

Chapter 9 Decision Trees Bgu

This book starts by presenting the basics of reinforcement learning using highly intuitive and easy-to-understand examples and applications, and then introduces the cutting-edge research advances that make reinforcement learning capable of out-performing most state-of-art systems, and even humans in a number of applications. The book not only equips readers with an understanding of multiple advanced and innovative algorithms, but also prepares them to implement systems such as those created by Google Deep Mind in actual code. This book is intended for readers who want to both understand and apply advanced concepts in a field that combines the best of two worlds – deep learning and reinforcement learning – to tap the potential of ‘advanced artificial intelligence’ for creating real-world applications and game-winning algorithms.

Introduction to Probability Models, Tenth Edition, provides an introduction to elementary probability theory and stochastic processes. There are two approaches to the study of probability theory. One is heuristic and nonrigorous, and attempts to develop in students an intuitive feel for the subject that enables him or her to think probabilistically. The other approach attempts a rigorous development of probability by using the tools of measure theory. The first approach is employed in this text. The book begins by introducing basic concepts of probability theory, such as the random variable, conditional probability, and conditional expectation. This is followed by discussions of stochastic processes, including Markov chains and Poisson processes. The remaining chapters cover queuing, reliability theory, Brownian motion, and simulation. Many examples are worked out throughout the text, along with exercises to be solved by students. This book will be particularly useful to those interested in learning how probability theory can be applied to the study of phenomena in fields such as engineering, computer science, management science, the physical and social sciences, and operations research. Ideally, this text would be used in a one-year course in probability models, or a one-semester course in introductory probability theory or a course in elementary stochastic processes. New to this Edition: 65% new chapter material including coverage of finite capacity queues, insurance risk models and Markov chains Contains compulsory material for new Exam 3 of the Society of Actuaries containing several sections in the new exams Updated data, and a list of commonly used notations and equations, a robust ancillary package, including a ISM, SSM, and test bank Includes SPSS PASW Modeler and SAS JMP software packages which are widely used in the field Hallmark features: Superior writing style Excellent exercises and examples covering the wide breadth of coverage of probability topics Real-world applications in engineering, science, business and economics

Complexes of physically interacting proteins constitute fundamental functional units that drive almost all biological processes within cells. A faithful reconstruction of the entire set of protein complexes (the "complexosome") is therefore important not only to understand the composition of complexes but also the higher level functional organization within cells. Advances over the last several years, particularly through the use of high-throughput proteomics techniques, have made it possible to map substantial fractions of protein interactions (the "interactomes") from model organisms including *Arabidopsis thaliana* (a flowering plant),

Caenorhabditis elegans (a nematode), *Drosophila melanogaster* (fruit fly), and *Saccharomyces cerevisiae* (budding yeast). These interaction datasets have enabled systematic inquiry into the identification and study of protein complexes from organisms. Computational methods have played a significant role in this context, by contributing accurate, efficient, and exhaustive ways to analyze the enormous amounts of data. These methods have helped to compensate for some of the limitations in experimental datasets including the presence of biological and technical noise and the relative paucity of credible interactions. In this book, we systematically walk through computational methods devised to date (approximately between 2000 and 2016) for identifying protein complexes from the network of protein interactions (the protein-protein interaction (PPI) network). We present a detailed taxonomy of these methods, and comprehensively evaluate them for protein complex identification across a variety of scenarios including the absence of many true interactions and the presence of false-positive interactions (noise) in PPI networks. Based on this evaluation, we highlight challenges faced by the methods, for instance in identifying sparse, sub-, or small complexes and in discerning overlapping complexes, and reveal how a combination of strategies is necessary to accurately reconstruct the entire complexosome.

This updated compendium provides a methodical introduction with a coherent and unified repository of ensemble methods, theories, trends, challenges, and applications. More than a third of this edition comprised of new materials, highlighting descriptions of the classic methods, and extensions and novel approaches that have recently been introduced. Along with algorithmic descriptions of each method, the settings in which each method is applicable and the consequences and tradeoffs incurred by using the method is succinctly featured. R code for implementation of the algorithm is also emphasized. The unique volume provides researchers, students and practitioners in industry with a comprehensive, concise and convenient resource on ensemble learning methods.

