

Portfolio Theory of Information Retrieval

Jun Wang and Jianhan Zhu
Department of Computer Science, University College London
Malet Place, London WC1E 6BT, UK
jun_wang@acm.org, jianhan.zhu@ucl.ac.uk

ABSTRACT

This paper studies document ranking under uncertainty. It is tackled in a general situation where the relevance predictions of individual documents have uncertainty, and are dependent between each other. Inspired by the Modern Portfolio Theory, an economic theory dealing with investment in financial markets, we argue that ranking under uncertainty is not just about picking individual relevant documents, but about choosing the right combination of relevant documents. This motivates us to quantify a ranked list of documents on the basis of its expected overall relevance (mean) and its variance; the latter serves as a measure of risk, which was rarely studied for document ranking in the past. Through the analysis of the mean and variance, we show that an optimal rank order is the one that balancing the overall relevance (mean) of the ranked list against its risk level (variance). Based on this principle, we then derive an efficient document ranking algorithm. It generalizes the well-known probability ranking principle (PRP) by considering both the uncertainty of relevance predictions and correlations between retrieved documents. Moreover, the benefit of diversification is mathematically quantified; we show that diversifying documents is an effective way to reduce the risk of document ranking. Experimental results in text retrieval confirm the theoretical insights with improved retrieval performance.

Categories and Subject Descriptors

H.3.3 [Information Search and Retrieval]: Retrieval models, Search process, and Selection process

General Terms

Algorithms, Experimentation, Measurement, Performance

Keywords

Modern portfolio theory, Mean-variance analysis, Probability ranking principle, Ranking under uncertainty

1 Introduction

Information retrieval (IR) concerns how to retrieve documents for a user information need. The process of retrieving documents may be divided into two stages. In the first stage, the relevance between the given user information need and each of the documents in a collection is calculated. Probabilistic retrieval models that have been proposed and tested over decades are primarily focusing on this task, aiming at

producing a “best guess” at a document’s relevance. Examples include the HSIJ model [15] (a further development of that model led to the HME25 term weighting function [16]), and the language modelling approaches [23]. The second stage focuses on how to present (normally rank) documents to the user. The probability ranking principle (PRP) [6] forms the basis in this stage, stating that the system should rank documents in order of decreasing probability of relevance; it has been shown that, following the principle, the overall effectiveness of an IR system, such as expected Precision, is maximized [13].

If we make an analogy with the field of finance, our ranking task resembles the investment problem in financial markets; for example, suppose that an investor needs to select a set (portfolio) of n stocks that will provide the best distribution of future returns, given his or her investment budget – an analogy with IR is that we invest ranking positions in documents. The PRP of IR might suggest that, for optimal selection, one should first rank stocks in order of decreasing future returns and then choose the top- n most “profitable” stocks to construct the portfolio. Such a principle that essentially maximizes the expected future return was, however, rejected by an economist Harry Markowitz in his Nobel Prize winning work, the Modern Portfolio Theory (MPT) of finance, in 1952 [11]. As one of the most influential economic theories dealing with finance and investment, the MPT was motivated on the basis of the following two observations [11]. 1) The future return of a stock is unknown and cannot be calculated with absolute certainty. Investors have different preferences of the risk associated with uncertainty. Therefore, it is highly desirable to have a method of quantifying this uncertainty or risk, and reflect them and incorporate users’ risk preferences when selecting stocks. 2) Since in practice the future returns of stocks are correlated, assuming independence between the returns and selecting them independently to construct a portfolio is not preferable.

Realizing the two fundamental issues, the MPT emphasizes that risk (uncertainty) is an inherent part of future return, and quantifies it by using the variance (or the standard deviation) of the return. The theory suggests that, for a risk-averse decision, an investor should both maximize the return as a desirable thing and minimize the variance of the return as an undesirable thing. Under such a formulation, the MPT mathematically shows that diversification, known as “not putting all of your eggs in one basket”, is an effective way to reduce the risk of the portfolio.

