Expert Systems Principles And Programming Third Edition

The most popular basic introduction to Expert Systems is revised and updated to include new information on blackboard systems and has extended coverage of reasoning.

Building expert systems; Evaluating an expert system; Expert system tools; A typical problem for expert systems; Transcripts ilustrating the operation of prototype expert systems for the spill crisis-management application.

The genomic approach of technology development and large-scale generation of community resource data sets has introduced an important new dimension in biological and biomedical research. Interwoven advances in genetics, comparative genomics, high throughput biochemistry and bioinformatics are combining to attack basic understanding of human life and disease and to develop strategies to combat disease. Genomic research began with The Human Genome Project (HGP), the international research effort that determined the DNA sequence of the entire human genome, completed in April 2003. The HGP also included efforts to characterise and sequence the entire genomes of several other organisms, many of which are used extensively in biological research. Identification of the sequence or function of genes in a model organism is an important approach to finding and elucidating the function of human genes. Integral to the HGP are similar efforts to understand the genomes of various organisms commonly used in biomedical research, such as mice, fruit flies and roundworms. Such organisms are called "model organisms," because they can often serve as research models for how the human organism behaves. This book presents the latest advances in this fast-moving field.

Expert system technology is receiving increasing popularity and acceptance in the engineering community. This is due to the fact that there actually exists a close match between the capabilities of the current generation expert systems and the requirements of engineering practice. Prepared by a distinguished team of experts, this book provides a balanced state-of-the-art presentation of the design principles of engineering expert systems, and a representative picture of their capabilities to assist efficiently the design, diagnosis and operation of complex industrial plants. Among the application areas covered are the following: hardware synthesis, industrial plant layout design, fault diagnosis, process control, image analysis, computer communication, electric power systems, intelligent control, robotics, and manufacturing systems. The book is appropriate for the researcher and the professional. The researcher can save considerable time in searching the scattered technical information on engineering expert systems. The professional can have readily available a rich set of guidelines and techniques that are applicable to a wide class of engineering domains.

This book is dedicated to intelligent systems of broad-spectrum application, such as personal and social biosafety or use of intelligent sensory micro-nanosystems such as "e-nose", "e-tongue" and "e-eye". In addition to that, effective acquiring information, knowledge management and improved knowledge transfer in any media, as well as modeling its information content using meta- and hyper heuristics and semantic reasoning all benefit from the systems covered in this book. Intelligent systems can also be applied in education and generating the intelligent distributed eLearning architecture, as well as in a large number of technical fields, such as industrial design, manufacturing and utilization, e.g., in precision agriculture, cartography, electric power distribution systems, intelligent building management systems, drilling operations etc. Furthermore, decision making using fuzzy logic models, computational recognition of comprehension uncertainty and the joint synthesis of goals and means of intelligent behavior biosystems, as well as diagnostic and human support in the healthcare environment have also been made easier. The new edition of this market-leading text builds upon the blend of expert systems theory and application established in earlier editions.

This new edition provides a comprehensive, colorful, up-to-date, and accessible presentation of AI without sacrificing theoretical foundations. It includes numerous examples, applications, full color images, and human interest boxes to enhance student interest. New chapters on robotics and machine learning are now included. Advanced topics cover neural nets, genetic algorithms, natural language processing, planning, and complex board games. A companion DVD is provided with resources, applications, and figures from the book. Numerous instructors' resources are available upon adoption. eBook Customers: Companion files are available for downloading with order number/proof of purchase by writing to the publisher at info@merclearning.com.

FEATURES: • Includes new chapters on robotics and machine learning and new sections on speech understanding and metaphor in NLP • Provides a comprehensive, colorful, up to date, and accessible presentation of AI without sacrificing theoretical foundations • Uses numerous examples, applications, full color images, and human interest boxes to enhance student interest • Introduces important AI concepts e.g., robotics, use in video games, neural nets, machine learning, and more thorough practical applications • Features over 300 figures and color images with worked problems detailing AI methods and solutions to selected exercises • Includes DVD with resources, simulations, and figures from the book • Provides numerous instructors' resources, including: solutions to exercises, Microsoft PP slides, etc.

