

Probabilistic Reasoning In Intelligent Systems Networks Of Plausible Inference Morgan Kaufmann Series In Representation And Reasoning

Probabilistic Networks and Expert Systems
Uncertainty in Artificial Intelligence
Fuzzy Expert Systems
Artificial Intelligence
Bayesian Rationality
New Directions in Rough Sets, Data Mining, and Granular-Soft Computing
Systematic Introduction to Expert Systems
Artificial Intelligence
Causal Inference in Statistics
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A Project to Find the Fundamental Theory of Physics
Advanced Artificial Intelligence
Knowledge Representation, Reasoning, and the Design of Intelligent Agents
Probabilistic Reasoning in Multiagent Systems
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Deep Learning from Scratch
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Bayesian Networks and Decision Graphs
Probabilistic Reasoning in Intelligent Systems
Probabilistic Inductive Logic Programming
Computational Learning and Probabilistic Reasoning
Artificial Intelligence
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Causality
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Probabilistic Networks and Expert Systems

Until recently, fuzzy logic was the intellectual plaything of a handful of researchers. Now it is being used to enhance the power of intelligent systems, as well as improve the performance and reduce the cost of intelligent and "smart" products appearing in the commercial market. Fuzzy Expert Systems focuses primarily on the theory of fuzzy expert systems and their applications in science and engineering. In doing so, it provides the first comprehensive study of "soft" expert systems and applications for those systems. Topics covered include general purpose fuzzy expert systems, processing imperfect information using structured frameworks, the fuzzy linguistic inference network generator, fuzzy associative memories, the role of approximate reasoning in medical expert systems, MILORD (a fuzzy expert systems shell), and COMAX (an autonomous fuzzy expert system for tactical communications networks). Fuzzy Expert Systems provides an invaluable reference resource for researchers and students in artificial intelligence (AI) and approximate reasoning (AR), as well as for other researchers looking for methods to apply similar tools in their own designs of intelligent systems.

Uncertainty in Artificial Intelligence

Abstract In this chapter we provide an overview of probabilistic logic networks (PLN), including our motivations for developing PLN and the guiding principles underlying PLN. We discuss foundational choices we made, introduce PLN knowledge representation, and briefly introduce inference rules and truth-values. We also place PLN in context with other approaches to uncertain inference.

1.1 Motivations This book presents Probabilistic Logic Networks (PLN), a systematic and pragmatic framework for computationally carrying out uncertain reasoning – reasoning about uncertain data, and/or reasoning involving uncertain conclusions. We begin with a few comments about why we believe this is such an interesting and important domain of investigation. First of all, we hold to a philosophical perspective in which “reasoning” – properly understood – plays a central role in cognitive activity. We realize that other perspectives exist; in particular, logical reasoning is sometimes construed as a special kind of cognition that humans carry out only occasionally, as a deviation from their usual (intuitive, emotional, pragmatic, sensorimotor, etc.) modes of thought. However, we consider this alternative view to be valid only according to a very limited definition of “logic.” Construed properly, we suggest, logical reasoning may be understood as the basic framework underlying all forms of cognition, including those conventionally thought of as illogical and irrational.

Fuzzy Expert Systems

Artificial Intelligence: A Modern Approach offers the most comprehensive, up-to-date introduction to the theory and practice of artificial intelligence. Number one in its field, this textbook is ideal for one or two-semester, undergraduate or graduate-level courses in Artificial Intelligence.

Artificial Intelligence

A practical introduction perfect for final-year undergraduate and graduate students without a solid background in linear algebra and calculus.

Bayesian Rationality

Many of the concepts and terminology surrounding modern causal inference can be quite intimidating to the novice. Judea Pearl presents a book ideal for beginners in statistics, providing a comprehensive introduction to the field of causality. Examples from classical statistics are presented throughout to demonstrate the need for causality in resolving decision-making dilemmas posed by data. Causal methods are also compared to traditional statistical methods, whilst questions are provided at the end of each section to aid student learning.

