

# Engineering Applications Of Artificial Intelligence Measurement

Advances in Metaheuristics for Hard Optimization  
Industrial And Engineering Applications Of Artificial Intelligence And Expert Systems  
What Every Engineer Should Know about Artificial Intelligence  
Artificial Intelligence in Chemical Engineering  
Big Data in Engineering Applications  
Industrial and Engineering Applications of Artificial Intelligence and Expert Systems  
Proceedings, the Second International Conference on Industrial & Engineering Applications of Artificial Intelligence & Expert Systems  
Applications of Artificial Intelligence Techniques in Industry 4.0  
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Artificial Intelligence and Knowledge Engineering Applications: A Bioinspired Approach  
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Industrial and Engineering Applications of Artificial Intelligence and Expert Systems  
Industrial and Engineering Applications of Artificial Intelligence and Expert Systems  
Expert Systems in Engineering

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Applications Handbook of Research on Artificial Intelligence Applications in the Aviation and Aerospace Industries Industrial and Engineering Applications or Artificial Intelligence and Expert Systems Applications of Artificial Intelligence in Electrical Engineering Industrial and Engineering Applications of Artificial Intelligence and Expert Systems Artificial Intelligence Applications of Artificial Intelligence Techniques in Engineering Medical Applications of Artificial Intelligence Artificial Intelligence Techniques in Power Systems Artificial Intelligence in Process Engineering Artificial Intelligence Applications for Improved Software Engineering Development: New Prospects Artificial Intelligence Beyond Artificial Intelligence Artificial Intelligence and Machine Learning Applications in Civil, Mechanical, and Industrial Engineering Computational Intelligence for Multimedia Big Data on the Cloud with Engineering Applications Industrial and Engineering Applications of Artificial Intelligence and Expert Systems Applications of Artificial Intelligence in Process Systems Engineering Readings in Artificial Intelligence and Software Engineering Industrial and Engineering Applications of Artificial Intelligence and Expert Systems Industrial and Engineering Applications of Artificial Intelligence and Expert Systems - Invited and Additional Papers

### **Advances in Metaheuristics for Hard Optimization**

Expert system technology is receiving increasing popularity and acceptance in the

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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.

### **Industrial And Engineering Applications Of Artificial Intelligence And Expert Systems**

Artificial intelligence (AI) is taking an increasingly important role in our society. From cars, smartphones, airplanes, consumer applications, and even medical equipment, the impact of AI is changing the world around us. The ability of

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machines to demonstrate advanced cognitive skills in taking decisions, learn and perceive the environment, predict certain behavior, and process written or spoken languages, among other skills, makes this discipline of paramount importance in today's world. Although AI is changing the world for the better in many applications, it also comes with its challenges. This book encompasses many applications as well as new techniques, challenges, and opportunities in this fascinating area.

### **What Every Engineer Should Know about Artificial Intelligence**

In recent years the applications of advanced information technologies in the field of transportation have affected both road infrastructures and vehicle technologies. The development of advanced transport telematics systems and the implementation of a new generation of technological options in the transport environment have had a significant impact on improved traffic management, efficiency and safety. This volume contains contributions from scientific and academic centres which have been active in this field of research and provides an overview of applications of AI technology in the field of traffic control and management. The topics covered are: -- current status of AI in transport -- AI applications in traffic engineering -- in-vehicle AI

### **Artificial Intelligence in Chemical Engineering**

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

### **Big Data in Engineering Applications**

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Artificial Intelligence in Process Engineering aims to present a diverse sample of Artificial Intelligence (AI) applications in process engineering. The book contains contributions, selected by the editors based on educational value and diversity of AI methods and process engineering application domains. Topics discussed in the text include the use of qualitative reasoning for modeling and simulation of chemical systems; the use of qualitative models in discrete event simulation to analyze malfunctions in processing systems; and the diagnosis of faults in processes that are controlled by Programmable Logic Controllers. There are also debates on the issue of quantitative versus qualitative information. The control of batch processes, a design of a system that synthesizes bioseparation processes, and process design in the domain of chemical (rather than biochemical) systems are likewise covered in the text. This publication will be of value to industrial engineers and process engineers and researchers.

