

Programming Expert Systems In Ops5 An Introduction To Rule Based Programming The Addison Wesley Series In Artificial Intelligence

This is the third book presenting selected results of research on the further development of the shape understanding system (SUS) carried out by authors in the newly founded Queen Jadwiga Research Institute of Understanding. In this book the new term Machine Understanding is introduced referring to a new area of research aiming to investigate the possibility of building machines with the ability to understand. It is presented that SUS needs to some extent mimic human understanding and for this reason machines are evaluated according to the rules applied for the evaluation of human understanding. The book shows how to formulate problems and how it can be tested if the machine is able to solve these problems.

Structural safety of industrial systems and components raises a steadily growing public, scientific and engineering interest, and causes permanent development of methods and techniques used for its assessment. In addition to the well established engineering methods, applied in the field, several new methods and tools have emerged recently. Among them, the most novel ones are probably those related to expert system applications, appearing as an important possible improvement of the current engineering practice. The issue has been addressed by the international course EXPERT SYSTEMS IN STRUCTURAL SAFETY ASSESSMENT organized by MPA Stuttgart and JRC Ispra (Stuttgart, October 2-4, 1989), and the proceedings of the course are contained in this volume of the Lecture Notes in Engineering. The contributions (invited lectures) tackle the issues usually confronting developers and users of expert systems applied in structural engineering, i.e. in structural safety and integrity assessment. Both the book and the course are a combination of a tutorial and of presentation of the current achievements in the field. Starting from the basic elements of expert systems (knowledge based systems), the book should "guide" the reader up to the applications in various particular sub-domains.

Expert Systems in Construction and Structural Engineering is a valuable reference both for researchers interested in the state-of-the-art of civil engineering expert systems, and practitioners interested in exploring the practical applications of this new technology.

This book is written for software engineers, software project leaders, and software managers who would like to introduce a new advanced software technology, expert systems, into their product. Expert system technology brings into programming a new dimension in which "rule of thumb" or heuristic expert knowledge is encoded in the program. In contrast to conventional procedural languages {e. g. , Fortran or C}, expert systems employ high-level programming languages {Le. , expert system shells} that enable us to capture the judgmental

knowledge of experts such as geologists, doctors, lawyers, bankers, or insurance underwriters. Past expert systems have been more successfully applied in the problem areas of analysis and synthesis where the boundary of knowledge is well defined and where experts are available and can be identified. Early successful applications include diagnosis systems such as MYCIN, geological systems such as PROSPECTOR, or design/configuration systems such as XCON. These early expert systems were mainly applicable to scientific and engineering problems, which are not theoretically well understood in terms of decisionmaking processes by their experts and which therefore require judgmental assessment. The more recent expert systems are being applied to sophisticated synthesis problems that involve a large number of choices, such as how the elements are to be compared. These problems normally entailed a large search space and slower speed for the expert systems designed. Examples of these systems include factory scheduling applications such as ISIS, or legal reasoning applications such as TAXMAN.

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.

This is a combination introductory and reference manual for OPS5, a programming language for production systems. OPS5 is used primarily for applications in the areas of artificial intelligence, cognitive psychology, and expert systems. OPS5 interpreters have been implemented in LISP and BLISS. (Author).

Problem solving is a central topic for both cognitive psychology and artificial intelligence (AI). Psychology seeks to analyze naturally occurring problem solving into hypothetical processes, while AI seeks to synthesize problem-solving performance from well-defined processes. Psychology may suggest possible

processes to AI and, in turn, AI may suggest plausible hypotheses to psychology. It should be useful for both sides to have some idea of the other's contribution—hence this book, which brings together overviews of psychological and AI research in major areas of problem solving. At a more general level, this book is intended to be a contribution toward comparative cognitive science. Cognitive science is the study of intelligent systems, whether natural or artificial, and treats both organisms and computers as types of information-processing systems. Clearly, humans and typical current computers have rather different functional or cognitive architectures. Thus, insights into the role of cognitive architecture in performance may be gained by comparing typical human problem solving with efficient machine problem solving over a range of tasks. Readers may notice that there is little mention of connectionist approaches in this volume. This is because, at the time of writing, such approaches have had little or no impact on research at the problem solving level. Should a similar volume be produced in ten years or so, of course, a very different story may need to be told.

AI expert and consultant William Taylor provides a practical explanation of the parts of AI research that are ready for use by anyone with an engineering degree and that can help engineers do their jobs better.

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.

This volume contains the papers selected for presentation at a symposium on methodologies for intelligent systems. The main topics were approximate reasoning, expert systems, intelligent databases, knowledge representation, learning and adaptive systems, and logic for artificial intelligence.