Amos Tversky (1937–1996), a towering figure in cognitive and mathematical psychology, devoted his professional life to the study of similarity, judgment, and decision making. He had a unique ability to master the technicalities of normative ideals and then to intuit and demonstrate experimentally their systematic violation due to the vagaries and consequences of human information processing. He created new areas of study and helped transform disciplines as varied as economics, law, medicine, political science, philosophy, and statistics. This book collects forty of Tversky's articles, selected by him in collaboration with the editor during the last months of Tversky's life. It is divided into three sections: Similarity, Judgment, and Preferences. The Preferences section is subdivided into Probabilistic Models of Choice, Choice under Risk and Uncertainty, and Contingent Preferences. Included are several articles written with his frequent collaborator, Nobel Prize-winning economist Daniel Kahneman.

Genetic programming (GP) is a systematic, domain-independent method for getting computers to solve problems automatically starting from a high-level statement of what needs to be done. Using ideas from natural evolution, GP starts from an ooze of random computer programs, and progressively refines them through processes of mutation and sexual recombination, until high-fitness solutions emerge. All this without the user having to know or specify the form or structure of solutions in advance. GP has

generated a plethora of human-competitive results and applications, including novel scientific discoveries and patentable inventions. This unique overview of this exciting technique is written by three of the most active scientists in GP. See www.gp-field-guide.org.uk for more information on the book.

Learn Data Structures & Algorithms in Kotlin! Data structures and algorithms are fundamental tools every developer should have. In this book, you'll learn how to implement key data structures in Kotlin, and how to use them to solve a robust set of algorithms. This book is for intermediate Kotlin or Android developers who already know the basics of the language and want to improve their knowledge. Topics Covered in This Book Introduction to Kotlin: If you're new to Kotlin, you can learn the main constructs and begin writing code. Complexity: When you study algorithms, you need a way to compare their performance in time and space. Learn about the Big-O notation to help you do this. Elementary Data Structures: Learn how to implement Linked List, Stacks, and Queues in Kotlin. Trees: Learn everything you need about Trees - in particular, Binary Trees, AVL Trees, as well as Binary Search and much more. Sorting Algorithms: Sorting algorithms are critical for any developer. Learn to implement the main sorting algorithms, using the tools provided by Kotlin. Graphs: Have you ever heard of Dijkstra and the calculation of the shortest path between two different points? Learn about Graphs and how to use them to solve the most useful and important algorithms. Effective marine biodiversity conservation is dependent upon a clear scientific rationale for practical interventions. This book is intended to provide knowledge and tools for marine conservation practitioners and to identify issues and mechanisms for upper-level undergraduate and Masters students. It also provides sound guidance for marine biology field course work and professionals. The main focus is on benthic species living on or in the seabed and immediately above, rather than on commercial fisheries or highly mobile vertebrates. Such species, including algae and invertebrates, are fundamental to a stable and sustainable marine ecosystem. The book is a practical guide based on a clear exposition of the principles of marine ecology and species biology to demonstrate how marine conservation issues and mechanisms have been tackled worldwide and especially the criteria, structures and decision trees that practitioners and managers will find useful. Well illustrated with conceptual diagrams and flow charts, the book includes case study examples from both temperate and tropical marine environments.

This book presents state-of-the-art developments in the area of computationally intelligent methods applied to various aspects and ways of Web exploration and Web mining. Some novel data mining algorithms that can lead to more effective and intelligent Web-based systems are also described. Scientists, engineers, and research students can expect to find many inspiring ideas in this volume.

Data Mining is the science and technology of exploring large and complex bodies of data in order to discover useful patterns. It is extremely important because it enables modeling and knowledge extraction from abundant data availability. This book introduces soft computing methods extending the envelope of problems that data mining can solve efficiently. It presents practical soft-computing approaches in data mining and includes various real-world case studies with detailed

results.

