Ming Yang, Ying-ming Li, Zhongfei(Mark) Zhang, 2014. Scientific articles recommendation with topic regression and relational matrix factorization. *Journal of Zhejiang University-SCIENCE C (Computers & Electronics)*, **15**(11):984-998. [doi:10.1631/jzus.C1300374]

Scientific articles recommendation with topic regression and relational matrix factorization

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Key words: Matrix factorization, Probabilistic topic modeling, Relational matrix factorization, Recommender system

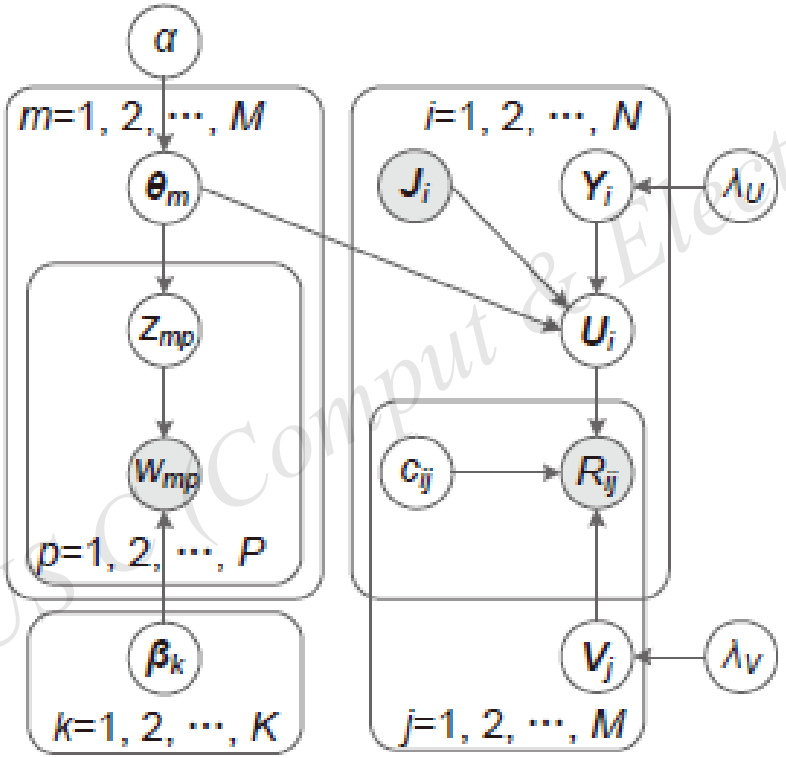
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Introduction

- The existing recommendation methods may have trouble in making accurate predictions for users with few ratings
- The existing recommendation methods do not effectively support tasks that are specific to a certain research field
- There is no consideration for the relational structures

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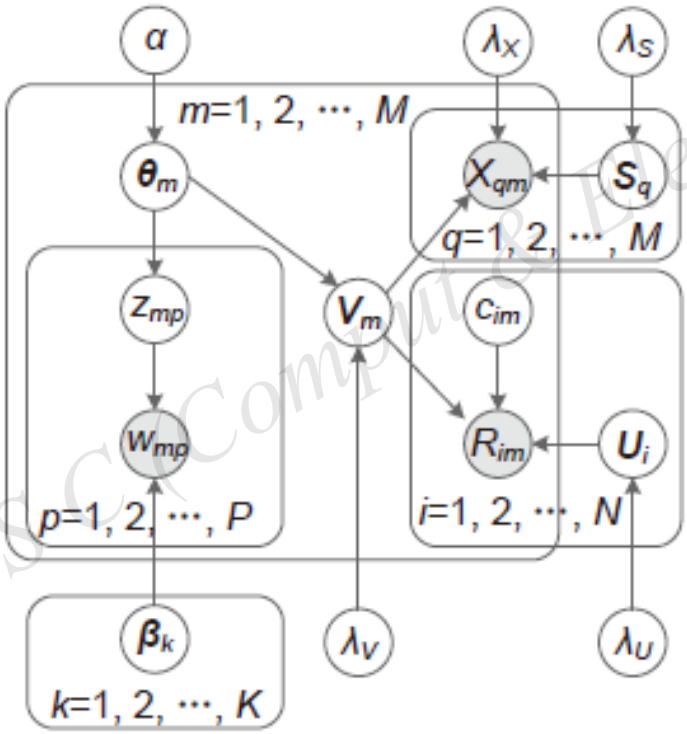
Design method (I)



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Graphical model of topic regression matrix factorization (tr-MF) model

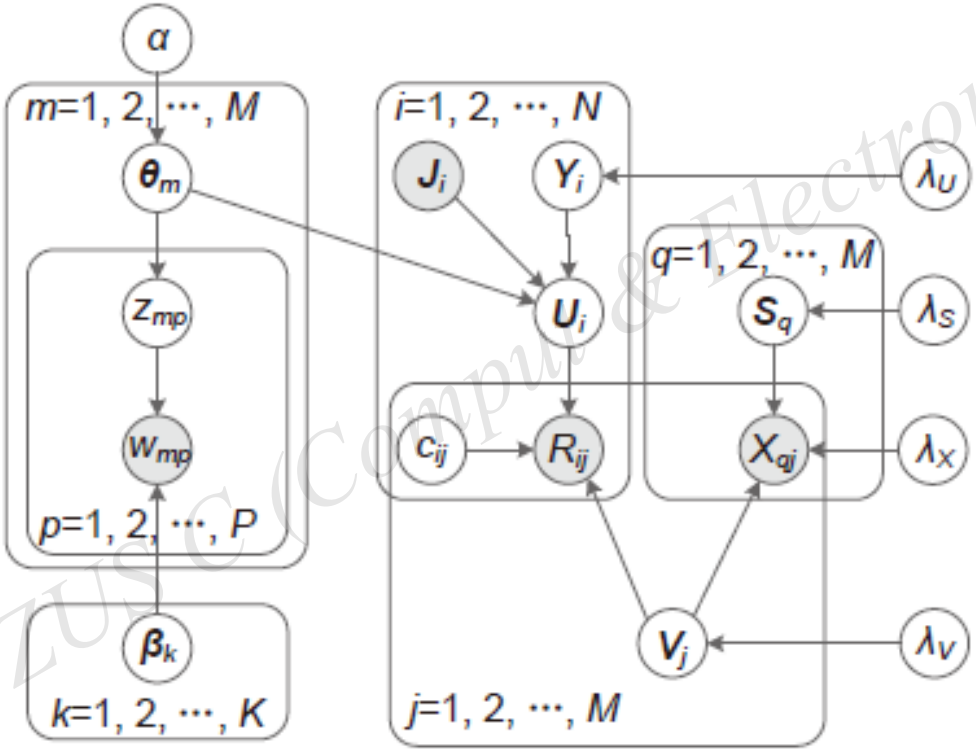
Design method (II)