### **Industrial and Engineering Applications of Artificial Intelligence and Expert Systems**

With the emergence of smart technology and automated systems in today's world, artificial intelligence (AI) is being incorporated into an array of professions. The aviation and aerospace industry, specifically, is a field that has seen the successful implementation of early stages of automation in daily flight operations through

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flight management systems and autopilot. However, the effectiveness of aviation systems and the provision of flight safety still depend primarily upon the reliability of aviation specialists and human decision making. The Handbook of Research on Artificial Intelligence Applications in the Aviation and Aerospace Industries is a pivotal reference source that explores best practices for AI implementation in aviation to enhance security and the ability to learn, improve, and predict. While highlighting topics such as computer-aided design, automated systems, and human factors, this publication explores the enhancement of global aviation security as well as the methods of modern information systems in the aeronautics industry. This book is ideally designed for pilots, scientists, engineers, aviation operators, air crash investigators, teachers, academicians, researchers, and students seeking current research on the application of AI in the field of aviation.

### **Proceedings, the Second International Conference on Industrial & Engineering Applications of Artificial Intelligence & Expert Systems**

This book is to presents and evaluates a way of modelling and optimizing nonlinear RFID Network Planning (RNP) problems using artificial intelligence techniques. It uses Artificial Neural Network models (ANN) to bind together the computational artificial intelligence algorithm with knowledge representation an efficient artificial

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intelligence paradigm to model and optimize RFID networks. This effort leads to proposing a novel artificial intelligence algorithm which has been named hybrid artificial intelligence optimization technique to perform optimization of RNP as a hard learning problem. This hybrid optimization technique consists of two different optimization phases. First phase is optimizing RNP by Redundant Antenna Elimination (RAE) algorithm and the second phase which completes RNP optimization process is Ring Probabilistic Logic Neural Networks (RPLNN). The hybrid paradigm is explored using a flexible manufacturing system (FMS) and the results are compared with well-known evolutionary optimization technique namely Genetic Algorithm (GA) to demonstrate the feasibility of the proposed architecture successfully.

### **Applications of Artificial Intelligence Techniques in Industry 4.0**

This book presents the current trends, technologies, and challenges in Big Data in the diversified field of engineering and sciences. It covers the applications of Big Data ranging from conventional fields of mechanical engineering, civil engineering to electronics, electrical, and computer science to areas in pharmaceutical and biological sciences. This book consists of contributions from various authors from all sectors of academia and industries, demonstrating the imperative application of Big Data for the decision-making process in sectors where the volume, variety, and velocity of information keep increasing. The book is a useful reference for graduate

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students, researchers and scientists interested in exploring the potential of Big Data in the application of engineering areas.

### **Artificial Neural Networks for Engineering Applications**

Artificial intelligence is increasingly finding its way into industrial and manufacturing contexts. The prevalence of AI in industry from stock market trading to manufacturing makes it easy to forget how complex artificial intelligence has become. Engineering provides various current and prospective applications of these new and complex artificial intelligence technologies. Applications of Artificial Intelligence in Electrical Engineering is a critical research book that examines the advancing developments in artificial intelligence with a focus on theory and research and their implications. Highlighting a wide range of topics such as evolutionary computing, image processing, and swarm intelligence, this book is essential for engineers, manufacturers, technology developers, IT specialists, managers, academicians, researchers, computer scientists, and students.

### **Artificial Intelligence and Knowledge Engineering Applications: A Bioinspired Approach**

"This book provides an overview of useful techniques in artificial intelligence for

future software development along with critical assessment for further advancement"--Provided by publisher.