New Directions in Rough Sets, Data Mining, and Granular-Soft Computing

Description to come

Systematic Introduction to Expert Systems

Problem-solving strategies and the nature of Heuristic information. Heuristics and problem representations. Basic Heuristic-Search procedures. Formal properties of Heuristic methods. Heuristics viewed as information provided by simplified models. Performance analysis of Heuristic methods. Abstract models for quantitative performance analysis. Complexity versus precision of admissible Heuristics. Searching with nonadmissible Heuristics. Game-playing programs. Strategies and models for game-playing programs. Performance analysis for game-searching strategies. Decision quality in game searching. Bibliography. Index.

Artificial Intelligence

Providing a unified coverage of the latest research and applications methods and techniques, this book is devoted to two interrelated techniques for solving some important problems in machine intelligence and pattern recognition, namely probabilistic reasoning and computational learning. The contributions in this volume describe and explore the current developments in computer science and theoretical statistics which provide computational probabilistic models for manipulating knowledge found in industrial and business data. These methods are very efficient for handling complex problems in medicine, commerce and finance. Part I covers Generalisation Principles and Learning and describes several new inductive principles and techniques used in computational learning. Part II describes Causation and Model Selection including the graphical probabilistic models that exploit the independence relationships presented in the graphs, and applications of Bayesian networks to multivariate statistical analysis. Part III includes case studies and descriptions of Bayesian Belief Networks and Hybrid Systems. Finally, Part IV on Decision-Making, Optimization and Classification describes some related theoretical work in the field of probabilistic reasoning. Statisticians, IT strategy planners, professionals and researchers with interests in learning, intelligent databases and pattern recognition and data processing for expert systems will find this book to be an invaluable resource. Real-life problems are used to demonstrate the practical and effective implementation of the relevant algorithms and techniques.

Causal Inference in Statistics

Knowledge representation is at the very core of a radical idea for understanding intelligence. This book talks about the

central concepts of knowledge representation developed over the years. It is suitable for researchers and practitioners in database management, information retrieval, object-oriented systems and artificial intelligence.

Learning in Graphical Models

Knowledge representation and reasoning is the foundation of artificial intelligence, declarative programming, and the design of knowledge-intensive software systems capable of performing intelligent tasks. Using logical and probabilistic formalisms based on answer set programming (ASP) and action languages, this book shows how knowledge-intensive systems can be given knowledge about the world and how it can be used to solve non-trivial computational problems. The authors maintain a balance between mathematical analysis and practical design of intelligent agents. All the concepts, such as answering queries, planning, diagnostics, and probabilistic reasoning, are illustrated by programs of ASP. The text can be used for AI-related undergraduate and graduate classes and by researchers who would like to learn more about ASP and knowledge representation.

Applications of Uncertainty Formalisms

Artificial Intelligence presents a practical guide to AI, including agents, machine learning and problem-solving simple and complex domains.

The Book of Why

A Turing Award-winning computer scientist and statistician shows how understanding causality has revolutionized science and will revolutionize artificial intelligence "Correlation is not causation." This mantra, chanted by scientists for more than a century, has led to a virtual prohibition on causal talk. Today, that taboo is dead. The causal revolution, instigated by Judea Pearl and his colleagues, has cut through a century of confusion and established causality -- the study of cause and effect -- on a firm scientific basis. His work explains how we can know easy things, like whether it was rain or a sprinkler that made a sidewalk wet; and how to answer hard questions, like whether a drug cured an illness. Pearl's work enables us to know not just whether one thing causes another: it lets us explore the world that is and the worlds that could have been. It shows us the essence of human thought and key to artificial intelligence. Anyone who wants to understand either needs The Book of Why.

