Fast Hierarchical Modeling for Recommender Networks

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In the context of a recommender system, a hierarchical model allows for user-specific tastes while simultaneously borrowing estimation strength across all users. Unfortunately, existing likelihood-based methods for fitting hierarchical models have high computational demands, and these demands have limited their adoption in large-scale prediction tasks. We propose a moment-based method for fitting a hierarchical model, which has its roots in a method originally introduced by Cochran in 1937. The method trades statistical efficiency for computational efficiency. It gives consistent parameter estimates, competitive prediction error performance, and dramatic computational improvements.

Keywords: hierarchical model; generalized linear mixed model; recommender systems; statistical-computational tradeoff.