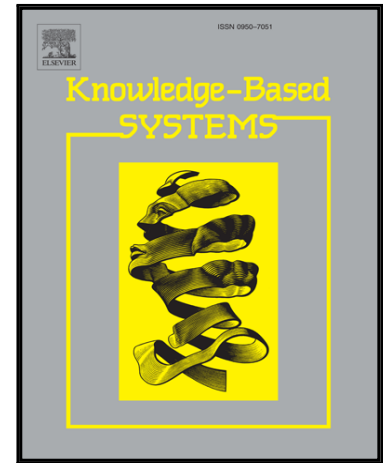


## Accepted Manuscript

Matrix Factorization for Recommendation with Explicit and Implicit Feedback

Shulong Chen, Yuxing Peng

PII: S0950-7051(18)30284-3  
DOI: [10.1016/j.knosys.2018.05.040](https://doi.org/10.1016/j.knosys.2018.05.040)  
Reference: KNOSYS 4360



To appear in: *Knowledge-Based Systems*

Received date: 18 December 2017  
Revised date: 28 May 2018  
Accepted date: 29 May 2018

Please cite this article as: Shulong Chen, Yuxing Peng, Matrix Factorization for Recommendation with Explicit and Implicit Feedback, *Knowledge-Based Systems* (2018), doi: [10.1016/j.knosys.2018.05.040](https://doi.org/10.1016/j.knosys.2018.05.040)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

# Matrix Factorization for Recommendation with Explicit and Implicit Feedback

Shulong Chen\*, Yuxing Peng

*Science and Technology on Parallel and Distributed Laboratory, College of Computer, National University of Defense Technology, Changsha, 410073, China*

---

## Abstract

Matrix factorization (MF) methods have proven as efficient and scalable approaches for collaborative filtering problems. Numerous existing MF methods rely heavily on explicit feedback. Typically, these data types may be extremely sparse; therefore, these methods can perform poorly. In order to address these challenges, we propose a latent factor model based on probabilistic MF, by incorporating implicit feedback as complementary information. Specifically, the explicit and implicit feedback matrices are decomposed into a shared subspace simultaneously. Then, the latent factor vectors are jointly optimized using a gradient descent algorithm. The experimental results using the MovieLens datasets demonstrate that the proposed algorithm outperforms the baselines.

*Keywords:* collaborative filtering, probabilistic matrix factorization, matrix co-factorization, implicit feedback

---

## 1. Introduction

With the explosive growth in information, it has become increasingly difficult for users to find information of interest. Personalized recommendation is an effective tool for solving this problem. It determines user preferences by analyzing their historical behavior data, and then recommends items that may be of interest to these users. Collaborative filtering (CF) has become a popular approach for implementing a recommender system owing to its effectiveness and scalability. Two collaborative filtering approaches exist: memory-based and model-based methods. Matrix factorization (MF) is a typical model-based method that has obtained excellent results in the Netflix prize problem [1]. Despite this success, typical MF methods rely mainly on explicit feedback; that is, explicit ratings. Typically, these data types may be extremely sparse, which can result in poor recommendation performance. In order to alleviate the data scarcity and cold start problems, researchers have attempted to enhance recommender systems by incorporating different complementary information, such as implicit feedback. Compared to explicit feedback, implicit feedback, such as browsing, purchase, and click-through history, is easier to collect and

---

\*Corresponding author

*Email address:* chenshulong@yeah.net (Shulong Chen)

Download English Version:

<https://daneshyari.com/en/article/6861284>

Download Persian Version:

<https://daneshyari.com/article/6861284>

[Daneshyari.com](https://daneshyari.com)