THE UNIVERSITY OF CHICAGO | DEPARTMENT OF STATISTICS

MASTER'S THESIS PRESENTATION

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Identify Heterogeneity of Consumer Choice Using Machine Learning in Graph

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ABSTRACT

We innovatively provide a framework to identify heterogeneity of consumer choice by applying machine learning in graph, and test its performance with two real-world datasets. We show that the consumer past purchasing behavior can form a graph, and the similarity between graphs can be viewed as an additional source of identifying heterogeneity. For calculation of the similarity between graphs, we modify the Laplacian graph kernel (MLG kernel) and use it for weighed edges, use the radial basis function kernel (RBF kernel) for weighted vertices, and combine the two when we consider both features. We also try to combine the graphic features with demographic features in the models. For evaluation, we firstly do clustering with selected features and assign the consumers into multiple groups. We then estimate a consumer choice model with group-specific parameters for each set of features, and compare the performance of the models on the training and testing set. The results show that the graphic features have a higher ability of capturing heterogeneity than demographic features, edge feature performs better than vertex feature, and the model performs the best when demographic features and the two kinds of graphic features are considered together.