THE UNIVERSITY OF CHICAGO | DEPARTMENT OF STATISTICS

MASTER'S THESIS PRESENTATION

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Bayesian Inference for the Plackett-Luce Ranking Model

TUESDAY, May 1, 2023, at 2:00 PM
Zoom Meeting

ABSTRACT

Rank-ordered data analysis has been extensively explored in the statistical literature, covering a wide range of applications. The Plackett-Luce model is a well-known ranking model in statistics and machine learning, typically employed to model the preferences and rankings of items by individuals. In this study, we investigate the Bayesian extension of the Plackett-Luce Ranking Model in the context of ranking the relative skills of poker players. Specifically, we consider two Plackett-Luce observation models, one with seniority covariates and one without. We conduct prior elicitation, model checking, and model fitting with MCMC to infer the skill and seniority parameters. We perform model comparisons of the two proposed model using the Bayes factor, computing the marginal likelihood estimated via the Bridge estimator before numerical simulations are performed. Finally, we propose future research directions. Our findings demonstrate the flexibility and robustness of the Bayesian Plackett-Luce model, as well as the efficacy of the proposed sampling scheme, particularly when applied to data sets with limited sample sizes.