Decision trees have become one of the most powerful and popular approaches in knowledge discovery and data mining; it is the science of exploring large and complex bodies of data in order to discover useful patterns. Decision tree learning continues to evolve over time. Existing methods are constantly being improved and new methods introduced. This 2nd Edition is dedicated entirely to the field of decision trees in data mining; to cover all aspects of this important technique, as well as improved or new methods and techniques developed after the publication of our first edition. In this new edition, all chapters have been revised and new topics brought in. New topics include Cost-Sensitive Active Learning, Learning with Uncertain and Imbalanced Data, Using Decision Trees beyond Classification Tasks, Privacy Preserving Decision Tree Learning, Lessons Learned from Comparative Studies, and Learning Decision Trees for Big Data. A walk-through guide to existing open-source data mining software is also included in this edition. This book invites readers to explore the many benefits in data mining that decision trees offer:

This book organizes key concepts, theories, standards, methodologies, trends, challenges and applications of data mining and knowledge discovery in databases. It first surveys, then provides comprehensive yet concise algorithmic descriptions of methods, including classic methods plus the extensions and novel methods developed recently. It also gives in-depth descriptions of data mining applications in various interdisciplinary industries.

Rely on this robust and thorough guide to build and maintain successful test automation. As the software industry shifts from traditional waterfall paradigms into more agile ones, test automation becomes a highly important tool that allows your development teams to deliver software at an ever-increasing pace without compromising quality. Even though it may seem trivial to automate the repetitive tester's work, using test automation efficiently and properly is not trivial. Many test automation endeavors end up in the "graveyard" of software projects. There are many things that affect the value of test automation, and also its costs. This book aims to cover all of these aspects in great detail so you can make decisions to create the best test automation solution that will not only help your test automation project to succeed, but also allow the entire software project to thrive. One of the most important details that affects the success of the test automation is how easy it is to maintain the automated tests. Complete Guide to Test Automation provides a detailed hands-on guide for writing highly maintainable test code. What You'll Learn Know the real value to be expected from test automation Discover the key traits that will make your test automation project succeed Be aware of the different considerations to take into account when planning automated tests vs. manual tests Determine who should implement the tests and the implications of this decision Architect the test project and fit it to the architecture of the tested application Design and implement highly reliable automated tests Begin gaining value from test automation earlier Integrate test automation into

the business processes of the development team Leverage test automation to improve your organization's performance and quality, even without formal authority Understand how different types of automated tests will fit into your testing strategy, including unit testing, load and performance testing, visual testing, and more Who This Book Is For Those involved with software development such as test automation leads, QA managers, test automation developers, and development managers. Some parts of the book assume hands-on experience in writing code in an object-oriented language (mainly C# or Java), although most of the content is also relevant for nonprogrammers.

Ten years ago Bill Gale of AT&T Bell Laboratories was primary organizer of the first Workshop on Artificial Intelligence and Statistics. In the early days of the Workshop series it seemed clear that researchers in AI and statistics had common interests, though with different emphases, goals, and vocabularies. In learning and model selection, for example, a historical goal of AI to build autonomous agents probably contributed to a focus on parameter-free learning systems, which relied little on an external analyst's assumptions about the data. This seemed at odds with statistical strategy, which stemmed from a view that model selection methods were tools to augment, not replace, the abilities of a human analyst. Thus, statisticians have traditionally spent considerably more time exploiting prior information of the environment to model data and exploratory data analysis methods tailored to their assumptions. In statistics, special emphasis is placed on model checking, making extensive use of residual analysis, because all models are 'wrong', but some are better than others. It is increasingly recognized that AI researchers and/or AI programs can exploit the same kind of statistical strategies to good effect. Often AI researchers and statisticians emphasized different aspects of what in retrospect we might now regard as the same overriding tasks.

This lively, practical text presents a fresh and comprehensive approach to doing qualitative research. The book offers a unique balance of theory and clear-cut choices for customizing every phase of a qualitative study. A scholarly mix of classic and contemporary studies from multiple disciplines provides compelling, field-based examples of the full range of qualitative approaches. Readers learn about adaptive ways of designing studies, collecting data, analyzing data, and reporting findings. Key aspects of the researcher's craft are addressed, such as fieldwork options, the five phases of data analysis (with and without using computer-based software), and how to incorporate the researcher's "declarative" and "reflective" selves into a final report. Ideal for graduate-level courses, the text includes: * Discussions of ethnography, grounded theory, phenomenology, feminist research, and other approaches. * Instructions for creating a study bank to get a new study started. * End-of-chapter exercises and a semester-long, field-based project. * Quick study boxes, research vignettes, sample studies, and a glossary. * Previews for sections within chapters, and chapter recaps. * Discussion of the place of qualitative research among other social science methods, including mixed methods research.