Going back to our IR problem, we have two similar critical issues: 1) during retrieval, the relevance of documents is unknown and cannot be estimated with absolute certainty from IR models. There are many sources of uncertainty such as ambiguity in the query, specific user preferences,

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, to republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee.

SIGIR 09, July 19–23, 2009, Boston, Massachusetts, USA.
Copyright 2009 ACM 978-1-60226-483-6/09/07 ...\$5.00.

Portfolio Theory Of Information Retrieval

KJ Lindholm-Leary



Portfolio Theory Of Information Retrieval:

Getting the books **Portfolio Theory Of Information Retrieval** now is not type of inspiring means. You could not lonesome going past book accrual or library or borrowing from your links to way in them. This is an no question easy means to specifically get guide by on-line. This online notice Portfolio Theory Of Information Retrieval can be one of the options to accompany you with having other time.

It will not waste your time. admit me, the e-book will categorically way of being you extra event to read. Just invest tiny become old to admittance this on-line publication **Portfolio Theory Of Information Retrieval** as capably as evaluation them wherever you are now.

https://py.bijouxmedusa.com/data/browse/HomePages/mathematics_linear_1ma0_algebra_solving_equations.pdf

Table of Contents Portfolio Theory Of Information Retrieval

1. Understanding the eBook Portfolio Theory Of Information Retrieval
 - The Rise of Digital Reading Portfolio Theory Of Information Retrieval
 - Advantages of eBooks Over Traditional Books
2. Identifying Portfolio Theory Of Information Retrieval
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Portfolio Theory Of Information Retrieval
 - User-Friendly Interface
4. Exploring eBook Recommendations from Portfolio Theory Of Information Retrieval
 - Personalized Recommendations
 - Portfolio Theory Of Information Retrieval User Reviews and Ratings
 - Portfolio Theory Of Information Retrieval and Bestseller Lists

5. Accessing Portfolio Theory Of Information Retrieval Free and Paid eBooks
 - Portfolio Theory Of Information Retrieval Public Domain eBooks
 - Portfolio Theory Of Information Retrieval eBook Subscription Services
 - Portfolio Theory Of Information Retrieval Budget-Friendly Options
6. Navigating Portfolio Theory Of Information Retrieval eBook Formats
 - ePub, PDF, MOBI, and More
 - Portfolio Theory Of Information Retrieval Compatibility with Devices
 - Portfolio Theory Of Information Retrieval Enhanced eBook Features
7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Portfolio Theory Of Information Retrieval
 - Highlighting and Note-Taking Portfolio Theory Of Information Retrieval
 - Interactive Elements Portfolio Theory Of Information Retrieval
8. Staying Engaged with Portfolio Theory Of Information Retrieval
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Portfolio Theory Of Information Retrieval
9. Balancing eBooks and Physical Books Portfolio Theory Of Information Retrieval
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Portfolio Theory Of Information Retrieval
10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
11. Cultivating a Reading Routine Portfolio Theory Of Information Retrieval
 - Setting Reading Goals Portfolio Theory Of Information Retrieval
 - Carving Out Dedicated Reading Time
12. Sourcing Reliable Information of Portfolio Theory Of Information Retrieval
 - Fact-Checking eBook Content of Portfolio Theory Of Information Retrieval
 - Distinguishing Credible Sources
13. Promoting Lifelong Learning

- Utilizing eBooks for Skill Development
 - Exploring Educational eBooks
14. Embracing eBook Trends
- Integration of Multimedia Elements
 - Interactive and Gamified eBooks