A Project to Find the Fundamental Theory of Physics

The notion of artificial intelligence (AI) often sparks thoughts of characters from science fiction, such as the Terminator and HAL 9000. While these two artificial entities do not exist, the algorithms of AI have been able to address many real issues, from performing medical diagnoses to navigating difficult terrain to monitoring possible failures of spacecrafts. Exploring these algorithms and applications, Contemporary Artificial Intelligence presents strong AI methods and algorithms for solving challenging problems involving systems that behave intelligently in specialized domains such as medical and software diagnostics, financial decision making, speech and text recognition, genetic analysis, and more. One of the first AI texts accessible to students, the book focuses on the most useful problem-solving strategies that have emerged from AI. In a student-friendly way, the authors cover logic-based methods; probability-based methods; emergent intelligence, including evolutionary computation and swarm intelligence; data-derived logical and probabilistic learning models; and natural language understanding. Through reading this book, students discover the importance of AI techniques in computer science.

Advanced Artificial Intelligence

This collection of readings shows how cognitive science can influence most of the primary branches of philosophy, as well as how philosophy critically examines the foundations of cognitive science. Its broad coverage extends beyond current texts that focus mainly on the impact of cognitive science on philosophy of mind and philosophy of psychology, to include materials that are relevant to five other branches of philosophy: epistemology, philosophy of science (and mathematics), metaphysics, language, and ethics. The readings are organized by philosophical fields, with selections evenly divided between philosophers and cognitive scientists. They draw on research in numerous areas of cognitive science, including cognitive psychology, developmental psychology, social psychology, psychology of reasoning and judgment, artificial intelligence, linguistics, and neuropsychology. There are timely treatments of current topics and debates such as the innate understanding of number, children's theory of mind, self-knowledge, consciousness, connectionism, and ethics and cognitive science.

Knowledge Representation, Reasoning, and the Design of Intelligent Agents

At present one of the main obstacles to a broader application of expert systems is the lack of a theory to tell us which problem-solving methods are available for a given problem class. Such a theory could lead to significant progress in the following central aims of the expert system technique: - Evaluating the technical feasibility of expert system projects: This depends on whether there is a suitable problem-solving method, and if possible a corresponding tool, for the given problem class. - Simplifying knowledge acquisition and maintenance: The problem-solving methods provide direct assistance as interpretation models in knowledge acquisition. Also, they make possible the development of problem-specific expert

system tools with graphical knowledge acquisition components, which can be used even by experts without programming experience. - Making use of expert systems as a knowledge medium: The structured knowledge in expert systems can be used not only for problem solving but also for knowledge communication and tutorial purposes. With such a theory in mind, this book provides a systematic introduction to expert systems. It describes the basic knowledge representations and the present situation with regard to the identification, realization, and integration of problem-solving methods for the main problem classes of expert systems: classification (diagnostics), construction, and simulation.

Probabilistic Reasoning in Multiagent Systems

Probabilistic information has many uses in an intelligent system. This book explores logical formalisms for representing and reasoning with probabilistic information that will be of particular value to researchers in nonmonotonic reasoning, applications of probabilities, and knowledge representation. It demonstrates that probabilities are not limited to particular applications, like expert systems; they have an important role to play in the formal design and specification of intelligent systems in general. Fahiem Bacchus focuses on two distinct notions of probabilities: one propositional, involving degrees of belief, the other proportional, involving statistics. He constructs distinct logics with different semantics for each type of probability that are a significant advance in the formal tools available for representing and reasoning with probabilities. These logics can represent an extensive variety of qualitative assertions, eliminating requirements for exact point-valued probabilities, and they can represent firstshy;order logical information. The logics also have proof theories which give a formal specification for a class of reasoning that subsumes and integrates most of the probabilistic reasoning schemes so far developed in AI. Using the new logical tools to connect statistical with propositional probability, Bacchus also proposes a system of direct inference in which degrees of belief can be inferred from statistical knowledge and demonstrates how this mechanism can be applied to yield a powerful and intuitively satisfying system of defeasible or default reasoning. Fahiem Bacchus is Assistant Professor of Computer Science at the University of Waterloo, Ontario. Contents: Introduction. Propositional Probabilities. Statistical Probabilities. Combining Statistical and Propositional Probabilities Default Inferences from Statistical Knowledge.