Offering an introduction to the field of expert/knowledge based systems, this text covers current and emerging trends as well as future research areas. It considers both the system shell and programming environment approaches to expert system development.;College or university bookshops may order five or more copies at a special student price. Price is available on request.

Jess in Action first introduces rule programming concepts and teaches you the Jess language. Armed with this knowledge, you then progress through a series of fully-developed applications chosen to expose you to practical rule-based development. The book shows you how you can add power and intelligence to your Java software.

Artificial intelligence (AI) is the part of computer science concerned with designing intelligent computer systems (systems that exhibit characteristics we associate with intelligence in human behavior). This book is the first published textbook of AI in chemical engineering, and provides broad and in-depth coverage of AI programming, AI principles, expert systems, and neural networks in chemical engineering. This book introduces the computational means and methodologies that are used to enable computers to perform intelligent engineering tasks. A key goal is to move beyond the principles of AI into its applications in chemical engineering. After reading this book, a chemical engineer will have a firm grounding in AI, know what chemical engineering applications of AI exist today, and understand the current challenges facing AI in engineering. Allows the reader to learn AI quickly using inexpensive personal computers Contains a large number of illustrative examples, simple exercises, and complex practice problems and solutions Includes a computer diskette for an illustrated case study Demonstrates an expert system for separation synthesis (EXSEP) Presents a detailed review of published literature on expert systems and neural networks in chemical engineering

This six-volume set presents cutting-edge advances and applications of expert systems. Because expert systems combine the expertise of engineers, computer scientists, and computer programmers, each

group will benefit from buying this important reference work. An "expert system" is a knowledge-based computer system that emulates the decision-making ability of a human expert. The primary role of the expert system is to perform appropriate functions under the close supervision of the human, whose work is supported by that expert system. In the reverse, this same expert system can monitor and double check the human in the performance of a task. Human-computer interaction in our highly complex world requires the development of a wide array of expert systems. Key Features * Expert systems techniques and applications are presented for a diverse array of topics including: * Experimental design and decision support * The integration of machine learning with knowledge acquisition for the design of expert systems * Process planning in design and manufacturing systems and process control applications * Knowledge discovery in large-scale knowledge bases * Robotic systems * Geograhphic information systems * Image analysis, recognition and interpretation * Cellular automata methods for pattern recognition * Real-time fault tolerant control systems * CAD-based vision systems in pattern matching processes * Financial systems * Agricultural applications * Medical diagnosis

Artificial Intelligence Illuminated presents an overview of the background and history of artificial intelligence, emphasizing its importance in today's society and potential for the future. The book covers a range of AI techniques, algorithms, and methodologies, including game playing, intelligent agents, machine learning, genetic algorithms, and Artificial Life. Material is presented in a lively and accessible manner and the author focuses on explaining how AI techniques relate to and are derived from natural systems, such as the human brain and evolution, and explaining how the artificial equivalents are used in the real world. Each chapter includes student exercises and review questions, and a detailed glossary at the end of the book defines important terms and concepts highlighted throughout the text.

Not long ago" Dennis Merritt wrote one of the best books that I know of about implementing expert systems in Prolog, and I was very glad he published it in our series. The only problem is there are still some unfortunate people around who do not know Prolog and are not sufficiently prepared either to read Merritt's book, or to use this extremely productive language, be it for knowledge-based work or even for everyday programming. Possibly this last statement may surprise you if you were under the impression that Prolog was an "artificial intelligence language" with very limited application potential. Please believe this editor's statement that quite the opposite is true: for at least four years, I have been using Prolog for every programming task in which I am given the option of choosing the language. Therefore, I 'am indeed happy that Dennis Merritt has written another good book on my language of choice, and that it meets the high standard he set with his prior book, Building Expert Systems in Prolog. All that remains for me to do is to wish you success and enjoyment when taking off on your Adventure in Prolog.

