

Factorization Models for Recommender Systems and Other Applications

Conclusions

Lars Schmidt-Thieme, Steffen Rendle

Information Systems and Machine Learning Lab (ISMLL)
Institute of Computer Science
University of Hildesheim, Germany

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Institute of Computer Science,
University of Konstanz, Germany

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MyMediaLite Recommender Systems Library



Features

- ▶ Rating prediction, item prediction
- ▶ evaluation framework
- ▶ state-of-the-art learning algorithms; multicore

Target audience:

- ▶ researchers
- ▶ teachers and students
- ▶ application developers

Development

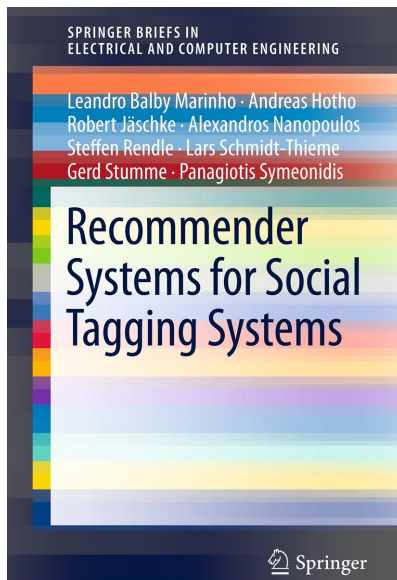
- ▶ written in C#, runs on Mono and Microsoft .NET
- ▶ GNU General Public License (GPL)
- ▶ monthly releases

- ▶ simple
- ▶ free
- ▶ scalable
- ▶ ample documentation
- ▶ stable
- ▶ feature rich

<http://www.ismll.uni-hildesheim.de/mymedialite/>

[Gantner et al., 2011]

The Social Recommender Systems Book



Conclusion

- ▶ Factorization models can be applied to many different types of data
 - ▶ sparse matrices
 - Matrix factorization: predict unobserved cells.
 - ▶ sparse tensors
 - Tensor factorization: predict unobserved cells.
 - ▶ several sparse matrices/tensors
 - multi-relational factorization models: predict unobserved cells of the target relation.
 - ▶ general matrix data with nominal variables with many levels
 - factorized polynomial regression models / factorization machines: predict target variable.

Conclusion (contd.)

- ▶ For all these cases simple and fast learning algorithms exist (SGD, Coordinate Descent/ALS).
- ▶ Factorization models can handle different problems such as regression, ordinal regression, classification, and ranking.
- ▶ Factorization models are the leading models (in terms of predictive accuracy) in many different applications, esp. in recommender systems.
- ▶ Wherever parameter matrices or tensors have to be learned, factorization models can be plugged in (“the factorization trick”).

References I

Zeno Gantner, Steffen Rendle, Christoph Freudenthaler, and Lars Schmidt-Thieme. MyMediaLite: a free recommender system library. In *Proceedings of the fifth ACM conference on Recommender systems*, RecSys '11, page 305–308, New York, NY, USA, 2011. ACM. ISBN 978-1-4503-0683-6. doi: 10.1145/2043932.2043989. URL <http://doi.acm.org/10.1145/2043932.2043989>.