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This volume contains the refereed and invited papers from the eleventh annual conference of the British Computer Society's Specialist Group on Expert Systems, held in London in September 1991. The increasing complexity of our world demands new perspectives on the role of technology in decision making. Human decision making has its limitations in terms of information-processing capacity. We need new technology to cope with the increasingly complex and information-rich nature of our modern society. This is particularly true for critical environments such as crisis management and traffic management, where humans need to engage in close collaborations with artificial systems to observe and understand the situation and respond in a sensible way. We believe that close collaborations between humans and artificial systems will become essential and that the importance of research into Interactive Collaborative Information Systems (ICIS) is self-evident. Developments in information and communication technology have radically changed our working environments. The vast amount of information available nowadays and the wirelessly networked nature of our modern society open up new opportunities to handle difficult decision-making situations such as computer-supported situation assessment and distributed decision making. To make good use of these new possibilities, we need to update our traditional views on the role and capabilities of information systems. The aim of the Interactive Collaborative Information Systems project is to develop techniques that support humans in complex information environments and that facilitate distributed decision-making capabilities. ICIS emphasizes the importance of building actor-agent communities: close collaborations between human and artificial actors that highlight their complementary capabilities, and in which task distribution is flexible and adaptive. This book is about the development of knowledge-based, and related, expert systems in chemistry and toxicology. It shows how computers can work with

qualitative information where precise numerical methods are not satisfactory. As well as explaining to a reader with a knowledge of chemistry how the computer programs work, the book provides insights into how personal and political factors influence scientific progress. It provides an understanding of how predictions and judgements are being made without depending on numerical methods. It provides an excellent introduction to an exciting area of computing in chemistry which is rapidly gaining importance and will be of interest to students of all levels, scientists and academics affiliated to or working in this area. 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. The Database and Expert Systems Applications (DEXA) conferences have established themselves as a platform for bringing together researchers and practitioners from various backgrounds and all regions of the world to exchange ideas, experiences and opinions in a friendly and stimulating environment. The papers presented at the conference represent recent developments in the field and important steps towards shaping the future of applied computer science and information systems. DEXA covers a broad field: all aspects of databases, knowledge based systems, knowledge management, web-based systems, information systems, related technologies and their applications. Once again there were a good number of submissions: out of 183 papers that were submitted, the program committee selected 92 to be presented. In the first year of this new millennium DEXA has come back to the United Kingdom, following events in Vienna, Berlin, Valencia, Prague, Athens, London, Zurich, Toulouse, Vienna and Florence. The past decade has seen several revolutionary developments, one of which was the explosion of Internet-related applications in the areas covered by DEXA, developments in which DEXA has played a role and in which DEXA will continue to play a role in its second decade, starting with this conference. The aim of this book is to educate the readers regarding expert systems. Intelligent systems aka expert systems fulfill the purpose of their name in the way that they act as facilitators in this procedure. These are systems that are based on specialist information on any topic in order to emulate human capability in the exact field. To attain this information, the knowledge experts, also called software engineers, require expanding of methodologies for intelligent systems. In this field there is still no unified methodology that supplies efficient techniques and tools to facilitate any new advancement. This book constitutes the refereed proceedings of the 22 International Conference on Database and Expert Systems Applications, DEXA 2011, held in Toulouse, France, August 29 - September 2, 2011. The 52 revised full papers and 40 short papers presented were carefully reviewed and selected from 207 submissions. The papers are organized in topical sections on XML querying and views; data mining; queries and search; semantic web; information retrieval; business applications; user support; indexing; queries, views and data warehouses; ontologies; physical aspects of databases; Design; distribution; miscellaneous topics. This text is a reprint of the seminal 1989 book Probabilistic Reasoning in Expert systems: Theory and Algorithms, which helped serve to create the field we now call Bayesian networks. It introduces the properties of Bayesian networks (called causal networks in the text), discusses algorithms for doing inference in Bayesian networks, covers abductive inference, and provides an introduction to decision analysis. Furthermore, it compares rule-based experts systems to ones based on Bayesian networks, and it introduces the frequentist and Bayesian approaches to probability. Finally, it provides a critique