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Graphical model of collaborative topic regression with relational matrix factorization (CTR-RMF) model

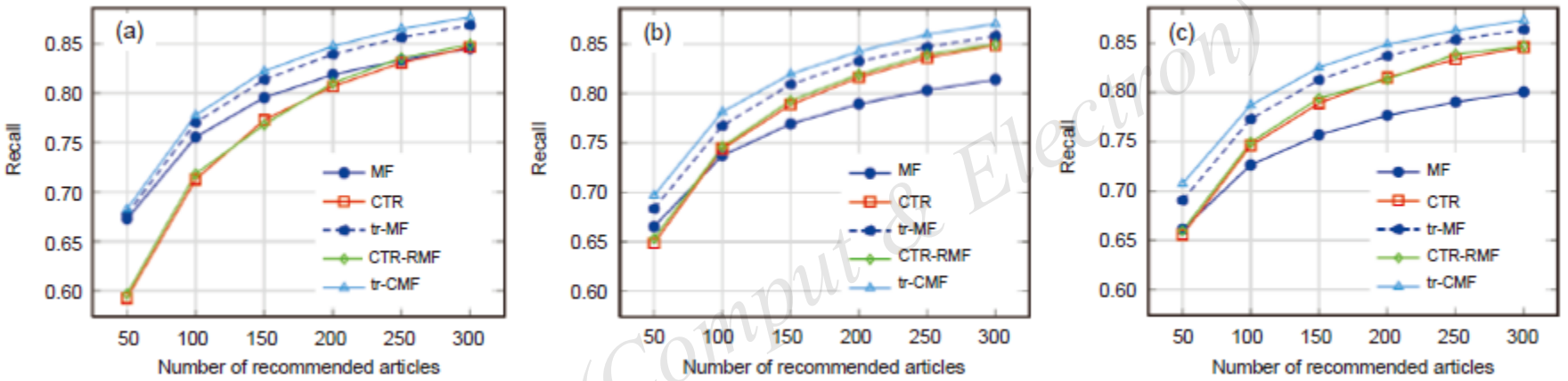
Design method (III)



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Graphical model of topic regression collective matrix factorization (tr-CMF) model

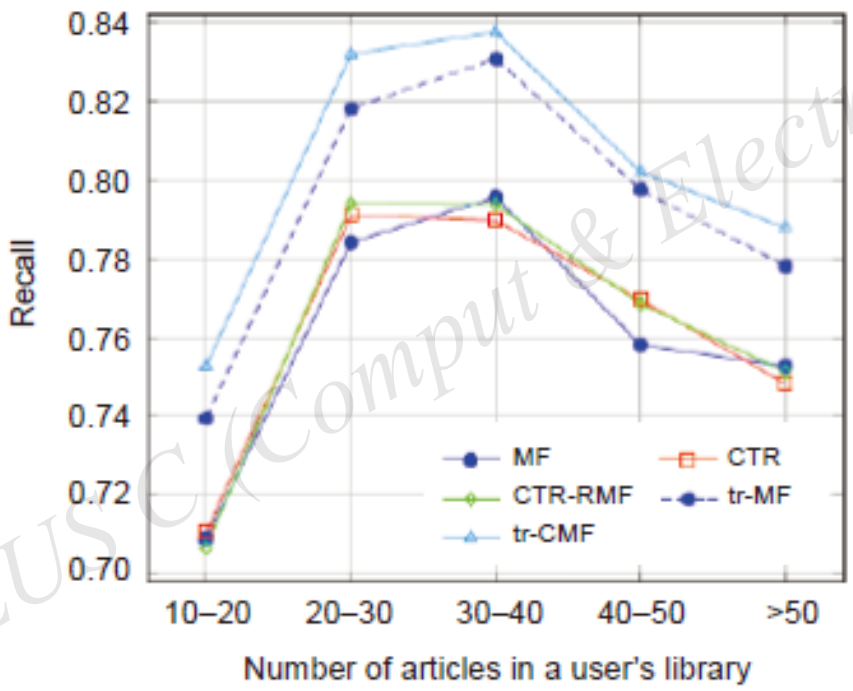
Evaluation



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Comparison of the recall on predictions for different dimensionalities of the latent feature vectors: (a) K=100; (b) K=200; (c) K=300

Evaluation



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Comparison of the recalls on different users

Conclusions

- We first have developed a new model called tr-MF for recommending scientific articles to users
- Through incorporating the relational information, we further propose the CTR-RMF and tr-CMF for relational model training
- The proposed methods are compared with the state-of-the-art methods and show promising capability for supporting the task of recommending papers

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