The world of microelectronics is filled with cusses measurement systems, manufacturing many success stories. From the use of semi control techniques, test, diagnostics, and fail ure analysis. It discusses methods for modeling conductors for powerful desktop computers to their use in maintaining optimum engine per and reducing defects, and for preventing de formance in modem automobiles, they have fects in the first place. The approach described, clearly improved our daily lives. The broad while geared to the microelectronics world, has useability of the technology is enabled, how applicability to any manufacturing process of similar complexity. The authors comprise some ever, only by the progress made in reducing their cost and improving their reliability. De of the best scientific minds in the world, and fect reduction receives a significant focus in our are practitioners of the art. The information modem

manufacturing world, and high-quality captured here is world class. I know you will find the material to be an excellent reference in of product failures enables step func Analysis your application. tion improvements in yield and reliability. which works to reduce cost and open up new Dr. Paul R. Low applications and technologies. IBM Vice President and This book describes the process of defect re of Technology Products General Manager duction in the microelectronics world.

This volume investigates our ability to capture, and then apply, expertise. In recent years, expertise has come to be regarded as an increasingly valuable and surprisingly elusive resource. Experts, who were the sole active dispensers of certain kinds of knowledge in the days before AI, have themselves become the objects of empirical inquiry, in which their knowledge is elicited and studied -- by knowledge engineers, experimental psychologists, applied psychologists, or other experts -- involved in the development of expert systems. This book achieves a marriage between experimentalists, applied scientists, and theoreticians who deal with expertise. It envisions the benefits to society of an advanced technology for capturing and disseminating the knowledge and skills of the best corporate managers, the most seasoned pilots, and the most renowned medical diagnosticians. This book should be of interest to psychologists as well as to knowledge engineers who are "out in the trenches" developing expert systems, and anyone pondering the nature of expertise and the question of how it can be elicited and studied scientifically. The book's scope and the pivotal concepts that it elucidates and appraises, as well as the extensive categorized bibliographies it includes, make this volume a landmark in the field of expert systems and AI as well as the field of applied experimental psychology.

It is quite an onerous task to edit the proceedings of a two week long institute with learned contributors from many parts of the world. All the same, the editorial team has found the process of refereeing and reviewing the contributions worthwhile and completing the volume has proven to be a satisfying task. In setting up the institute we had considered models and methods taken from a number of different disciplines. As a result the whole institute - preparing for it, attending it and editing the proceedings - proved to be an intense learning experience for us. Here I speak on behalf of the committee and the editorial team. By the time the institute took place, the papers were delivered and the delegates exchanged their views, the structure of the topics covered and their relative positioning appeared in a different light. In editing the volume I felt compelled to introduce a new structure in grouping the papers. The contents of this volume are organised in eight main sections set out below: 1 . Abstracts. 2. Review Paper. 3. Models with Multiple Criteria and Single or Multiple Decision Makers. 4. Use of Optimisation Models as Decision Support Tools. 5. Role of Information Systems in Decision Making: Database and Model Management Issues. 6. Methods of Artificial Intelligence in Decision Making: Intelligent Knowledge Based Systems. 7. Representation of Uncertainty in Mathematical

Models and Knowledge Based Systems. 8. Mathematical Basis for Constructing Models and Model Validation.

Keeping up with constant changes and innovations puts a lot of pressure on information providers and users to continuously upgrade their knowledge and skill. This change means being flexible enough to recognize that the knowledge you receive today must be constantly updated. This book will provide readers with the latest research findings and managerial experiences on a variety of technological innovations of IT.

presents a unified and in-depth development of neural network learning algorithms and neural network expert systems

This volume contains the 5 invited papers and 72 selected papers that were presented at the Fifth International Conference on Industrial and Engineering Applications of Artificial Intelligence. This is the first IEA/AIE conference to take place outside the USA: more than 120 papers were received from 23 countries, clearly indicating the international character of the conference series. Each paper was reviewed by at least three referees. The papers are grouped into parts on: CAM, reasoning and modelling, pattern recognition, software engineering and AI/ES, CAD, vision, verification and validation, neural networks, machine learning, fuzzy logic and control, robotics, design and architecture, configuration, finance, knowledge-based systems, knowledge representation, knowledge acquisition and language processing, reasoning and decision support, intelligent interfaces/DB and tutoring, fault diagnosis, planning and scheduling, and data/sensor fusion.