Portfolio Theory Of Information Retrieval Introduction

In the digital age, access to information has become easier than ever before. The ability to download Portfolio Theory Of Information Retrieval has revolutionized the way we consume written content. Whether you are a student looking for course material, an avid reader searching for your next favorite book, or a professional seeking research papers, the option to download Portfolio Theory Of Information Retrieval has opened up a world of possibilities. Downloading Portfolio Theory Of Information Retrieval provides numerous advantages over physical copies of books and documents. Firstly, it is incredibly convenient. Gone are the days of carrying around heavy textbooks or bulky folders filled with papers. With the click of a button, you can gain immediate access to valuable resources on any device. This convenience allows for efficient studying, researching, and reading on the go. Moreover, the cost-effective nature of downloading Portfolio Theory Of Information Retrieval has democratized knowledge. Traditional books and academic journals can be expensive, making it difficult for individuals with limited financial resources to access information. By offering free PDF downloads, publishers and authors are enabling a wider audience to benefit from their work. This inclusivity promotes equal opportunities for learning and personal growth. There are numerous websites and platforms where individuals can download Portfolio Theory Of Information Retrieval. These websites range from academic databases offering research papers and journals to online libraries with an expansive collection of books from various genres. Many authors and publishers also upload their work to specific websites, granting readers access to their content without any charge. These platforms not only provide access to existing literature but also serve as an excellent platform for undiscovered authors to share their work with the world. However, it is essential to be cautious while downloading Portfolio Theory Of Information Retrieval. Some websites may offer pirated or illegally obtained copies of copyrighted material. Engaging in such activities not only violates copyright laws but also undermines the efforts of authors, publishers, and researchers. To ensure ethical downloading, it is advisable to utilize reputable websites that prioritize the legal distribution of content. When downloading Portfolio Theory Of Information Retrieval, users should also consider the potential security risks associated with online platforms. Malicious actors may exploit vulnerabilities in unprotected websites to distribute malware or steal personal information. To protect themselves, individuals should ensure their devices have reliable antivirus software installed and validate the legitimacy of the websites

they are downloading from. In conclusion, the ability to download Portfolio Theory Of Information Retrieval has transformed the way we access information. With the convenience, cost-effectiveness, and accessibility it offers, free PDF downloads have become a popular choice for students, researchers, and book lovers worldwide. However, it is crucial to engage in ethical downloading practices and prioritize personal security when utilizing online platforms. By doing so, individuals can make the most of the vast array of free PDF resources available and embark on a journey of continuous learning and intellectual growth.

FAQs About Portfolio Theory Of Information Retrieval Books

How do I know which eBook platform is the best for me? Finding the best eBook platform depends on your reading preferences and device compatibility. Research different platforms, read user reviews, and explore their features before making a choice. Are free eBooks of good quality? Yes, many reputable platforms offer high-quality free eBooks, including classics and public domain works. However, make sure to verify the source to ensure the eBook credibility. Can I read eBooks without an eReader? Absolutely! Most eBook platforms offer webbased readers or mobile apps that allow you to read eBooks on your computer, tablet, or smartphone. How do I avoid digital eye strain while reading eBooks? To prevent digital eye strain, take regular breaks, adjust the font size and background color, and ensure proper lighting while reading eBooks. What the advantage of interactive eBooks? Interactive eBooks incorporate multimedia elements, quizzes, and activities, enhancing the reader engagement and providing a more immersive learning experience. Portfolio Theory Of Information Retrieval is one of the best book in our library for free trial. We provide copy of Portfolio Theory Of Information Retrieval in digital format, so the resources that you find are reliable. There are also many Ebooks of related with Portfolio Theory Of Information Retrieval. Where to download Portfolio Theory Of Information Retrieval online for free? Are you looking for Portfolio Theory Of Information Retrieval PDF? This is definitely going to save you time and cash in something you should think about. If you trying to find then search around for online. Without a doubt there are numerous these available and many of them have the freedom. However without doubt you receive whatever you purchase. An alternate way to get ideas is always to check another Portfolio Theory Of Information Retrieval. This method for see exactly what may be included and adopt these ideas to your book. This site will almost certainly help you save time and effort, money and stress. If you are looking for free books then you really should consider finding to assist you try this. Several of Portfolio Theory Of Information Retrieval are for sale to free while some are payable. If you arent sure if the books you would like to download works with for usage along with your computer, it is possible to download free trials. The free guides make it easy for someone to free access online library for download books to your device. You can get free download on free trial for lots of books categories.

