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Zero patterns in multi-way binary contingency tables with uniform margins

We study the problem of transforming a multi-way contingency table into an equivalent table with uniform margins and same dependence structure. This is an old question which relates to recent advances in copula modeling for discrete random vectors. In this work, we focus on multi-way binary tables and develop novel theory to show how the zero patterns affect the existence of the transformation as well as its statistical interpretability in terms of dependence structure. The implementation of the theory relies on combinatorial and linear programming techniques, which can also be applied to arbitrary multi-way tables. In addition, we investigate which odds ratios characterize the unique solution in relation to specific zero patterns. Several examples are described to illustrate the approach and point to interesting future research directions.
The talk is based on a recent joint work with Elisa Perrone (Eindhoven University of Technology, Eindhoven, The Netherlands) and Fabio Rapallo (Università di Genova, Genova, Italy).

Special/ Invited session

SIS Invited Session: "Statistical methods, applications and recent developments for the technogical field"

Classification

Mainly methodology

Keywords

Categorical Data Analysis; Discrete Copulas: Iterative Proportional Fitting.

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