Programming Expert Systems in OPS5 An Introduction to Rule-based Programming Addison Wesley Publishing Company

This book provides a comprehensive presentation of artificial intelligence (AI) methodologies and tools valuable for solving a wide spectrum of engineering problems. What's more, it offers these AI tools on an accompanying disk with easy-to-use software. Artificial Intelligence and Expert Systems for Engineers details the AI-based methodologies known as: Knowledge-Based Expert Systems (KBES); Design Synthesis; Design Critiquing; and Case-Based Reasoning. KBES are the most popular AI-based tools and have been successfully applied to planning, diagnosis, classification, monitoring, and design problems. Case studies are provided with problems in engineering design for better understanding of the problem-solving models using the four methodologies in an integrated software environment. Throughout the book, examples are given so that students and engineers can acquire skills in the use of AI-based methodologies for application to practical problems ranging from diagnosis to planning, design, and construction and manufacturing in various disciplines of engineering. Artificial Intelligence and Expert Systems for Engineers is a must-have reference for students, teachers, research scholars, and professionals working in the area of civil engineering design in particular and engineering design in general.

Fuzzy sets were for a long time not accepted by the AI community. Now they have become highly evolved and their techniques are well established. This book will teach the reader how to construct a fuzzy expert system to solve real-world problems. After a general discussion of expert systems, the basic fuzzy math required is presented first, requiring little more math background than high-school algebra. This book will fill a void in the market because although there are many books on expert systems, none devote more than a few pages to the notion of fuzzy sets and their applications in this domain. Therefore their use in this book is timely and should be well received. The book is designed as a text and has ample problems with solutions, a solutions manual and an accompanying program on our ftp site. Coverage is accessible to practitioners and academic readers alike.

In 1985 it was 20 years since Nobel Laureate Herbert A. Simon published: 'THE SHAPE OF AUTOMATION: For Men and Management'. This short but important and still topical book dwells on three subjects: - The Long-Range Economic Effects of Automation; - Will the Corporation be Managed by Machines? - The New Science of Management Decision. In contrast with George Orwell, who was a critic of contemporary political systems rather than a prophet, Simon portrays a far more rosy picture of our 'brave new world'. Simon's work breathes optimism. First, computer technology; looking back it is a doubtful whether even the professor expected the hardware development we have witnessed. Secondly, our ability to 'tame the beast'; there is now not much reason for complacency and satisfaction. Offices and factories can by no means be called automated, at most semi-automated. Thirdly the organizational and social implications of these rapid technological developments; referring to what he then called: 'The Computer and the new decision making techniques ..' Concerning this last point, there is little need to emphasize that had been less practical application in organizations than the often impressive theoretical developments would lead one to believe. In Europe this situation is even more acute than in the USA and Japan. The ESPRIT programme of the ECC and many similar national programs intend to bridge the gap.

Artificial Intelligence and expert systems research, development, and demonstration have rapidly expanded over the past several years; as a result, new terminology is appearing at a phenomenal rate. This sourcebook provides an introduction to artificial intelligence and expert systems, it provides brief definitions, it includes brief descriptions of software products, and vendors, and notes leaders in the field. Extensive support material is provided by delineating points of contact for receiving additional information, acronyms, a detailed bibliography, and other reference data. The terminology includes artificial intelligence and expert system elements for: • Artificial Intelligence • Expert Systems • Natural language Processing • Smart Robots • Machine Vision • Speech Synthesis The Artificial Intelligence and Expert System Sourcebook is compiled from information acquired from numerous books, journals, and

authorities in the field of artificial intelligence and expert systems. I hope this compilation of information will help clarify the terminology for artificial intelligence and expert systems' activities. Your comments, revisions, or questions are welcome. V. Daniel Hunt Springfield, Virginia May, 1986 ix Acknowledgments The information in Artificial Intelligence and Expert Systems Sourcebook has been compiled from a wide variety of authorities who are specialists in their respective fields. The following publications were used as the basic technical resources for this book. Portions of these publications may have been used in the book. Those definitions or artwork used have been reproduced with the permission to reprint of the respective publisher.

Software -- Programming Techniques.

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.

An in-depth description and analysis of some of the most important tools and techniques that are available to the professional artificial intelligence programmer, researcher, or student are presented in this text.

This comprehensive collection brings together current information on CAD for control systems including present and future trends in computer-aided design exploring the areas of modeling, simulation, simulation languages, environments, and design techniques. Presenting a systems approach to control d

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.

