
YIMING XU, University of Kentucky
Statistical Ranking with Dynamic Covariates

The Plackett-Luce model has been widely applied for rank aggregation in sports analytics and social sciences. In this presentation, we consider a covariate-assisted ranking model within the Plackett-Luce framework. Unlike existing approaches focusing solely on pure covariates or individual effects with fixed covariates, our model incorporates individual effects with dynamic covariates. This increased flexibility enhances model fitting by allowing for individualized dynamic ranking but also presents significant challenges in analysis. We address these challenges in the context of maximum likelihood estimation (MLE) under a general graph topology. Specifically, we provide conditions for model identifiability and the unique existence of the MLE, propose an alternating maximization algorithm to compute the MLE, and establish a uniform consistency result. Finally, we demonstrate an application of the proposed model by analyzing a large-scale ATP tennis dataset.