Our library is the biggest of these that have literally hundreds of thousands of different products categories represented. You will also see that there are specific sites catered to different product types or categories, brands or niches related with Portfolio Theory Of Information Retrieval. So depending on what exactly you are searching, you will be able to choose e books to suit your own need. Need to access completely for Campbell Biology Seventh Edition book? Access Ebook without any digging. And by having access to our ebook online or by storing it on your computer, you have convenient answers with Portfolio Theory Of Information Retrieval To get started finding Portfolio Theory Of Information Retrieval, you are right to find our website which has a comprehensive collection of books online. Our library is the biggest of these that have literally hundreds of thousands of different products represented. You will also see that there are specific sites catered to different categories or niches related with Portfolio Theory Of Information Retrieval So depending on what exactly you are searching, you will be able to choose ebook to suit your own need. Thank you for reading Portfolio Theory Of Information Retrieval. Maybe you have knowledge that, people have search numerous times for their favorite readings like this Portfolio Theory Of Information Retrieval, but end up in harmful downloads. Rather than reading a good book with a cup of coffee in the afternoon, instead they juggled with some harmful bugs inside their laptop. Portfolio Theory Of Information Retrieval is available in our book collection an online access to it is set as public so you can download it instantly. Our digital library spans in multiple locations, allowing you to get the most less latency time to download any of our books like this one. Merely said, Portfolio Theory Of Information Retrieval is universally compatible with any devices to read.

Find Portfolio Theory Of Information Retrieval :

mathematics linear 1ma0 algebra solving equations

maxwell maltz and dan kennedy the new psycho cybernetics

mcconnell brue economics 15th edition outlines

mcgraw hill anatomy physiology 6th edition

manual mazda b2500 diesel chosealore

mechanical engineering reference manual 11th edition

maranatha music praise chorus book

mba hrm employee absenteeism project report

maths crossword puzzle with answers for class 9

mazda 6 2004 factory full service repair

mathematical methods for geophysics and space physics

materials engineer exam reviewer download

materi bahasa indonesia un 2017 menulis terbatas
~~master service tv tutorial cara belajar service tv~~
~~matokeo ya mtihani darasa la saba 2003~~

Portfolio Theory Of Information Retrieval :

A+ Guide to Managing & Maintaining Your PC - Amazon.com Written by best-selling author and educator Jean Andrews, A+ GUIDE TO MANAGING AND MAINTAINING YOUR PC closely integrates the CompTIA A+ Exam objectives to ... A+ Guide to Managing & Maintaining Your PC, 8th Edition Learn about the various parts inside a computer case and how they connect together and are compatible. • Learn how to protect yourself and the equipment. A+ Guide to Managing & Maintaining Your PC (with Printed ... This product is the A+ CompTIA Guide to Managing and Maintianing Your PC 8th Edition by Jean Andrews. It contains highlights and underlines in the first ... A+ Guide to Managing & Maintaining Your PC, 8th Edition Make notes for backtracking. • Remove loose jewelry that might get caught. • Stay organized by keeping small parts in one place. A+ Guide to Managing and Maintaining Your PC 8th Ed. Ch.3 A+ Guide to Managing and Maintaining Your PC 8th Edition Ch 3 Learn with flashcards, games, and more — for free. A+ Guide to Managing & Maintaining Your PC - 8th edition Written by best-selling author and educator Jean Andrews, A+ GUIDE TO MANAGING AND MAINTAINING YOUR PC closely integrates the CompTIA A+ Exam objectives to ... A+ Guide to Managing & Maintaining Your PC 8th Edition Access A+ Guide to Managing & Maintaining Your PC 8th Edition solutions now. Our solutions are written by Chegg experts so you can be assured of the highest ... A+ Guide to Managing and Maintaining Your PC 8th Ed. Ch.1 a document that explains how to properly handle substances such as chemical solvents, it includes information such as physical data, toxicity, health effects, ... CompTIA A+ Guide to Managing and Maintaining Your PC ... Guide book to your pc · Great and well details product. · Really thoroughly explains everything about computers. Especially hardware. · Great value. · Great for ... A+ Guide to Managing & Maintaining Your PC, 8th Edition Aug 12, 2017 — A+ Guide to Managing and Maintaining Your PC, 7e Chapter 15 Tools for Solving Windows Problems. Economic Approaches to Organization (6th Edition) This latest edition is packed with practical examples from real-world companies, helping you to understand how the concepts relate to economic and ... Economic Approaches to Organisations (5th Edition) This latest edition is packed with practical examples from real-world companies, helping you to understand how the concepts relate to economic and ... Economic Approaches to Organizations The focus of this unique text is on the importance of economic issues and developments in the study of organizations and management. This is one of only a few ... Economic Approaches to Organizations - Sytse Douma This fully updated edition is packed with practical examples from real-world companies, helping you to understand how the concepts relate to economic and ... Economic approaches to organizations This text explains in a non-technical way different economic