of the maximum entropy formalism. Probabilistic Reasoning in Expert Systems was written from the perspective of a mathematician with the emphasis being on the development of theorems and algorithms. Every effort was made to make the material accessible. There are ample examples throughout the text. This text is important reading for anyone interested in both the fundamentals of Bayesian networks and in the history of how they came to be. It also provides an insightful comparison of the two most prominent approaches to probability. Probabilistic expert systems are graphical networks which support the modeling of uncertainty and decisions in large complex domains, while retaining ease of calculation. Building on original research by the authors, this book gives a thorough and rigorous mathematical treatment of the underlying ideas, structures, and algorithms. The book will be of interest to researchers in both artificial intelligence and statistics, who desire an introduction to this fascinating and rapidly developing field. The book, winner of the

DeGroot Prize 2002, the only book prize in the field of statistics, is new in paperback. Possessing great potential power for gathering and managing data in chemistry, biology, and other sciences, Artificial Intelligence (AI) methods are prompting increased exploration into the most effective areas for implementation. A comprehensive resource documenting the current state-of-the-science and future directions of the field is required to Crash Course in Digital Technology teaches the basics of digital electronics theory and circuits in an easy-to-understand format. Each chapter includes learning objectives, clear explanations and examples, and an end-of-chapter self-quiz. The drill-and-review software included with the book allows learners to test themselves on the contents of each chapter, providing a second reinforcement of the material. A final chapter teaches the basics of troubleshooting digital circuits. With the two other Crash Course books, Electronics Technology and Microprocessor Technology, this book forms a complete course in electronics and microcomputer technology appropriate for technical schools, industrial training, and hobbyists. Louis Frenzel is an experienced electronics engineer and educator, as well as the author of many magazine articles and texts. He is currently an instructor at Austin Community College in Austin, Texas. Drill-and-review software included Clear, easy format Self-paced introduction to digital electronics This introduction to the design of expert systems is written in an easy-to-read style and offers practical examples for each new topic presented. Emphasis is less on the intricacies of programming language, more on explanation. Defines what expert systems are, and discusses knowledge representation and inference. Chapters also cover logic, two-valued inference, inexact and semi-exact reasoning, advanced tools and topics, and draw on studies of human cognition to motivate technical definitions. Each chapter has an introduction and a summary, and provides suggestions for further reading. Contains student projects. Probabilistic expert systems are graphical networks which support the modeling of uncertainty and decisions in large complex domains, while retaining ease of calculation. Building on original research by the authors, this book gives a thorough and rigorous mathematical treatment of the underlying ideas, structures, and algorithms. The book will be of interest to researchers in both artificial intelligence and statistics, who desire an introduction to this fascinating and rapidly developing field. The book, winner of the DeGroot Prize 2002, the only book prize in the field of statistics, is new in paperback. Bestselling British master of science fiction Adrian Tchaikovsky brings readers a new, mind-expanding science fantasia in *The Expert System's Brother* After an unfortunate accident, Handry is forced to wander a world he doesn't understand, searching for meaning. He soon discovers that the life he thought he knew is far stranger than he could even possibly imagine. Can an unlikely saviour provide the answers to the questions he barely comprehends? At the Publisher's request, this title is being sold without Digital Rights Management Software (DRM) applied. This book is designed to identify some of the current applications and techniques of artificial intelligence as an aid to solving problems and accomplishing tasks. It provides a general introduction to the various branches of AI which include formal logic, reasoning, knowledge engineering, expert systems, neural networks, and fuzzy logic, etc. The book has been structured into five parts with an emphasis on expert systems: problems and state space search, knowledge engineering, neural networks, fuzzy logic, and Prolog. Features: Introduces the various branches of AI which include formal logic, reasoning, knowledge engineering, expert systems, neural networks, and fuzzy logic, etc. Includes a separate chapter on Prolog to introduce basic programming techniques in AI Exact and inexact reasoning in knowledge engineering; Fuzzy sets; knowledge representation; Aproximate reasoning; Knowledge engineering in decision support systems; Knowledge engineering in management expert systems; The categorial analysis of logic; Bibliography; Index. A boy & his grandparents live near a cursed wood. the boy longs for a dog - but the ungainly creature found by his grandfather hardly fits his image of the perfect pet. But then the dog starts to grow human ears! Although the tenn quality does not have a precise and universally accepted definition, its meaning is generally well understood: quality is what makes the difference between success and failure in a competitive world. Given the importance of quality, there is a need for effective quality systems to ensure that the highest quality is achieved within given constraints on human, material or financial resources. This book discusses Intelligent Quality Systems,