Probabilistic Reasoning in Intelligent Systems

A leading artificial intelligence researcher lays out a new approach to AI that will enable people to coexist successfully with increasingly intelligent machines.

Human Compatible

Probabilistic Methods for Financial and Marketing Informatics aims to provide students with insights and a guide explaining how to apply probabilistic reasoning to business problems. Rather than dwelling on rigor, algorithms, and proofs of theorems, the authors concentrate on showing examples and using the software package Netica to represent and solve problems. The book contains unique coverage of probabilistic reasoning topics applied to business problems, including marketing, banking, operations management, and finance. It shares insights about when and why probabilistic methods can and cannot be used effectively. This book is recommended for all R&D professionals and students who are involved with industrial informatics, that is, applying the methodologies of computer science and engineering to business or industry information. This includes computer science and other professionals in the data management and data mining field whose interests are business and marketing information in general, and who want to apply AI and probabilistic methods to their problems in order to better predict how well a product or service will do in a particular market, for instance. Typical fields where this technology is used are in advertising, venture capital decision making, operational risk measurement in any industry, credit scoring, and investment science. Unique coverage of probabilistic reasoning topics applied to business problems, including marketing, banking, operations management, and finance Shares insights about when and why probabilistic methods can and cannot be used effectively Complete review of Bayesian networks and probabilistic methods for those IT professionals new to informatics.

Heuristics

Probabilistic Reasoning in Intelligent Systems is a complete and accessible account of the theoretical foundations and computational methods that underlie plausible reasoning under uncertainty. The author provides a coherent explication of probability as a language for reasoning with partial belief and offers a unifying perspective on other AI approaches to uncertainty, such as the Dempster-Shafer formalism, truth maintenance systems, and nonmonotonic logic. The author distinguishes syntactic and semantic approaches to uncertainty--and offers techniques, based on belief networks, that provide a mechanism for making semantics-based systems operational. Specifically, network-propagation techniques serve as a mechanism for combining the theoretical coherence of probability theory with modern demands of reasoning-systems technology: modular declarative inputs, conceptually meaningful inferences, and parallel distributed computation. Application areas include diagnosis, forecasting, image interpretation, multi-sensor fusion, decision support systems, plan recognition, planning, speech recognition--in short, almost every task requiring that conclusions be drawn from uncertain clues and incomplete information. Probabilistic Reasoning in Intelligent Systems will be of special interest to scholars and researchers in AI, decision theory, statistics, logic, philosophy, cognitive psychology, and the management sciences. Professionals in the areas of knowledge-based systems, operations research, engineering, and statistics will find theoretical and computational tools of immediate practical use. The book can also be used as an excellent text for graduate-level courses in AI, operations research, or applied probability.

Bayesian Artificial Intelligence

In the past decade, a number of different research communities within the computational sciences have studied learning in networks, starting from a number of different points of view. There has been substantial progress in these different communities and surprising convergence has developed between the formalisms. The awareness of this convergence and the growing interest of researchers in understanding the essential unity of the subject underlies the current volume. Two research communities which have used graphical or network formalisms to particular advantage are the belief network community and the neural network community. Belief networks arose within computer science and statistics and were developed with an emphasis on prior knowledge and exact probabilistic calculations. Neural networks arose within electrical engineering, physics and neuroscience and have emphasised pattern recognition and systems modelling problems. This volume draws together researchers from these two communities and presents both kinds of networks as instances of a general unified graphical formalism. The book focuses on probabilistic methods for learning and inference in graphical models, algorithm analysis and design, theory and applications. Exact methods, sampling methods and variational methods are discussed in detail. Audience: A wide cross-section of computationally oriented researchers, including computer scientists, statisticians, electrical engineers, physicists and neuroscientists.

