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Ranking Sets of Variables by Multivariate Association: a Non Parametric Combination Approach

In many applied contexts, organizations need to evaluate and compare sets of explanatory variables in terms of their association with a Key Performance Indicator (KPI) of interest. This problem frequently arises in industrial and marketing applications, where companies seek to identify which groups of product characteristics or drivers are most strongly related to outcomes such as customer satisfaction or perceived performance. This work proposes a methodological framework to rank clusters of explanatory variables according to the strength of their multivariate association with a response variable. For each cluster, the association between the outcome and the corresponding set of drivers is assessed through a permutation-based approach. Specifically, the method relies on the NonParametric Combination (NPC) methodology, which enables the joint evaluation of multiple partial tests measuring the association between the response and each variable within the cluster.

The partial permutation tests are combined within the NPC framework to obtain a global statistic that summarizes the overall strength of association for each cluster. These global measures are then used to derive a ranking of the clusters, thereby identifying which sets of drivers exhibit stronger relationships with the response variable.

The methodology provides a flexible and robust tool for applications such as customer satisfaction analysis and product development, supporting the identification of the most influential groups of drivers on the KPI of interest.

Special/ Invited session

Classification

Both methodology and application

Keywords

Association, Multivariate, Permutation, Ranking

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