that is quality systems employing techniques from the field of Artificial Intelligence (AI). The book focuses on two popular AI techniques, expert or knowledge-based systems and neural networks. Expert systems encapsulate human expertise for solving difficult problems. Neural networks have the ability to learn problem solving from examples. The aim of the book is to illustrate applications of these techniques to the design and operation of effective quality systems. The book comprises 8 chapters. Chapter 1 provides an introduction to quality control and a general discussion of possible AI-based quality systems. Chapter 2 gives technical information on the key AI techniques of expert systems and neural networks. The use of these techniques, singly and in a combined hybrid form, to realise intelligent Statistical Process Control (SPC) systems for quality improvement is the subject of Chapters 3-5. Chapter 6 covers experimental design and the Taguchi method which is an effective technique for designing quality into a product or process. The application of expert systems and neural networks to facilitate experimental design is described in this chapter. Software -- Programming Techniques. 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 constitutes the refereed proceedings of the workshops held at the 32nd International Conference on Database and Expert Systems Applications, DEXA 2021, held in a virtual format in September 2021: The 12th International Workshop on Biological Knowledge Discovery from Data (BIOKDD 2021), the 5th International Workshop on Cyber-Security and Functional Safety in Cyber-Physical Systems (IWCFS 2021), the 3rd International Workshop on Machine Learning and Knowledge Graphs (MLKgraphs 2021), the 1st International Workshop on Artificial Intelligence for Clean, Affordable and Reliable Energy Supply (AI-CARES 2021), the 1st International Workshop on Time Ordered Data (ProTime2021), and the 1st International Workshop on AI System Engineering: Math, Modelling and Software (AISys2021). Due to the COVID-19 pandemic the conference and workshops were held virtually. The 23 papers were thoroughly reviewed and selected from 50 submissions, and discuss a range of topics including: knowledge discovery, biological data, cyber security, cyber-physical system, machine learning, knowledge graphs, information retriever, data base, and artificial intelligence. We welcome you to the proceedings of the 21 International Conference on Database and Expert Systems Applications held in Bilbao. With information and database systems being a central topic of computer science, it was to be expected that the integration of knowledge, information and data is today contributing to the again rapidly increasing attractiveness of this field for researchers and practitioners. Since its foundation in 1990, DEXA has been an annual international conference, located in Europe, which showcases state-of-the-art research activities in these areas. DEXA 2010 continued this tradition and provided a forum for presenting and discussing research results in the area of database and intelligent systems and advanced search topics, applications and practically relevant issues related to these areas. It offered attendees the opportunity to extensively discuss requirements, problems, and solutions in the field in the pleasant atmosphere of the city of Bilbao, which is known for its driving industriousness, its top cultural venues and its rich and inspiring heritage and lifestyle. The University of Deusto with its great educational and research traditions, and the hospitality which the university and the city are so famous for, set the stage for this year's DEXA conference. This volume contains the papers selected for presentation at the DEXA conference. 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. 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
- * Geographic 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

What opportunities are there to apply expert systems, artificial intelligence, and knowledge representation technologies to metadata management? Expert systems: where are you? How do expert systems support the activities of managers? Why haven't expert systems totally replaced humans? Which of them can be supported by expert systems/neural networks/deep learning methodologies? This valuable Expert Systems self-assessment will make you the reliable Expert Systems domain master by revealing just what you need to know to be fluent and ready for any Expert Systems challenge. How do I reduce the effort in the Expert Systems work to be done to get problems solved? How can I ensure that plans of action include every Expert Systems task and that every Expert Systems outcome is in place? How will I save time investigating strategic and tactical options and ensuring Expert Systems costs are low? How can I deliver tailored Expert Systems advice instantly with structured going-forward plans? There's no better guide through these mind-expanding questions than acclaimed best-selling author Gerard Blokdyk. Blokdyk ensures all Expert Systems essentials are covered, from every angle: the Expert Systems self-assessment shows succinctly and clearly that what needs to be clarified to organize the required activities and processes so that Expert Systems outcomes are achieved. Contains extensive criteria grounded in past and current successful projects and activities by experienced Expert Systems practitioners. Their mastery, combined with the easy elegance of the self-assessment, provides its superior value to you in knowing how to ensure the outcome of any efforts in Expert Systems are maximized with professional results. Your purchase includes access details to the Expert Systems self-assessment dashboard download which gives