### **New Applications of Artificial Intelligence**

Many advances have recently been made in metaheuristic methods, from theory to applications. The editors, both leading experts in this field, have assembled a team of researchers to contribute 21 chapters organized into parts on simulated annealing, tabu search, ant colony algorithms, general purpose studies of evolutionary algorithms, applications of evolutionary algorithms, and metaheuristics.

### **Applications of Artificial Intelligence Techniques in the Petroleum Industry**

Products of modern artificial intelligence (AI) have mostly been formed by the views, opinions and goals of the "insiders", i.e. people usually with engineering background who are driven by the force that can be metaphorically described as the pursuit of the craft of Hephaestus. However, since the present-day technology allows for tighter and tighter mergence of the "natural" everyday human life with machines of immense complexity, the responsible reaction of the scientific

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community should be based on cautious reflection of what really lies beyond AI, i.e. on the frontiers where the tumultuous ever-growing and ever-changing cloud of AI touches the rest of the world. The chapters of this book are based on the selected subset of the presentations that were delivered by their respective authors at the conference “Beyond AI: Interdisciplinary Aspects of Artificial Intelligence” held in Pilsen in December 2011. From its very definition, the reflection of the phenomena that lie beyond AI must be inherently interdisciplinary. And so is this book: all the authors took part in a mutual transdisciplinary dialogue after explaining their views on AI not only to a narrow selection of their usual close peers with the same specialisation, but to a much broader audience of various experts from AI engineering, natural sciences, humanities and philosophy. The chapters of this book thus reflect results of such a dialogue.

### **Cutting Edge Technologies and Microcomputer Applications for Developing Countries**

Proceedings of the Sixth International Conference on [title] held in Edinburgh, Scotland, June 1-4, 1993. Papers include those on CAD-CAM, case-based reasoning, distributed AI, intelligent interfaces, knowledge acquisition, methods, representation, machine learning, neural networks, reasoning under uncertainty, applications. The usual mix of a few fine, many good, and the odd poor paper. No

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## **Electric Systems, Dynamics, and Stability with Artificial Intelligence Applications**

### **Artificial Intelligence Applications to Traffic Engineering**

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.

## **Artificial Intelligence and Industrial Applications**

The book is a collection of high-quality, peer-reviewed innovative research papers from the International Conference on Signals, Machines and Automation (SIGMA 2018) held at Netaji Subhas Institute of Technology (NSIT), Delhi, India. The conference offered researchers from academic and industry the opportunity to present their original work and exchange ideas, information, techniques and applications in the field of computational intelligence, artificial intelligence and machine intelligence. The book is divided into two volumes discussing a wide variety of industrial, engineering and scientific applications of the emerging techniques.

## **Emerging Artificial Intelligence Applications in Computer Engineering**

"The ever expanding abundance of information and computing power enables researchers and users to tackle highly interesting issues for the first time, such as applications providing personalized access and interactivity to multimodal information based on user preferences and semantic concepts or human-machine interface systems utilizing information on the affective state of the user. The purpose of this book is to provide insights on how today's computer engineers can

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implement AI in real world applications. Overall, the field of artificial intelligence is extremely broad. In essence, AI has found applications, in one way or another, in every aspect of computing and in most aspects of modern life. Consequently, it is not possible to provide a complete review of the field in the framework of a single book, unless if the review is broad rather than deep. In this book we have chosen to present selected current and emerging practical applications of AI, thus allowing for a more detailed presentation of topics. The book is organized in four parts; General Purpose Applications of AI; Intelligent Human-Computer Interaction; Intelligent Applications in Signal Processing and eHealth; and Real world AI applications in Computer Engineering."