approaches (including game theory, agency theory, transaction costs economics, economics of ... Showing results for "economic approaches to organizations" Organizational Behavior: An Experiential Approach. 8th Edition. Joyce S Osland, David A. Kolb, Irwin M Rubin, Marlene E. Turner. ISBN-13: 9780131441514. Economic Approaches to Organizations Now in its fifth edition, Economic Approaches to Organisations remains one of the few texts to emphasize the importance of economic issues and developments ... Economic Approaches to Organizations *Increases the use of empirical results and real-world examples. *There are five chapters discussing the organisations. These approaches are behavioural theory, ... Economic Approaches to Organizations - Softcover The focus of this unique text is on the importance of economic issues and developments in the study of organizations and management. This is one of only a few ... Economic Approaches to Organizations Focuses on economic decision making within the firm and helps students make the link between management and economic theories and ideas. TCM Parts Manual Engine Nissan H 15 H 20 H 25 PE ... May 27, 2021 — TCM - Parts Manual - Engine Nissan H15 H20 H25 - PE-H15RMT000B - 168 pages. TCM Nissan H15 H20 H25 Forklift Gasoline Engine Shop ... TCM Nissan H15 H20 H25 Forklift Gasoline Engine Shop Service Repair Manual ; Compatible Equipment Make. Nissan, TCM ; Accurate description. 4.8 ; Reasonable ... Nissan ForkLift Engines Service Manual H15 / H20-II / H25 ... This service manual has been prepared to provide necessary information concerning the maintenance and repair procedures for the NISSAN FORKLIFT D01/D02 series. H25 Nissan Engine Manual Pdf Page 1. H25 Nissan Engine Manual Pdf. INTRODUCTION H25 Nissan Engine Manual Pdf Copy. Nissan ForkLift Engines Service Manual H15 / H20-II / H25 ... This service manual has been prepared to provide necessary information concerning the maintenance and repair procedures for the NISSAN FORKLIFT D01/D02 series. Nissan H25 2472 CC TAM QUICK ENGINE SPECIFICATION specs_nis_h25.xlsx. Nissan H25. 2472 C.C.. BORE. STROKE. FIRING. MAIN. ROD. ORDER. JOURNAL. JOURNAL. 3.622. 3.661. 1-3-4-2. Nissan Forklift J01, J02 Series with H15, H20-II, H25, ... Nissan Forklift J01, J02 Series with H15, H20-II, H25, TD27, BD30 Engines Workshop Service Manual · 1. H15/H20-II/H2S ENGINE Service Manual, PDF, 154 pages · 2. 4Z TOYO TCM Shop Manual for Nissan H15 H20 H25 ... 4Z- TOYO TCM shop manual for nissan H15, H20, H25 gasoline engines ... Engines, Owners Repair Manual Book. Listed on Nov 7, 2023. Report this item to Etsy · All ... Still OM Pimespo Nissan Motor H25 Engine Repair ... Still OM Pimespo Nissan Motor H25 Engine Repair Manual_4141-4257. Size: 11.3 MB Format: PDF Language: English Brand: Still-OM Pimespo-Nissan Nissan Forklift J01, J02 Series with H15, H20-II, H25, TD27 ... High Quality Manuals. Nissan Forklift J01, J02 Series with H15, H20-II, H25, TD27, BD30 Engines Workshop Service Repair Manual. Sale. \$ 19.92; Regular price ...