Building Probabilistic Graphical Models with Python

This book provides an introduction to probabilistic inductive logic programming. It places emphasis on the methods based on logic programming principles and covers formalisms and systems, implementations and applications, as well as theory.

Readings in Philosophy and Cognitive Science

With the resurgence of neural networks in the 2010s, deep learning has become essential for machine learning practitioners and even many software engineers. This book provides a comprehensive introduction for data scientists and software engineers with machine learning experience. You'll start with deep learning basics and move quickly to the details of important advanced architectures, implementing everything from scratch along the way. Author Seth Weidman shows you how neural networks work using a first principles approach. You'll learn how to apply multilayer neural networks, convolutional neural networks, and recurrent neural networks from the ground up. With a thorough understanding of how neural networks work mathematically, computationally, and conceptually, you'll be set up for success on all future deep learning projects. This book provides: Extremely clear and thorough mental models—accompanied by working code examples and mathematical explanations—for understanding neural networks Methods for implementing multilayer neural networks from scratch, using an easy-to-understand object-oriented framework Working implementations and clear-cut

explanations of convolutional and recurrent neural networks Implementation of these neural network concepts using the popular PyTorch framework

Bayesian Reasoning and Machine Learning

Knowledge Representation and Reasoning

This is a short, practical guide that allows data scientists to understand the concepts of Graphical models and enables them to try them out using small Python code snippets, without being too mathematically complicated. If you are a data scientist who knows about machine learning and want to enhance your knowledge of graphical models, such as Bayes network, in order to use them to solve real-world problems using Python libraries, this book is for you. This book is intended for those who have some Python and machine learning experience, or are exploring the machine learning field.

Modeling and Reasoning with Bayesian Networks

An introductory review of uncertainty formalisms by the volume editors begins the volume. The first main part of the book introduces some of the general problems dealt with in research. The second part is devoted to case studies; each presentation in this category has a well-delineated application problem and an analyzed solution based on an uncertainty formalism. The final part reports on developments of uncertainty formalisms and supporting technology, such as automated reasoning systems, that are vital to making these formalisms applicable. The book ends with a useful subject index. There is considerable synergy between the papers presented. The representative collection of case studies and associated techniques make the volume a particularly coherent and valuable resource. It will be indispensable reading for researchers and professionals interested in the application of uncertainty formalisms as well as for newcomers to the topic.

Probabilistic Methods for Financial and Marketing Informatics

As the power of Bayesian techniques has become more fully realized, the field of artificial intelligence has embraced Bayesian methodology and integrated it to the point where an introduction to Bayesian techniques is now a core course in many computer science programs. Unlike other books on the subject, Bayesian Artificial Intelligence keeps mathematical detail to a minimum and covers a broad range of topics. The authors integrate all of Bayesian net technology and learning Bayesian net technology and apply them both to knowledge engineering. They emphasize understanding and intuition but also provide the algorithms and technical background needed for applications. Software, exercises, and solutions are

available on the authors' website.

Representing and Reasoning with Probabilistic Knowledge

This 2002 book investigates the opportunities in building intelligent decision support systems offered by multi-agent distributed probabilistic reasoning. Probabilistic reasoning with graphical models, also known as Bayesian networks or belief networks, has become increasingly an active field of research and practice in artificial intelligence, operations research and statistics. The success of this technique in modeling intelligent decision support systems under the centralized and single-agent paradigm has been striking. Yang Xiang extends graphical dependence models to the distributed and multi-agent paradigm. He identifies the major technical challenges involved in such an endeavor and presents the results. The framework developed in the book allows distributed representation of uncertain knowledge on a large and complex environment embedded in multiple cooperative agents, and effective, exact and distributed probabilistic inference.