### **Applications of Artificial Intelligence Techniques in Engineering**

Engineers can profit from the revolution in AI research that is changing the ground rules of the profession. 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. Taylor tours the field of artificial intelligence in a highly readable and engaging manner, outlining in detail how engineers can work with AI. In separate chapters he discusses the three basic programming styles - function-based programming, object-oriented programming, and rulebased programming - as well as the use of Lisp and Prolog. He concludes by offering several suggestions for getting started in

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the field. As Taylor defines it, AI is a programming style that has much in common with engineering practice: programs operate on data according to rules in order to accomplish goals. While the term "artificial intelligence" is generally defined as meaning the design of computers to think the way people do, Taylor points out that for engineering purposes it is more accurately defined as a few software ideas that work well enough to be used. And as AI technology matures, computers will be able to provide actual design help. They will, in effect, serve as design apprentices, offering suggestions and handling actual parts of the design. William A. Taylor is an international consultant on the practical applications of artificial intelligence and has spent several years giving seminars on AI to senior engineers and engineering management.

### **Industrial and Engineering Applications of Artificial Intelligence and Expert Systems**

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.

### **Industrial and Engineering Applications of Artificial Intelligence and Expert Systems**

Artificial Intelligence (AI) is still seen by some as a controversial area of computer science research. This opinion is reinforced by the perception that AI is about the creation of a model of human intelligence in a computer and the fact that this has not yet been done. In fact, this demonstrably false impression of AI is nowhere further from the truth than in the areas of industry and engineering where AI techniques have become the norm in sectors including computer aided design, intelligent manufacturing, and control. AI techniques are fast becoming accepted in industry-related areas such as production of technical documentation, planning and scheduling of processes, fuzzy control and analysis (e.g., parameter extraction) of real-time engineering data. The papers in this volume represent work by both computer scientists and engineers separately and together. They directly and indirectly represent a real collaboration between computer science and engineering, covering a wide variety of fields related to intelligent systems technology ranging from neural networks; knowledge acquisition and representation; automated scheduling; machine learning; multimedia; genetic algorithms; fuzzy logic; robotics; automated reasoning; heuristic searching;

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automated problem solving; temporal, spatial and model-based reasoning; clustering; blackboard architectures; automated design; pattern recognition and image processing; automated planning; speech recognition; simulated annealing; and intelligent tutoring, as well as various computer applications of intelligent systems including financial analysis, artificial insemination, automated manufacturing, diagnosis, oil discoveries, communications and controls, health delivery, air travel and tourist information processing, and aircraft trajectory planning.

### **Expert Systems in Engineering Applications**

Readings in Artificial Intelligence and Software Engineering covers the main techniques and application of artificial intelligence and software engineering. The ultimate goal of artificial intelligence applied to software engineering is automatic programming. Automatic programming would allow a user to simply say what is wanted and have a program produced completely automatically. This book is organized into 11 parts encompassing 34 chapters that specifically tackle the topics of deductive synthesis, program transformations, program verification, and programming tutors. The opening parts provide an introduction to the key ideas to the deductive approach, namely the correspondence between theorems and specifications and between constructive proofs and programs. These parts also describes automatic theorem provers whose development has been designed for the

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programming domain. The subsequent parts present generalized program transformation systems, the problems involved in using natural language input, the features of very high level languages, and the advantages of the programming by example system. Other parts explore the intelligent assistant approach and the significance and relation of programming knowledge in other programming system. The concluding parts focus on the features of the domain knowledge system and the artificial intelligence programming. Software engineers and designers and computer programmers, as well as researchers in the field of artificial intelligence will find this book invaluable.

### **Handbook of Research on Artificial Intelligence Applications in the Aviation and Aerospace Industries**

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

### **Industrial and Engineering Applications or Artificial Intelligence and Expert Systems**

Artificial Neural Networks for Engineering Applications presents current trends for the solution of complex engineering problems that cannot be solved through

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conventional methods. The proposed methodologies can be applied to modeling, pattern recognition, classification, forecasting, estimation, and more. Readers will find different methodologies to solve various problems, including complex nonlinear systems, cellular computational networks, waste water treatment, attack detection on cyber-physical systems, control of UAVs, biomechanical and biomedical systems, time series forecasting, biofuels, and more. Besides the real-time implementations, the book contains all the theory required to use the proposed methodologies for different applications. Presents the current trends for the solution of complex engineering problems that cannot be solved through conventional methods Includes real-life scenarios where a wide range of artificial neural network architectures can be used to solve the problems encountered in engineering Contains all the theory required to use the proposed methodologies for different applications