Owing to climate change related uncertainties and anticipated population growth, different parts of the developing and the developed world (particularly urban areas) are experiencing water shortages or flooding and security of fit-for-purpose supplies is becoming a major issue. The emphasis on decentralized alternative water supply systems has increased considerably. Most of the information on such systems is either scattered or focuses on large scale reuse with little consideration given to decentralized small to medium scale systems. *Alternative Water Supply Systems* brings together recent research into the available and innovative options and additionally shares experiences from a wide range of contexts from both developed and developing countries. *Alternative Water Supply Systems* covers technical, social, financial and institutional aspects associated with decentralized alternative water supply systems. These include systems for greywater recycling, rainwater harvesting, recovery of water through condensation and sewer mining. A number of case studies from the UK, the USA, Australia and the developing world are presented to discuss associated environmental and health implications. The book provides insights into a range of aspects associated with alternative water supply systems and an evidence base (through case studies) on potential water savings and trade-offs. The information organized in the book is aimed at facilitating wider uptake of context specific alternatives at a decentralized scale mainly in urban areas. This book is a key reference for postgraduate level students and researchers interested in environmental engineering, water resources management, urban planning and resource efficiency, water demand management, building service engineering and sustainable architecture. It provides practical insights for water professionals such as systems designers, operators, and decision makers responsible for planning and delivering sustainable water management in urban areas through the implementation of decentralized water recycling. Authors: Fayyaz Ali Memon, Centre for Water Systems, University of Exeter, UK and Sarah Ward, Centre for Water Systems, University of Exeter, UK

The IEEE International Conference on Intelligence and Security Informatics (ISI) and Pacific Asia Workshop on Intelligence and Security Informatics (PAISI) conference series (<http://www.isiconference.org>) have drawn significant attention in the recent years. Intelligence and Security Informatics is concerned with the study of the development and use of advanced information technologies and systems for national, international, and societal security-related applications. The ISI conference series have brought together academic researchers, law enforcement and intelligence experts, information technology consultant and practitioners to discuss their research and practice related to various ISI topics including ISI data management, data and text mining for ISI applications, terrorism informatics, deception and intent detection, terrorist and criminal social network analysis, public health and bio-security, crime analysis, cyber-infrastructure protection, transportation infrastructure security, policy studies and evaluation, information assurance, among others. In this book, we collect the work of the most active researchers in the area. Topics include data and text mining in terrorism, information sharing, social network analysis, Web-based intelligence monitoring and analysis, crime data analysis, infrastructure protection, deception and intent detection and more. Scope and

Organization The book is organized in four major areas. The first unit focuses on the terrorism - formatics and data mining. The second unit discusses the intelligence and crime analysis. The third unit covers access control, infrastructure protection, and privacy. The fourth unit presents surveillance and emergency response.

In *Moscow Rules* Gabriel Allon went up against the sadistic Ivan Kharkov. Now he must outsmart him once and for all in this #1 New York Times bestseller from Daniel Silva. Grigori Bulganov once saved Gabriel Allon's life in Moscow—and Allon always repays his debts. So when the former Russian intelligence officer vanishes, Allon gathers his team of operatives to go after those responsible. But, in a running battle that rages across the globe, Allon soon realizes that his enemy may already hold the key to victory. And that if he continues, it will cost him more than he can bear...

The methodology used to construct tree structured rules is the focus of this monograph. Unlike many other statistical procedures, which moved from pencil and paper to calculators, this text's use of trees was unthinkable before computers. Both the practical and theoretical sides have been developed in the authors' study of tree methods. *Classification and Regression Trees* reflects these two sides, covering the use of trees as a data analysis method, and in a more mathematical framework, proving some of their fundamental properties.

