



Statistical Methods for Recommender Systems

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Statistical Methods For Recommender Systems:

Statistical Methods for Recommender Systems Deepak K. Agarwal, Bee-Chung Chen, 2016-02-24 Designing algorithms to recommend items such as news articles and movies to users is a challenging task in numerous web applications. The crux of the problem is to rank items based on users' responses to different items to optimize for multiple objectives. Major technical challenges are high dimensional prediction with sparse data and constructing high dimensional sequential designs to collect data for user modeling and system design. This comprehensive treatment of the statistical issues that arise in recommender systems includes detailed in-depth discussions of current state-of-the-art methods such as adaptive sequential designs, multi-armed bandit methods, bilinear random effects models, matrix factorization, and scalable model fitting using modern computing paradigms like MapReduce. The authors draw upon their vast experience working with such large-scale systems at Yahoo and LinkedIn and bridge the gap between theory and practice by illustrating complex concepts with examples from applications they are directly involved with.

Review and Implementation of Common Statistical Methods for Recommender Systems Candace Jennifer McKeag, 2021 As a result of today's massive information overload, the exploration and development of recommender systems is burgeoning. This paper consists of a comprehensive literature review in which the current knowledge surrounding statistical methods for recommender systems is outlined and evaluated. For each method, the theoretical premise and application-related aspects such as optimal use cases and common research problems are described. To round out the literature review, an implementation of several collaborative filtering techniques is conducted in order to apply the discussed theory and identify some advantages and disadvantages of the methods.

Recommender Systems: Algorithms and their Applications Pushpendu Kar, Monideepa Roy, Sujoy Datta, 2024-06-11 The book includes a thorough examination of the many types of algorithms for recommender systems as well as a comparative analysis of them. It addresses the problem of dealing with the large amounts of data generated by the recommender system. The book also includes two case studies on recommender system applications in healthcare monitoring and military surveillance. It demonstrates how to create attack-resistant and trust-centric recommender systems for sensitive data applications. This book provides a solid foundation for designing recommender systems for use in healthcare and defense.

Recommender Systems Monideepa Roy, Pushpendu Kar, Sujoy Datta, 2023-06-19 *Recommender Systems: A Multi-Disciplinary Approach* presents a multi-disciplinary approach for the development of recommender systems. It explains different types of pertinent algorithms with their comparative analysis and their role for different applications. This book explains the big data behind recommender systems, the marketing benefits, how to make good decision support systems, the role of machine learning and artificial networks, and the statistical models with two case studies. It shows how to design attack-resistant and trust-centric recommender systems for applications dealing with sensitive data. Features of this book: Identifies and describes recommender systems for practical uses. Describes how to design, train, and evaluate a

recommendation algorithm Explains migration from a recommendation model to a live system with users Describes utilization of the data collected from a recommender system to understand the user preferences Addresses the security aspects and ways to deal with possible attacks to build a robust system This book is aimed at researchers and graduate students in computer science electronics and communication engineering mathematical science and data science

Intelligent Techniques in Recommendation Systems: Contextual Advancements and New Methods Dehuri, Satchidananda, Patra, Manas Ranjan, Misra, Bijan Bihari, Jagadev, Alok Kumar, 2012-11-30 Although recommendation systems have become a vital research area in the fields of cognitive science approximation theory information retrieval and management sciences they still require improvements to make recommendation methods more effective and intelligent Intelligent Techniques in Recommendation Systems Contextual Advancements and New Methods is a comprehensive collection of research on the latest advancements of intelligence techniques and their application to recommendation systems and how this could improve this field of study

Session-Based Recommender Systems Using Deep Learning Reza Ravanmehr, Rezvan Mohamadzaei, 2023-12-20 This book focuses on the widespread use of deep neural networks and their various techniques in session based recommender systems SBRS It presents the success of using deep learning techniques in many SBRS applications from different perspectives For this purpose the concepts and fundamentals of SBRS are fully elaborated and different deep learning techniques focusing on the development of SBRS are studied The book is well modularized and each chapter can be read in a stand alone manner based on individual interests and needs In the first chapter of the book definitions and concepts related to SBRS are reviewed and a taxonomy of different SBRS approaches is presented where the characteristics and applications of each class are discussed separately The second chapter starts with the basic concepts of deep learning and the characteristics of each model Then each deep learning model along with its architecture and mathematical foundations is introduced Next chapter 3 analyses different approaches of deep discriminative models in session based recommender systems In the fourth chapter session based recommender systems that benefit from deep generative neural networks are discussed Subsequently chapter 5 discusses session based recommender systems using advanced hybrid deep learning models Eventually chapter 6 reviews different learning to rank methods focusing on information retrieval and recommender system domains Finally the results of the investigations and findings from the research review conducted throughout the book are presented in a conclusive summary This book aims at researchers who intend to use deep learning models to solve the challenges related to SBRS The target audience includes researchers entering the field graduate students specializing in recommender systems web data mining information retrieval or machine deep learning and advanced industry developers working on recommender systems