Deep Learning from Scratch

This book constitutes the refereed proceedings of the 7th International Workshop on Rough Sets, Fuzzy Sets, Data Mining, and Granular-Soft Computing, RSFDGrC'99, held in Yamaguchi, Japan, in November 1999. The 45 revised regular papers and 15 revised short papers presented together with four invited contributions were carefully reviewed and selected from 89 submissions. The book is divided into sections on rough computing: foundations and applications, rough set theory and applications, fuzzy set theory and applications, nonclassical logic and approximate reasoning, information granulation and granular computing, data mining and knowledge discovery, machine learning, and intelligent agents and systems.

Artificial Intelligence and Symbolic Computation

Probabilistic Reasoning in Intelligent Systems is a complete and accessible account of the theoretical foundations and computational methods that underlie plausible reasoning under uncertainty. The author provides a coherent explication of probability as a language for reasoning with partial belief and offers a unifying perspective on other AI approaches to uncertainty, such as the Dempster-Shafer formalism, truth maintenance systems, and nonmonotonic logic. The author distinguishes syntactic and semantic approaches to uncertainty--and offers techniques, based on belief networks, that provide a mechanism for making semantics-based systems operational. Specifically, network-propagation techniques serve as a mechanism for combining the theoretical coherence of probability theory with modern demands of reasoning-systems technology: modular declarative inputs, conceptually meaningful inferences, and parallel distributed computation. Application areas include diagnosis, forecasting, image interpretation, multi-sensor fusion, decision support systems, plan

recognition, planning, speech recognition--in short, almost every task requiring that conclusions be drawn from uncertain clues and incomplete information. Probabilistic Reasoning in Intelligent Systems will be of special interest to scholars and researchers in AI, decision theory, statistics, logic, philosophy, cognitive psychology, and the management sciences. Professionals in the areas of knowledge-based systems, operations research, engineering, and statistics will find theoretical and computational tools of immediate practical use. The book can also be used as an excellent text for graduate-level courses in AI, operations research, or applied probability.

Bayesian Networks and Decision Graphs

For almost 2,500 years, the Western concept of what is to be human has been dominated by the idea that the mind is the seat of reason - humans are, almost by definition, the rational animal. In this text a more radical suggestion for explaining these puzzling aspects of human reasoning is put forward.

Probabilistic Reasoning in Intelligent Systems

This is a brand new edition of an essential work on Bayesian networks and decision graphs. It is an introduction to probabilistic graphical models including Bayesian networks and influence diagrams. The reader is guided through the two types of frameworks with examples and exercises, which also give instruction on how to build these models. Structured in two parts, the first section focuses on probabilistic graphical models, while the second part deals with decision graphs, and in addition to the frameworks described in the previous edition, it also introduces Markov decision process and partially ordered decision problems.

Probabilistic Inductive Logic Programming

Written by one of the preeminent researchers in the field, this book provides a comprehensive exposition of modern analysis of causation. It shows how causality has grown from a nebulous concept into a mathematical theory with significant applications in the fields of statistics, artificial intelligence, economics, philosophy, cognitive science, and the health and social sciences. Judea Pearl presents and unifies the probabilistic, manipulative, counterfactual, and structural approaches to causation and devises simple mathematical tools for studying the relationships between causal connections and statistical associations. Cited in more than 2,100 scientific publications, it continues to liberate scientists from the traditional molds of statistical thinking. In this revised edition, Judea Pearl elucidates thorny issues, answers readers' questions, and offers a panoramic view of recent advances in this field of research. Causality will be of interest to students and professionals in a wide variety of fields. Dr Judea Pearl has received the 2011 Rumelhart Prize for his leading research

in Artificial Intelligence (AI) and systems from The Cognitive Science Society.