you your dynamically prioritized projects-ready tool and shows you exactly what to do next. Your exclusive instant access details can be found in your book. You will receive the following contents with New and Updated specific criteria: - The latest quick edition of the book in PDF - The latest complete edition of the book in PDF, which criteria correspond to the criteria in... - The Self-Assessment Excel Dashboard - Example pre-filled Self-Assessment Excel Dashboard to get familiar with results generation - In-depth and specific Expert Systems Checklists - Project management checklists and templates to assist with implementation **INCLUDES LIFETIME SELF ASSESSMENT UPDATES** Every self assessment comes with Lifetime Updates and Lifetime Free Updated Books. Lifetime Updates is an industry-first feature which allows you to receive verified self assessment updates, ensuring you always have the most accurate information at your fingertips. Artificial intelligence and expert systems have seen a great deal of research in recent years, much of which has

been devoted to methods for incorporating uncertainty into models. This book is devoted to providing a thorough and up-to-date survey of this field for researchers and students. 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-known 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 MYCIN experiments is being offered to readers. Abstract: "We introduce a methodology for performing approximate computations in very complex probabilistic systems (e.g. huge pedigrees). Our approach, called blocking Gibbs, combines exact local computations with Gibbs sampling in a way that complements the strengths of both. The methodology is illustrated on a real-world problem involving a heavily inbred pedigree containing 20,000 individuals. We present results showing that blocking-Gibbs sampling converges much faster than Gibbs sampling for very complex problems." This book contains the refereed proceedings of the 8th International Conference on Database and Expert Systems Applications, DEXA '97, held in Toulouse, France, September 1997. The 62 revised full papers presented in the book, together with three invited contributions, were selected from a total of 159 submissions. The papers are organized in sections on modeling, object-oriented databases, active and temporal aspects, images, integrity constraints, multimedia databases, deductive databases and knowledge-based systems, allocation concepts, data interchange, digital libraries, transaction concepts, learning issues, optimization and performance, query languages, maintenance, federated databases, uncertainty handling and qualitative reasoning, and software engineering and reusable software. "This book addresses the development of a new generation of systems, Knowledge Base Management Systems (KBMS), specially constructed for effective and efficient management of knowledge bases, with the aim of filling part of the technological gap between artificial intelligence and databases. The book first investigates in detail the design process, the architecture, and the working methods of knowledge based systems (KS) in order to point out the key characteristics of the field as well as its current limitations, which serve then as basis for an exact formulation of KS requirements. An analysis and evaluation of other approaches (e.g., conventional DBS, non-standard DBS, coupling expert systems and DBS) to knowledge management is given. The book shows that in developing KBMS, the experience obtained by the investigation of each of these approaches is extremely important since they provide the basic concepts for building KBMS. The approaches should not be viewed as complete and final but as part of research work towards KBMS. A novel architecture is described for KBMS which integrates the functionality, flexibility and modeling power of DBS and AI. The main part of the book deals with all important architectural problems of KBMS: methods for knowledge representation with special emphasis on abstraction concepts, language proposals, and concepts for performance improvement. The book is based on practical experience accumulated over five years of successful research in coupling existing expert systems and DBS, extending DBS with deductive capabilities, and above all in the design and implementation of a KBMS prototype. Thus the book's proposals are illustrated with detailed descriptions of their realization in existing systems or prototypes."--PUBLISHER'S WEBSITE. 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. This book constitutes the refereed proceedings of

the 19th International Conference on Database and Expert Systems Applications, DEXA 2008, held in Turin, Italy, in September 2008. The 74 revised full papers presented together with 1 invited paper were carefully reviewed and selected from 208 submissions. The papers are organized in topical sections on data privacy; temporal, spatial and high dimensional databases; semantic Web and ontologies; query processing; Web and information retrieval; mobile data and information; data and information streams; data mining algorithms; multimedia databases; data mining systems, data warehousing, OLAP; data and information semantics; XML databases; applications of database, information, and decision support systems; and schema, process and knowledge modelling and evolution. This book focuses on the pioneering applications of an expert system in development relate to agriculture in many of the developing countries, introducing the reader to some of the key concepts underlying most expert systems. Describes some of the expert systems being developed for applications in the telecommunications field--capturing the knowledge and professional experience of the telecommunications experts. Written by leading authorities in expert systems applications, the book addresses: network and spectrum management, local