New Trends in Multimedia and Network Information Systems Aleksander Zgrzywa, Kazimierz Choroś, Andrzej Siemiński, 2008 Discusses a broad scope of subject matters including multimedia systems in their widest sense web systems and network technologies This monograph

also includes texts which deals with traditional information systems that draw on the experience of the multimedia and network systems

Hybrid Artificial Intelligent Systems Jeng-Shyang Pan, Marios M. Polycarpou, Michal Wozniak, André C.P.L.F. de Carvalho, Héctor Quintian, 2013-08-15 This volume constitutes the proceedings of the 8th International Conference on Hybrid Artificial Intelligent Systems HAIS 2013 held in Salamanca Spain in September 2013 The 68 papers published in this volume were carefully reviewed and selected from 218 submissions They are organized in topical sessions on Agents and Multi Agents Systems HAIS Applications Classification and Cluster Analysis Data Mining and Knowledge Discovery Video and Image Analysis Bio inspired Models and Evolutionary Computation Learning Algorithms Systems MAN and Cybernetics Hybrid Intelligent Systems for Data Mining and Applications Metaheuristics for Combinatorial Optimization and Modelling Complex Systems

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Proceedings of ... ACM/IEEE-CS Joint Conference on Digital Libraries, 2005

Sparsity, Scalability, and Distribution in Recommender Systems Badrul Munir Sarwar, 2001

Proceedings of the ... International Conference on Information and Knowledge Management, 2004

Recommender Systems for Information Providers Andreas W. Neumann, 2009-03-03 Information providers are a very promising application area of recommender systems due to the general problem of assessing the quality of information products prior to the purchase Recommender systems automatically generate product recommendations customers profit from a faster finding of relevant products stores profit from rising sales All aspects of recommender systems are covered the economic background mechanism design a survey of systems in the Internet statistical methods and algorithms service oriented architectures user interfaces as well as experiences and data from real world applications Specific solutions for areas with strong privacy concerns scalability issues for large collections of products as well as algorithms to lessen the cold start problem for a faster return on investment of recommender projects are addressed This book describes all steps it takes to design implement and successfully operate a recommender system for a specific information platform

Probabilistic Approaches to Recommendations Nicola Barbieri, Giuseppe Manco, Ettore Ritacco, 2014-05-01 The importance of accurate recommender systems has been widely recognized by academia and industry and recommendation is rapidly becoming one of the most successful applications of data mining and machine learning Understanding and predicting the choices and preferences of users is a challenging task real world scenarios involve users behaving in complex situations where prior beliefs specific tendencies and reciprocal influences jointly contribute to determining the preferences of users toward huge amounts of information services and products Probabilistic modeling represents a robust formal mathematical framework to model these assumptions and study their effects in the recommendation process This book starts with a brief summary of the recommendation problem and its challenges and a review of some widely used techniques Next we introduce and discuss probabilistic approaches for modeling preference data We focus our attention on methods based on latent factors such as mixture models probabilistic matrix factorization and topic models for explicit and implicit preference data These methods

represent a significant advance in the research and technology of recommendation. The resulting models allow us to identify complex patterns in preference data which can be exploited to predict future purchases effectively. The extreme sparsity of preference data poses serious challenges to the modeling of user preferences especially in the cases where few observations are available. Bayesian inference techniques elegantly address the need for regularization and their integration with latent factor modeling helps to boost the performances of the basic techniques. We summarize the strengths and weakness of several approaches by considering two different but related evaluation perspectives namely rating prediction and recommendation accuracy. Furthermore we describe how probabilistic methods based on latent factors enable the exploitation of preference patterns in novel applications beyond rating prediction or recommendation accuracy. We finally discuss the application of probabilistic techniques in two additional scenarios characterized by the availability of side information besides preference data. In summary the book categorizes the myriad probabilistic approaches to

recommendations and provides guidelines for their adoption in real world situations. **Meeting User Information Needs in Recommender Systems** Sean Michael McNee, 2006 **ACM Transactions on Information Systems**, 2005

Considers the design performance and evaluation of computer systems that facilitate the presentation of information in a variety of media as well as the underlying technologies that support these systems. Major themes include information retrieval and information filtering, information interfaces, natural language processing, knowledge and information representation, multimedia information systems, networked information systems, organizational interfaces and social impact of information systems and design and evaluation. **IUI 03** W. Lewis Johnson, Elisabeth André, John Domingue, 2003 *IUI ... Conference Proceedings*, 2007

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