This volume provides a foundation for understanding the fundamentals of biomedical informatics, which deals with the storage, retrieval and use of biomedical data for biological problem solving and medical decision making. It covers the three main biomedical domains of basic biology, clinical medicine and public health.

A Guide to Navigate Evangelical Feminism In a society where gender roles are a hot-button topic, the church is not immune to the controversy. In fact, the church has wrestled with varying degrees of evangelical feminism for decades. As evangelical feminism has crept into the church, time-trusted resources like *Recovering Biblical Manhood and Womanhood* help remind Christians of what the Bible has to say. In this new edition of the award-winning best seller, more than 20 influential men and women such as John Piper, Wayne Grudem, D. A. Carson, and Elisabeth Elliot offer thought-provoking essays responding to the challenge egalitarianism poses to life in the church and in the home. Covering topics like role distinctions in the church, how biblical manhood and womanhood should work out in practice, and women in the history of the church, this helpful resource will help readers learn to orient their beliefs with God's unchanging word in an ever-changing culture.

START-UP NATION addresses the trillion dollar question: How is it that Israel-- a country of 7.1 million, only 60 years old, surrounded by enemies, in a constant state of war since its founding, with no natural resources-- produces more start-up companies than large, peaceful, and stable nations like Japan, China, India, Korea, Canada and the UK? With the savvy of foreign policy insiders, Senor and Singer examine the lessons of the country's adversity-driven culture, which flattens hierarchy and elevates informality-- all backed up by government policies focused on innovation. In a world where economies as diverse as Ireland, Singapore and Dubai have tried to re-create the "Israel effect", there are entrepreneurial lessons well worth noting. As America reboots its own economy and can-do spirit, there's never been a better time to look at this remarkable and resilient nation for some impressive, surprising clues.

This book constitutes the revised selected papers of the Second Annual Workshop on Information Privacy and National Security, ISIPS 2008, held in New Brunswick, NJ, USA, in May 2008. The 11 revised full papers were carefully reviewed and selected from numerous submissions. The papers deal with the inherent tension between the need to gather intelligence necessary to protect the security of persons and nations, and the privacy rights of persons and organizations.

Data Mining and Knowledge Discovery Handbook Springer Science & Business Media

The main goal of the new field of data mining is the analysis of large and complex datasets. Some very important datasets may be derived from business and industrial activities. This kind of data is known as "enterprise data". The common characteristic of such datasets is that the analyst wishes to analyze them for the purpose of designing a more cost-effective strategy for optimizing some type of performance measure, such as reducing production time, improving quality, eliminating wastes, or maximizing profit. Data in this category may describe different scheduling scenarios in a manufacturing environment, quality control of some process, fault diagnosis in the operation of a machine or process, risk analysis when issuing credit to applicants, management of supply chains in a manufacturing system, or data for business related decision-making.

Due to the adverse stress conditions typical of olive cultivation in desert conditions, the olive tree is responding with production of high levels of antioxidant substances. Among these substances are polyphenols, tocopherols, and phytosterols. Studies have shown that saline irrigated varieties of olives have demonstrated advantages over those irrigated with tap water. This is just one of the aspects of desert cultivation of olives that is covered in Desert Olive Oil Advanced Biotechnologies. Based on 20 years of research, the book expounds on the appropriate selection of olive varieties with high productivity and oil quality, the impact of foliar nutrition on decreasing alternate bearing and increasing fruit quality, improving efficiency of mechanical harvesting, and increasing efficiency of oil extraction and oil quality regulating analysis. Addresses olive cultivation methods for semi-arid environments Focuses on intensive cultivation using saline and municipal waste recycled irrigation water and their significant impact on the production and nutritional value of olive oil Integrated and multidisciplinary approaches providing a comprehensive view of the desert olive industry Provides key considerations including ecological, biotechnological, agricultural and political impacts

This book is a complete guide to the C4.5 system as implemented in C for the UNIX environment. It contains a comprehensive guide to the system's use, the source code (about 8,800 lines), and implementation notes.