area networks, configuration; monitoring and control, and scheduling of satellite experimenter requests. Material is logically divided according to three issues. Part 1 deals with case studies where expert systems have been developed for telecommunications. The second section discusses methodologies that could be used specifically for building telecommunications. The third part deals with potential areas in telecommunications for applications in expert system development. Combines the study of neural networks and fuzzy systems with symbolic artificial intelligence (AI) methods to build comprehensive AI systems. Describes major AI problems (pattern recognition, speech recognition, prediction, decision-making, game-playing) and provides illustrative examples. Includes applications in engineering, business and finance. Throughout the industry, financial institutions seek to eliminate cumbersome authentication methods, such as PINs, passwords, and security questions, as these antiquated tactics prove increasingly weak. Thus, many organizations now aim to implement emerging technologies in an effort to validate identities with greater certainty. The near instantaneous nature of online banking, purchases, transactions, and payments puts tremendous pressure on banks to secure their operations and procedures. In order to reduce the risk of human error in financial domains, expert systems are seen to offer a great advantage in big data environments. Besides their efficiency in quantitative analysis such as profitability, banking management, and strategic financial planning, expert systems have successfully treated qualitative issues including financial analysis, investment advisories, and knowledge-based decision support systems. Due to the increase in financial applications' size, complexity, and number of components, it is no longer practical to anticipate and model all possible interactions and data processing in these applications using the traditional data processing model. The emergence of new research areas is clear evidence of the rise of new demands and requirements of modern real-life applications to be more intelligent. This book provides an exhaustive review of the roles of expert systems within the financial sector, with particular reference to big data environments. In addition, it offers a collection of high-quality research that addresses broad challenges in both theoretical and application aspects of intelligent and expert systems in finance. The book serves to aid the continued efforts of the application of intelligent systems that respond to the problem of big data processing in a smart banking and financial environment. This two volume set of LNCS 11029 and LNCS 11030 constitutes the refereed proceedings of the 29th International Conference on Database and Expert Systems Applications, DEXA 2018, held in Regensburg, Germany, in September 2018. The 35 revised full papers presented together with 40 short papers were carefully reviewed and selected from 160 submissions. The papers of the first volume discuss a range of topics including: Big data analytics; data integrity and privacy; decision support systems; data semantics; cloud data processing; time series data; social networks; temporal and spatial databases; and graph data and road networks. The papers of the second volume discuss a range of the following topics: Information retrieval; uncertain information; data warehouses and recommender systems; data streams; information networks and algorithms; database system architecture and performance; novel database solutions; graph querying

and databases; learning; emerging applications; data mining; privacy; and text processing. In this book the consequent use of probability theory is proposed for handling uncertainty in expert systems. It is shown that methods violating this suggestion may have dangerous consequences (e.g., the Dempster-Shafer rule and the method used in MYCIN). The necessity of some requirements for a correct combining of uncertain information in expert systems is demonstrated and suitable rules are provided. The possibility is taken into account that interval estimates are given instead of exact information about probabilities. For combining information containing interval estimates rules are provided which are useful in many cases. The 12th DEXA 2001, the 12 International Conference on Database and Expert Systems Applications was held on September 3–5, 2001, at the Technical University of Munich, Germany. The rapidly growing spectrum of database applications has led to the establishment of more specialized discussion platforms (DaWaK conference, EC Web conference, and DEXA workshop), which were all held in parallel with the DEXA conference in Munich. In your hands are the results of much effort, beginning with the preparation of the submitted papers. The papers then passed through the reviewing process, and the accepted papers were revised to final versions by their authors and arranged with the conference program. All this culminated in the conference itself. A total of 175 papers were submitted to this conference, and I would like to thank all the authors. They are the real base of the conference. The program committee and the supporting reviewers produced altogether 497 referee reports, on average of 2.84 reports per paper, and selected 93 papers for presentation. Comparing the weight or more precisely the number of papers devoted to particular topics at several recent DEXA conferences, an increase can be recognized in the areas of XMS databases, active databases, and multi and hypermedia efforts. The space devoted to the more classical topics such as information retrieval, distribution and Web aspects, and transaction, indexing and query aspects has remained more or less unchanged. Some decrease is visible for object orientation.

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