Paradigms of AI Programming is the first text to teach advanced Common Lisp techniques in the context of building major AI systems. By reconstructing authentic, complex AI programs using state-of-the-art Common Lisp, the book teaches students and professionals how to build and debug robust practical programs, while demonstrating superior programming style and important AI concepts. The author strongly emphasizes the practical performance issues involved in writing real working programs of significant size. Chapters on troubleshooting and efficiency are included, along with a discussion of the fundamentals of object-oriented programming and a description of the main CLOS functions. This volume is an excellent text for a course on AI programming, a useful supplement for general AI courses and an indispensable reference for the professional programmer.

Computational intelligence is a well-established paradigm, where new theories with a sound biological understanding have been evolving. The current experimental systems have many of the characteristics of biological computers (brains in other words) and are beginning to be built to perform a variety of tasks that are difficult or impossible to do with conventional computers. As evident, the ultimate achievement in this field would be to mimic or exceed human cognitive capabilities including reasoning, recognition, creativity, emotions, understanding, learning and so on. This book comprising of 17 chapters offers a step-by-step introduction (in a chronological order) to the various modern computational intelligence tools used in practical problem solving. Staring with different search techniques including informed and uninformed search, heuristic search, minmax, alpha-beta pruning methods, evolutionary algorithms and swarm intelligent techniques; the authors illustrate the design of knowledge-based systems and advanced expert systems, which incorporate uncertainty and fuzziness. Machine learning algorithms including decision trees and artificial neural networks are presented and finally the fundamentals of hybrid intelligent systems are also depicted. Academics, scientists as well as engineers engaged in research, development and application of computational intelligence techniques, machine learning and data mining would find the comprehensive coverage of this book invaluable.

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 areavailable 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 tothe identification, realization, and integration of problem-solving methods for the main problem classes of expert systems: classification (diagnostics), construction, and simulation.

Computing Methodologies -- Artificial Intelligence.

Describes the range of activities where expert systems can be employed for management decision-making, including: financial analysis; estimating casualty insurance losses; preparing income tax statements; sales and marketing support; quality assurance; crisis management; construction management; and contracting. Annotation copyrighted by Book News, Inc., Portland, OR

The first book to discuss efficient ways to implement the systems currently being developed--written by the co-author of Expert Systems: Artificial Intelligence in Business, generally regarded as the best non-technical guide to expert systems for business people. Gives innovative ideas for using expert systems to facilitate business operations.

Appropriate as a text or supplement for data base, decision support, or special-topic courses that cover expert systems. Clearly explains new applications of automatic decision-making in management, sales, operations, programming, research, and service industries. Text supported by extensive examples and graphs.

Digital Signal Processing in Power System Protection and Control bridges the gap between the theory of protection and control and the practical applications of protection equipment. Understanding how protection functions is crucial not only for equipment developers and manufacturers, but also for their users who need to install, set and operate the protection devices in an appropriate manner. After introductory chapters related to protection technology and functions, Digital Signal Processing in Power System Protection and Control presents the digital algorithms for signal filtering, followed by measurement algorithms of the most commonly-used protection criteria values and decision-making methods in protective relays. A large part of the book is devoted to the basic theory and applications of artificial intelligence techniques for protection and control. Fuzzy logic based schemes, artificial neural networks, expert systems and genetic algorithms with their advantages and drawbacks are discussed. AI techniques are compared and it is also shown how they can be combined to eliminate the disadvantages and magnify the useful features of particular techniques. The information provided in Digital Signal Processing in Power System Protection and Control can be useful for protection engineers working in utilities at various levels of the electricity network, as well as for students of electrical engineering, especially electrical power engineering. It may also be helpful for other readers who want to get acquainted with and to apply the filtering, measuring and decision-making algorithms for purposes other than protection and control, everywhere fast and on-line signal analysis is needed for proper functioning of the apparatus.

Focusing on fundamental scientific and engineering issues, this book communicates the principles of building and using knowledge systems from the conceptual standpoint as well as the practical. Previous treatments of knowledge systems have focused on applications within a particular field, or on symbol-level representations, such as the use of frame and rule representations. Introduction to Knowledge Systems presents fundamentals of symbol-level representations including representations for time, space, uncertainty, and vagueness. It also compares the knowledge-level organizations for three common knowledge-intensive tasks: classification, configuration, and diagnosis. The art of building knowledge systems incorporates computer science theory, programming practice, and psychology. The scope of this book is appropriately broad, ranging from the design of hierarchical search algorithms to techniques for acquiring the task-specific knowledge needed for successful applications. Each chapter proceeds from concepts to applications, and closes with a brief tour of current research topics and open issues. Readers will come away with a solid foundation that will enable them to create real-world knowledge systems using whatever tools and programming languages are most current and appropriate.