The objective of our monograph is to cover the developments on the theoretical foundations of distributed symmetry breaking in the message-passing model. We hope that our monograph will stimulate further progress in this exciting area. This book introduces multiagent planning under uncertainty as formalized by decentralized partially observable Markov decision processes (Dec-POMDPs). The intended audience is researchers and graduate students working in the fields of artificial intelligence related to sequential decision making: reinforcement learning, decision-theoretic planning for single agents, classical multiagent planning, decentralized control, and operations research.

Summary Machine Learning in Action is unique book that blends the foundational theories of machine learning with the

practical realities of building tools for everyday data analysis. You'll use the flexible Python programming language to build programs that implement algorithms for data classification, forecasting, recommendations, and higher-level features like summarization and simplification. About the Book A machine is said to learn when its performance improves with experience. Learning requires algorithms and programs that capture data and ferret out the interesting or useful patterns. Once the specialized domain of analysts and mathematicians, machine learning is becoming a skill needed by many. Machine Learning in Action is a clearly written tutorial for developers. It avoids academic language and takes you straight to the techniques you'll use in your day-to-day work. Many (Python) examples present the core algorithms of statistical data processing, data analysis, and data visualization in code you can reuse. You'll understand the concepts and how they fit in with tactical tasks like classification, forecasting, recommendations, and higher-level features like summarization and simplification. Readers need no prior experience with machine learning or statistical processing. Familiarity with Python is helpful. Purchase of the print book comes with an offer of a free PDF, ePub, and Kindle eBook from Manning. Also available is all code from the book. What's Inside A no-nonsense introduction Examples showing common ML tasks Everyday data analysis Implementing classic algorithms like Apriori and Adaboos Table of Contents PART 1 CLASSIFICATION Machine learning basics Classifying with k-Nearest Neighbors Splitting datasets one feature at a time: decision trees Classifying with probability theory: naïve Bayes Logistic regression Support vector machines Improving classification with the AdaBoost meta algorithm PART 2 FORECASTING NUMERIC VALUES WITH REGRESSION Predicting numeric values: regression Tree-based regression PART 3 UNSUPERVISED LEARNING Grouping unlabeled items using k-means clustering Association analysis with the Apriori algorithm Efficiently finding frequent itemsets with FP-growth PART 4 ADDITIONAL TOOLS Using principal component analysis to simplify data Simplifying data with the singular value decomposition Big data and MapReduce Data Mining and Knowledge Discovery Handbook organizes all major concepts, theories, methodologies, trends, challenges and applications of data mining (DM) and knowledge discovery in databases (KDD) into a coherent and unified repository. This book first surveys, then provides comprehensive yet concise algorithmic descriptions of methods, including classic methods plus the extensions and novel methods developed recently. This volume concludes with in-depth descriptions of data mining applications in various interdisciplinary industries including finance, marketing, medicine, biology, engineering, telecommunications, software, and security. Data Mining and Knowledge Discovery Handbook is designed for research scientists and graduate-level students in computer science and engineering. This book is also suitable for professionals in fields such as computing applications, information systems management, and strategic research management.

