlinomial Logit in Transportation: Comparing Prediction and Interpretation

EPFL - VITA, Visual Intelligence for Transportation

Brian Sifringer, Alexandre Alahi

March 4, 2019

Abstract

The emergence of large datasets in the field of transportation has recently led researchers to make use of representation learning methods, notably for their high predictive performances. However, these models offer little interpretation to the datasets when compared against more conventional machine learning methods such as Discrete Choice Modeling (DCM). The latter often comes with low parameter numbers and assumes *a priori* model specification. Although this is the strength of DCM interpretability, it may induce model misspecification and ultimately biased estimates. In this paper, we compare our new hybrid model, the Learning Multionimal Logit (L-MNL), against both the predictive performance of common Neural Networks (NN) methods and the interpretability of DCM models on a set of benchmark datasets. Our results suggest that the L-MNL framework may be an efficient and straightforward method for enhancing DCM predictive performance, while potentially reducing model misspecification and its consequent parameter biases. For instance, this may help researchers in transportation to obtain better mode choice predictions or market shares forecastings.