

Multi-purpose Library of Recommender System Algorithms for the Item Prediction Task

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1 Abstract

2 Introduction

2.1 Motivation

2.2 Task (what a Recommender System does)

A Recommender System works in a scenario with users, items and interactions users can have with items. Such a scenario could be an online shop, where the interactions are purchases of items by users or a video platform, where the users interact with items (videos) by watching them. Based on the past interactions of the users a Recommender System searches for items a user haven't interacted with yet but the probability that he will interact is maximized.

In contrast to this implicit approach you can also use ratings the user gave items explicitly, but in this work the focus lies on implicit feedback. However ratings can be interpreted as the strength of implicit feedback for example how often a user purchased an item. Some algorithms implemented in this library can use this information but none will explicitly predict ratings.

2.3 Objective and Motivation

3 3 Related Work

3.1 MyMediaLite

3.2 PREA

3.3 3.3 Mahout

3.4 Duine

3.5 Cofi

3.6 Lenskit

4 Recommendation Algorithms

4.1 Primitive Algorithms

4.2 k-Nearest-Neighbor

4.3 Matrix Factorization

4.3.1 BPRMF

4.3.2 RankMFX

4.3.3 Ranking SVD (Sparse SVD)

4.4 Evaluation Methods

4.4.1 Leave-one-out Protocol

4.5 Evaluation metrics

4.5.1 Hitrate/Recall

4.5.2 Precision

4.5.3 F1

4.5.4 Mean Reciprocal Hitrate

4.5.5 Area under the ROC

5 Datasets for testing

5.1 MovieLens

5.2 Million Song Dataset

5.3 SNAP

6 Experiments

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7.1 General structure

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8 User Manual

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9 Conclusions

9.1 Future work

9.2 Outlook

10 References