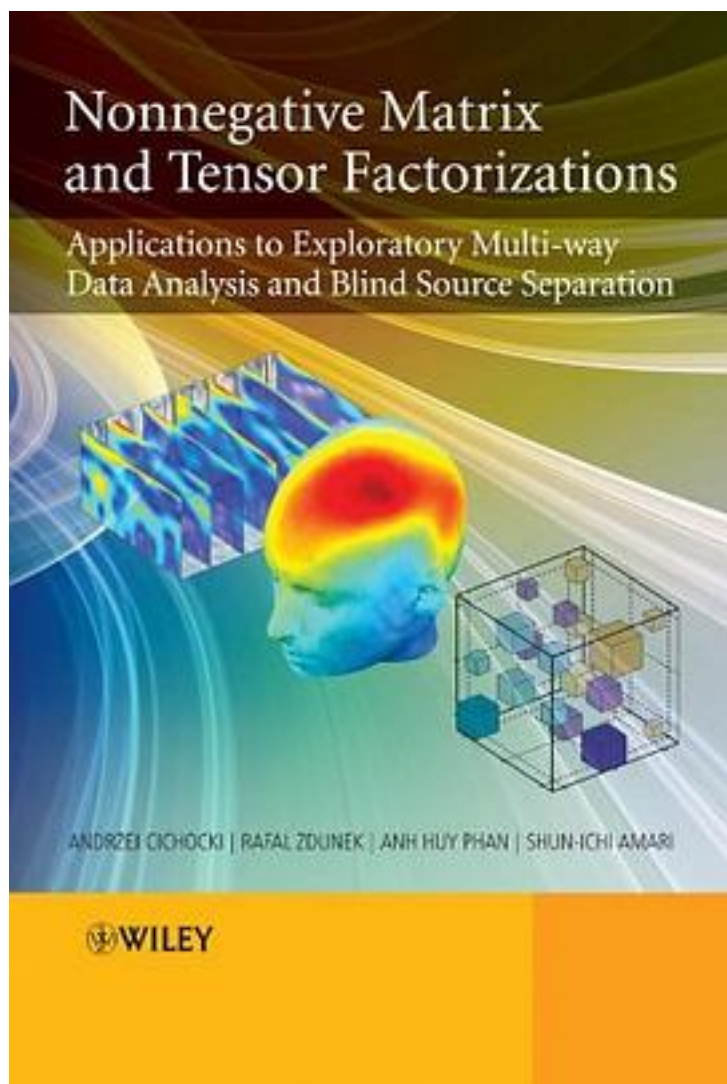# Nonnegative Matrix and Tensor Factorizations

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著者:Andrzej Cichocki

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This book provides a broad survey of models and efficient algorithms for Nonnegative Matrix Factorization (NMF). This includes NMF's various extensions and modifications, especially Nonnegative Tensor Factorizations (NTF) and Nonnegative Tucker Decompositions (NTD). NMF/NTF and their extensions are increasingly used as tools in signal and image processing, and data analysis, having garnered interest due to their capability to provide new insights and relevant information about the complex latent relationships in experimental data sets. It is suggested that NMF can provide meaningful components with physical interpretations; for example, in bioinformatics, NMF and its extensions have been successfully applied to gene expression, sequence analysis, the functional characterization of genes, clustering and text mining. As such, the authors focus on the algorithms that are most useful in practice, looking at the fastest, most robust, and suitable for large-scale models. Key features: Acts as a single source reference guide to NMF, collating information that is widely dispersed in current literature, including the authors' own recently developed techniques in the subject area. Uses generalized cost functions such as Bregman, Alpha and Beta divergences, to present practical implementations of several types of robust algorithms, in particular Multiplicative, Alternating Least Squares, Projected Gradient and Quasi Newton algorithms. Provides a comparative analysis of the different methods in order to identify approximation error and complexity. Includes pseudo codes and optimized MATLAB source codes for almost all algorithms presented in the book. The increasing interest in nonnegative matrix and tensor factorizations, as well as decompositions and sparse representation of data, will ensure that this book is essential reading for engineers, scientists, researchers, industry practitioners and graduate students across signal and image processing; neuroscience; data mining and data analysis; computer science; bioinformatics; speech processing; biomedical engineering; and multimedia.

作者介绍:

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标签

矩阵分解

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NMF

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评论

书评

首先这本书是目前唯一的一本全面介绍非负矩阵分解和非负张量分解的书。其次，书中从目标函数的构造(各种散度，没看懂)、求解方法等对现有的NMF算法进行了全面的总结，条理非常清新。对于刚接触NMF的人来说是一本很好的入门书。但这里作者主要研究的求解方法(拟牛顿、残差法，还...