"Mesmerizing & fascinating..." —The Seattle Post-Intelligencer "The Freakonomics of big data." —Stein Kretsinger, founding executive of Advertising.com Award-winning | Used by over 30 universities | Translated into 9 languages An introduction for everyone. In this rich, fascinating — surprisingly accessible — introduction, leading expert Eric Siegel reveals how predictive analytics (aka machine learning) works, and how it affects everyone every day. Rather than a "how to" for hands-on techies, the book serves lay readers and experts alike by covering new case studies and the latest state-of-the-art techniques. Prediction is booming. It reinvents industries and runs the world. Companies, governments, law enforcement, hospitals, and universities are seizing upon the power. These institutions predict whether you're going to click, buy, lie, or die. Why? For good reason: predicting human behavior combats risk, boosts sales, fortifies healthcare, streamlines manufacturing, conquers spam, optimizes social networks, toughens crime fighting, and wins elections. How? Prediction is powered by the world's most potent, flourishing unnatural resource: data. Accumulated in large part as the by-product of routine tasks, data is the unsalted, flavorless residue deposited en masse as organizations churn away. Surprise! This heap of refuse is a gold mine. Big data embodies an extraordinary wealth of experience from which to learn. Predictive analytics (aka machine learning) unleashes the power of data. With this technology, the computer literally learns from data how to predict the future behavior of individuals. Perfect prediction is not possible, but putting odds on the future drives millions of decisions more effectively, determining whom to call, mail, investigate, incarcerate, set up on a date, or medicate. In this lucid, captivating introduction — now in its Revised and Updated edition — former Columbia University professor and Predictive Analytics World founder Eric Siegel reveals the power and perils of prediction: What type of mortgage risk Chase Bank predicted before the recession. Predicting which people will drop out of school, cancel a subscription, or get divorced before they even know it themselves. Why early retirement predicts a shorter life expectancy and vegetarians miss fewer flights. Five reasons why organizations predict death — including one health insurance company. How U.S. Bank and Obama for America calculated the way to most strongly persuade each individual. Why the NSA wants all your data: machine learning supercomputers to fight terrorism. How IBM's Watson computer used predictive modeling to answer questions and beat the human champs on TV's Jeopardy! How companies ascertain untold, private truths — how Target figures out you're pregnant and Hewlett-Packard deduces you're about to quit your job. How judges and parole boards rely on crime-predicting computers to decide how long convicts remain in prison. 182 examples from Airbnb, the BBC, Citibank, ConEd, Facebook, Ford, Google, the IRS, LinkedIn, Match.com, MTV, Netflix, PayPal, Pfizer, Spotify, Uber, UPS, Wikipedia, and more. How does predictive analytics work? This jam-packed book satisfies by demystifying the intriguing science under the hood. For future hands-on practitioners pursuing a career in the field, it sets a strong foundation, delivers the prerequisite knowledge, and whets your appetite for more. A

truly omnipresent science, predictive analytics constantly affects our daily lives. Whether you are a consumer of it — or consumed by it — get a handle on the power of Predictive Analytics.

"This book presents cutting-edge research and analysis of the most recent advancements in the fields of database systems and software development"--Provided by publisher.

This second edition of a pioneering technical work in biomedical informatics provides a very readable treatment of the deep computational ideas at the foundation of the field. *Principles of Biomedical Informatics, 2nd Edition* is radically reorganized to make it especially useable as a textbook for courses that move beyond the standard introductory material. It includes exercises at the end of each chapter, ideas for student projects, and a number of new topics, such as:

- tree structured data, interval trees, and time-oriented medical data and their use
- On Line Application Processing (OLAP), an old database idea that is only recently coming of age and finding surprising importance in biomedical informatics
- a discussion of nursing knowledge and an example of encoding nursing advice in a rule-based system
- X-ray physics and algorithms for cross-sectional medical image reconstruction, recognizing that this area was one of the most central to the origin of biomedical computing
- an introduction to Markov processes, and
- an outline of the elements of a hospital IT security program, focusing on fundamental ideas rather than specifics of system vulnerabilities or specific technologies.

It is simultaneously a unified description of the core research concept areas of biomedical data and knowledge representation, biomedical information access, biomedical decision-making, and information and technology use in biomedical contexts, and a pre-eminent teaching reference for the growing number of healthcare and computing professionals embracing computation in health-related fields. As in the first edition, it includes many worked example programs in Common LISP, the most powerful and accessible modern language for advanced biomedical concept representation and manipulation. The text also includes humor, history, and anecdotal material to balance the mathematically and computationally intensive development in many of the topic areas. The emphasis, as in the first edition, is on ideas and methods that are likely to be of lasting value, not just the popular topics of the day. Ira Kalet is Professor Emeritus of Radiation Oncology, and of Biomedical Informatics and Medical Education, at the University of Washington. Until retiring in 2011 he was also an Adjunct Professor in Computer Science and Engineering, and Biological Structure. From 2005 to 2010 he served as IT Security Director for the University of Washington School of Medicine and its major teaching hospitals. He has been a member of the American Medical Informatics Association since 1990, and an elected Fellow of the American College of Medical Informatics since 2011. His research interests include simulation systems for design of radiation treatment for cancer, software development methodology, and artificial intelligence applications to medicine, particularly expert systems, ontologies and modeling. Develops principles and methods for representing biomedical data, using information in context and in decision making, and accessing information to assist the medical community in using data to its full potential Provides a series of principles for expressing biomedical data and ideas in a computable form to integrate biological, clinical, and public health applications Includes a discussion of user interfaces, interactive graphics, and knowledge resources and reference material on programming languages to provide medical informatics programmers with the technical tools to develop systems

