Dyad Ranking Using a Bilinear
Plackett-Luce Model (Abstract)[*]

Dirk Schäfer[1] and Eyke Hüllermeier[2]

[1] University of Marburg, Germany
`dirk.schaefer@uni-marburg.de`
[2] Department of Computer Science
University of Paderborn, Germany
`eyke@upb.de`

Preference learning is an emerging subfield of machine learning, which deals with the induction of preference models from observed or revealed preference information [2]. Such models are typically used for prediction purposes, for example, to predict context-dependent preferences of individuals on various choice alternatives. Depending on the representation of preferences, individuals, alternatives, and contexts, a large variety of preference models are conceivable, and many such models have already been studied in the literature.

A specific type of preference learning problem is the problem of *label ranking*, namely the problem of learning a model that maps instances to rankings (total orders) over a finite set of predefined alternatives [3]. An instance, which defines the context of the preference relation, is typically characterized in terms of a set of attributes or features; for example, an instance could be a person described by properties such as sex, age, income, etc. As opposed to this, the alternatives to be ranked, e.g., the political parties of a country, are only identified by their name (label), while not being characterized in terms of any properties or features.

In practice, however, information about properties of the alternatives is often available, too, and such information could obviously be useful from a learning point of view. Motivated by this observation, we introduce *dyad ranking* as a generalization of the label ranking problem. In dyad ranking, not only the instances but also the alternatives are represented in terms of attributes. For learning in the setting of dyad ranking, we propose an extension of an existing label ranking method based on the Plackett-Luce model, a statistical model for rank data [1]. First experimental studies with real and synthetic data confirm the usefulness of the additional feature information of alternatives.

References

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