Computational Learning and Probabilistic Reasoning

Uncertainty in Artificial Intelligence contains the proceedings of the Ninth Conference on Uncertainty in Artificial Intelligence held at the Catholic University of America in Washington, DC, on July 9-11, 1993. The papers focus on methods of reasoning and decision making under uncertainty as applied to problems in artificial intelligence (AI) and cover topics ranging from knowledge acquisition and automated model construction to learning, planning, temporal reasoning, and machine vision. Comprised of 66 chapters, this book begins with a discussion on causality in Bayesian belief networks before turning to a decision theoretic account of conditional ought statements that rectifies glaring deficiencies in classical deontic logic and forms a sound basis for qualitative decision theory. Subsequent chapters explore trade-offs in constructing and evaluating temporal influence diagrams; normative engineering risk management systems; additive belief-network models; and sensitivity analysis for probability assessments in Bayesian networks. Automated model construction and learning as well as algorithms for inference and decision making are also considered. This monograph will be of interest to both students and practitioners in the fields of AI and computer science.

Artificial Intelligence

Textbook offers an accessible account of the theoretical foundations and computational methods that underlie plausible reasoning under uncertainty. For graduate-level courses in AI, operations research, and applied probability. Annotation copyright Book News, Inc. Portland, Or.

Contemporary Artificial Intelligence

This book provides a thorough introduction to the formal foundations and practical applications of Bayesian networks. It provides an extensive discussion of techniques for building Bayesian networks that model real-world situations, including techniques for synthesizing models from design, learning models from data, and debugging models using sensitivity analysis. It also treats exact and approximate inference algorithms at both theoretical and practical levels. The author assumes very little background on the covered subjects, supplying in-depth discussions for theoretically inclined readers and enough practical details to provide an algorithmic cookbook for the system developer.

Causality

The first edition of this popular textbook, Contemporary Artificial Intelligence, provided an accessible and student friendly introduction to AI. This fully revised and expanded update, Artificial Intelligence: With an Introduction to Machine Learning, Second Edition, retains the same accessibility and problem-solving approach, while providing new material and methods. The book is divided into five sections that focus on the most useful techniques that have emerged from AI. The first section of the book covers logic-based methods, while the second section focuses on probability-based methods. Emergent intelligence is featured in the third section and explores evolutionary computation and methods based on swarm intelligence. The newest section comes next and provides a detailed overview of neural networks and deep learning. The final section of the book focuses on natural language understanding. Suitable for undergraduate and beginning graduate students, this class-tested textbook provides students and other readers with key AI methods and algorithms for solving challenging problems involving systems that behave intelligently in specialized domains such as medical and software diagnostics, financial decision making, speech and text recognition, genetic analysis, and more.

Learning Bayesian Networks

The work reviewed in this book represents the synthesis of two important developments in modelling of complex stochastic phenomena. The book gives a thorough and rigorous mathematical treatment of the underlying ideas, structures, and algorithms.

Probabilistic Logic Networks

Bayesian networks currently provide one of the most rapidly growing areas of research in computer science and statistics. In compiling this volume we have brought together contributions from some of the most prestigious researchers in this field. Each of the twelve chapters is self-contained. Both theoreticians and application scientists/engineers in the broad area of artificial intelligence will find this volume valuable. It also provides a useful sourcebook for Graduate students since it shows the direction of current research.

Probabilistic Reasoning in Intelligent Systems

This book constitutes the refereed proceedings of the 13th International Conference on Artificial Intelligence and Symbolic Computation, AISC 2018, held in Suzhou, China, in September 2018. The 13 full papers presented together with 5 short and 2 invited papers were carefully reviewed and selected from 31 submissions. The AISC conference is an important forum when it comes to ensuring that ideas, theoretical insights, methods and results from traditional AI can be discussed and showcased, while fostering new links with other areas of AI such as probabilistic reasoning and deep learning.

Innovations in Bayesian Networks

This book serves as a textbook or reference for anyone with an interest in probabilistic modeling in the fields of computer science, computer engineering, and electrical engineering. This text is also a resource for courses on expert systems, machine learning, and artificial intelligence. Beginning with a basic theoretical introduction, the author then provides a discussion of inference, methods of learning, and applications based on Bayesian networks and beyond.

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