A mixture of experts model for rank data

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A voting bloc is defined to be a group of voters who have similar voting preferences. The cleavage of the Irish electorate into voting blocs is of interest. Irish elections employ a 'single transferable vote' electoral system; under this system voters rank some or all of the electoral candidates in order of preference. These rank votes provide a rich source of preference information from which inferences about the composition of the electorate may be drawn. Additionally, the influence of social factors or covariates on the electorate composition is of interest.
A mixture of experts model is a mixture model in which the model parameters are functions of covariates. A mixture of experts model for rank data is developed to extend the current methodology to deal with the case of rank response data. The Benter model for rank data [1] is employed as the family of component densities within the mixture of experts model. Generalized linear model theory is employed to model the influence of covariates on the mixing proportions within the mixture model. Model fitting is achieved via a hybrid EM/MM algorithm.
The Irish presidential electorate is examined to provide an illustration of the mixture of experts model for rank data. The method provides a model-based clustering of the voters into voting blocs, examines the influence of social factors on this clustering and highlights the characteristic preferences of the voting blocs.

References

[1] Benter, W. (1984) Computer-based Horse Race Handicapping and Wagering Systems: A Report. In Effciency of Racetrack Betting Markets, Belmont, California: Wadsworth.