Covers all aspects of the Certified Information Systems Security Professional (CISSP) exam.

A concise practical introduction to the history, characteristics, structure, operation, and use of expert systems. Provides programmers with sufficient insight and guidance to enable them to construct an expert system shell using a favorite programming language. Shows how to develp and maintain expert systems, and how to tackle technical problems unique to the field. There's also advice on how to access new applications.

This volume contains the refereed and invited papers which were presented at Expert Systems 92, the twelfth annual conference of the British Computer Society's Specialist Group on Expert Systems, held in Cambridge in December 1992. Together with its predecessors this is essential reading for those who wish to keep up-to-date with developments and opportunities in this important field.

Computational Intelligence is tolerant of imprecise information, partial truth and uncertainty. This book presents a selected collection of contributions on a focused treatment of important elements of CI, centred on its key element: learning. This book presents novel applications and real world applications working in Manufacturing and Engineering, and it sets a basis for understanding Domotic and Production Methods of the XXI Century.

Presents a step-by-step methodology for designing expert systems. Each chapter on design methodology starts with a problem and leads the reader through the design of a system which solves that problem.

This volume collects the most recent papers on artificial intelligence (AI) and expert systems written at The Rand Corporation. Rand's leadershipin the field of AI started with the seminal work of Newell, Shaw, and Simon some thirty years ago and continues with recent work in expert systems and knowledge-based simulation. The first chapter in this volume provides a brief historical perspective of Rand's AI activity from its early days in the 1950s to its current efforts. Special attention is given to Rand's research during the past decade.

This text takes a broad view of the work going on in the development of user interfaces for expert systems and examines the expert system building process both in academic and industrial surroundings. The development of an expert system is viewed as containing three separate, but highly interacting components: knowledge capture, programming and debugging the system, and finally placing the system before an active user community. Some of the issues in each of the three components, the application of general human factors principles in the design of expert systems, the special needs in the design of expert systems, and the efficacy of these interfaces.

A self-contained tutorial on Z for working programmers discussing practical ways to apply formal methods in real projects, first published in 1997.

Expert systems allow scientists to access, manage, and apply data and specialized knowledge from various disciplines to their own research. Expert Systems in Chemistry Research explains the general scientific basis and computational principles behind expert systems and demonstrates how they can improve the efficiency of scientific workflows and support decision-making

processes. Focused initially on clarifying the fundamental concepts, limits, and drawbacks of using computer software to approach human decision making, the author also underscores the importance of putting theory into practice. The book highlights current capabilities for planning and monitoring experiments, scientific data management and interpretation, chemical characterization, problem solving, and methods for encoding chemical data. It also examines the challenges as well as requirements, strategies, and considerations for implementing expert systems effectively in an existing laboratory software environment. Expert Systems in Chemistry Research covers various artificial intelligence technologies used to support expert systems, including nonlinear statistics, wavelet transforms, artificial neural networks, genetic algorithms, and fuzzy logic. This definitive text provides researchers, scientists, and engineers with a cornerstone resource for developing new applications in chemoinformatics, systems design, and other emerging fields.

Artificial intelligence, or AI, is largely an experimental science--at least as much progress has been made by building and analyzing programs as by examining theoretical questions. MYCIN is one of several well-know programs that embody some intelligence and provide data on the extent to which intelligent behavior can be programmed. As with other AI programs, its development was slow and not always in a forward direction. The book shares the results of nearly a decade of work, the experiments performed, and present a coherent picture of the work. It presents a critical analysis of several pieces of related research, performed by a large number of scientists. The whole field of AI will benefit from detailed, retrospective examinations of experiments, for this is the way the scientific foundations of the field will gradually be defined. This is the reason this analysis of the MCYIN experiments is being offered to readers.

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