The 33rd Annual Meeting of the German Association for Medical Documentation, Informatics and Statistics was combined with a Special Topic Conference of the European Federation for Medical Informatics and takes place at Hannover, F. R. of Germany, from September 26 to 29, 1988. It was planned and initially prepared by the late Prof. P. L Reichertz, who headed the Hannover institute from 1969 to 1987. To commemorate his contribution to the development of medicine the conference was devoted to him "Peter Reichertz Memorial Conference on Expert Systems and Decision Support in Medicine" Since computers in the early Fifties were first applied to support medical reasoning, various phases of euphoria and

resistance have followed. Every new methodology which became technically possible was and will be applied to the old question of how to diagnose diseases more reliably. Artificial Intelligence is just one new approach to the old challenge. Over the years some authors have been very optimistic and put forward opinions which motivated the common press to coin the phrase 'Dr. med. computer'. Papers printed under this heading rebuffed the majority of physicians for many years. Today we know that medical decision making is a most complex human performance. And 30 years of research on decision support have given us only limited insight into the underlying processes. Most of the principal methodological questions were already asked very early on.

This volume constitutes the proceedings of the 5th International Conference on Database and Expert Systems Applications (DEXA '94), held in Athens, Greece in September 1994. The 78 papers presented were selected from more than 300 submissions and give a comprehensive view of advanced applications of databases and expert systems. Among the topics covered are object-oriented, temporal, active, geographical, hypermedia and distributed databases, data management, cooperative office applications, object-oriented modelling, industrial applications, conceptual modelling, legal systems, evolving environments, knowledge engineering, information retrieval, advanced querying, medical systems, and CIM.

When I compare the books on expert systems in my library with the production expert systems I know of, I note that there are few good books on building expert systems in Prolog. Of course, the set of actual production systems is a little small for a valid statistical sample, at least at the time and place of this writing - here in Germany, and in the first days of 1989. But there are at least some systems I have seen running in real life commercial and industrial environments, and not only at trade shows. I can observe the most impressive one in my immediate neighborhood. It is installed in the Telephone Shop of the German Federal PTT near the Munich National Theater, and helps configure telephone systems and small PBXs for mostly private customers. It has a neat, graphical interface, and constructs and prices an individual telephone installation interactively before the very eyes of the customer. The hidden features of the system are even more impressive. It is part of an expert system network with a distributed knowledge base that will grow to about 150 installations in every Telephone Shop throughout Germany. Each of them can be updated individually overnight via Teletex to present special offers or to adapt the selection process to the hardware supplies currently available at the local warehouses.

Rule-Based Programming is a broad presentation of the rule-based programming method with many example programs showing the strengths of the rule-based approach. The rule-based approach has been used extensively in the development of artificial intelligence systems, such as expert systems and machine learning. This rule-based programming technique has been applied in such diverse fields as medical diagnostic systems, insurance and banking systems, as well as automated design and configuration systems. Rule-based programming is also helpful in bridging the semantic gap between an application and a program, allowing domain specialists to understand programs and participate more closely in their development. Over sixty programs are

presented and all programs are available from an ftp site. Many of these programs are presented in several versions allowing the reader to see how realistic programs are elaborated from 'back of envelope' models. Metaprogramming is also presented as a technique for bridging the 'semantic gap'. Rule-Based Programming will be of interest to programmers, systems analysts and other developers of expert systems as well as to researchers and practitioners in artificial intelligence, computer science professionals and educators.

This work represents a broad spectrum of new ideas in the field of applied artificial intelligence and expert systems, and serves to disseminate information regarding intelligent methodologies and their implementation in solving various problems in industry and engineering. Many innovative artificial intelligence (AI) systems have emerged as the result of engineering machines to think like humans and perform intelligent functions. However, only recently have intelligent systems been applied to solve real life problems.

For more than 40 years, Computerworld has been the leading source of technology news and information for IT influencers worldwide. Computerworld's award-winning Web site (Computerworld.com), twice-monthly publication, focused conference series and custom research form the hub of the world's largest global IT media network. Knowledge acquisition has become a major area of artificial intelligence and cognitive science research. The papers in this book show that the area of knowledge acquisition for knowledge-based systems is still a diverse field in which a large number of research topics are being addressed. However, several main themes run through the papers. First, the issues of integrating knowledge from different sources and K.A. tools is a salient topic in many papers. A second major topic in the papers is that of knowledge modelling. Research in knowledge-based systems emphasises the use of generic models of reasoning and its underlying knowledge. An important trend in the area of knowledge modelling aims at the formalisation of knowledge models. Where the field of knowledge acquisition was without tools and techniques years ago, now there is a rapidly growing body of techniques and tools. Apart from the integrated workbenches already mentioned above, several papers in this book present new tools. Although knowledge acquisition and machine learning have been considered as separate subfields of AI, there is a tendency for the two fields to come together. This publication combines machine learning techniques with more conventional knowledge elicitation techniques. A framework is presented in which reasoning, problem solving and learning together form a knowledge intensive system that can acquire knowledge from its own experience.

Proceedings -- Parallel Computing.

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