Edited by one of the leading experts in the field, this handbook emphasizes why solid-state issues are important, which approaches should be taken to avoid problems and exploit the opportunities offered by solid state properties in the pharmaceutical and agricultural industries. With its practical approach, this is at once a guideline for development chemists just entering the field as well as a high-quality source of reference

material for specialists in the pharmaceutical and chemical industry, structural chemists, physicochemists, crystallographers, inorganic chemists, and patent departments.

A new approach for defining causality and such related notions as degree of responsibility, degrees of blame, and causal explanation. Causality plays a central role in the way people structure the world; we constantly seek causal explanations for our observations. But what does it even mean that an event C “actually caused” event E? The problem of defining actual causation goes beyond mere philosophical speculation. For example, in many legal arguments, it is precisely what needs to be established in order to determine responsibility. The philosophy literature has been struggling with the problem of defining causality since Hume. In this book, Joseph Halpern explores actual causality, and such related notions as degree of responsibility, degree of blame, and causal explanation. The goal is to arrive at a definition of causality that matches our natural language usage and is helpful, for example, to a jury deciding a legal case, a programmer looking for the line of code that cause some software to fail, or an economist trying to determine whether austerity caused a subsequent depression. Halpern applies and expands an approach to causality that he and Judea Pearl developed, based on structural equations. He carefully formulates a definition of causality, and building on this, defines degree of responsibility, degree of blame, and causal explanation. He concludes by discussing how these ideas can be applied to such practical problems as accountability and program verification. Technical details are generally confined to the final section of each chapter and can be skipped by non-mathematical readers.

Paralleling the human senses, the author explores the secret lives of various plants, from the colors they see to whether or not they really like classical music to their ability to sense nearby danger.

A guide for everyone involved in medical decision making to plot a clear course through complex and conflicting benefits and risks.

This book presents a specific and unified approach to Knowledge Discovery and Data Mining, termed IFN for Information Fuzzy Network methodology. Data Mining (DM) is the science of modelling and generalizing common patterns from large sets of multi-type data. DM is a part of KDD, which is the overall process for Knowledge Discovery in Databases. The accessibility and abundance of information today makes this a topic of particular importance and need. The book has three main parts complemented by appendices as well as software and project data that are accessible from the book's web site (<http://www.eng.tau.ac.il/~maironlifn-kdg/>). Part I (Chapters 1-4) starts with the topic of KDD and DM in general and makes reference to other works in the field, especially those related to the information theoretic approach. The remainder of the book presents our work, starting with the IFN theory and algorithms. Part II (Chapters 5-6) discusses the methodology of application and includes case studies. Then in Part III (Chapters 7-9) a comparative study is presented, concluding with some advanced methods and open problems. The IFN, being a generic methodology, applies to a variety of fields, such as manufacturing, finance, health care, medicine, insurance, and human resources. The appendices expand on the relevant theoretical background and present descriptions of sample projects (including detailed results).

This second edition of a well-received text, with 20 new chapters, presents a coherent and unified repository of recommender systems' major concepts, theories, methodologies, trends, and challenges. A variety of real-world applications and detailed case studies are included. In addition to wholesale revision of the existing chapters, this edition includes new topics including: decision making and recommender systems, reciprocal recommender systems, recommender systems in social networks, mobile recommender systems, explanations for recommender systems, music recommender systems, cross-domain recommendations, privacy in recommender systems, and semantic-based recommender systems. This multi-disciplinary handbook involves world-wide experts from diverse fields such as artificial intelligence, human-

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computer interaction, information retrieval, data mining, mathematics, statistics, adaptive user interfaces, decision support systems, psychology, marketing, and consumer behavior. Theoreticians and practitioners from these fields will find this reference to be an invaluable source of ideas, methods and techniques for developing more efficient, cost-effective and accurate recommender systems.

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