### **Applications of Artificial Intelligence in Electrical Engineering**

The book is a collection of high-quality, peer-reviewed innovative research papers from the International Conference on Signals, Machines and Automation (SIGMA 2018) held at Netaji Subhas Institute of Technology (NSIT), Delhi, India. The conference offered researchers from academic and industry the opportunity to present their original work and exchange ideas, information, techniques and applications in the field of computational intelligence, artificial intelligence and

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machine intelligence. The book is divided into two volumes discussing a wide variety of industrial, engineering and scientific applications of the emerging techniques.

### **Industrial and Engineering Applications of Artificial Intelligence and Expert Systems**

CONTENTS: Adaptive architectures; Case-based reasoning; Computer aided manufacturing; Diagnosis; Fuzzy logic and control; Image; Knowledge acquisition; Knowledge based systems; Model based- reasoning; Modelling; Software engineering; Invited presentation. (KAR) p. 3.

### **Artificial Intelligence**

The intention of this book is to give an introduction to, and an overview of, the field of artificial intelligence techniques in power systems, with a look at various application studies.

### **Applications of Artificial Intelligence Techniques in Engineering**

## **Medical Applications of Artificial Intelligence**

This report covers microcomputer applications in cutting edge technologies for developing countries. For those developing countries with experience in microcomputer use, it provides information on important new areas. These include advanced computer concepts, artificial intelligence, computer-aided design and manufacture, applied expert systems, and geographic information systems. For developing countries initiating use of microcomputers, this report can help set priorities by providing awareness of the unique ways that problems in resource assessment, resource utilization, and communication can be approached using newly developed hardware and software. For all developing countries, microcomputers can assist government and industrial planning with extensive guidance on options and outcomes. Microcomputers have a special role in development because they can provide access to new technologies and facilitate the implementation of these technologies. Because of these dual functions in technology and planning, microcomputers can speed the incorporation of science and technology into both government and industrial planning and maximize its benefits. Preparation of this report was coordinated by the Board on Science and Technology for International Development in response to a request from the U. S. Agency for International Development.

### **Artificial Intelligence Techniques in Power Systems**

This work seeks to provide a solid foundation to the principles and practices of dynamics and stability assessment of large-scale power systems, focusing on the use of interconnected systems - and aiming to meet the requirements of today's competitive and deregulated environments. It contains easy-to-follow examples of fundamental concepts and algorithmic procedures.

### **Artificial Intelligence in Process Engineering**

Computational Intelligence for Multimedia Big Data on the Cloud with Engineering Applications covers timely topics, including the neural network (NN), particle swarm optimization (PSO), evolutionary algorithm (GA), fuzzy sets (FS) and rough sets (RS), etc. Furthermore, the book highlights recent research on representative techniques to elaborate how a data-centric system formed a powerful platform for the processing of cloud hosted multimedia big data and how it could be analyzed, processed and characterized by CI. The book also provides a view on how techniques in CI can offer solutions in modeling, relationship pattern recognition, clustering and other problems in bioengineering. It is written for domain experts and developers who want to understand and explore the application of computational intelligence aspects (opportunities and challenges) for design and

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development of a data-centric system in the context of multimedia cloud, big data era and its related applications, such as smarter healthcare, homeland security, traffic control trading analysis and telecom, etc. Researchers and PhD students exploring the significance of data centric systems in the next paradigm of computing will find this book extremely useful. Presents a brief overview of computational intelligence paradigms and its significant role in application domains Illustrates the state-of-the-art and recent developments in the new theories and applications of CI approaches Familiarizes the reader with computational intelligence concepts and technologies that are successfully used in the implementation of cloud-centric multimedia services in massive data processing Provides new advances in the fields of CI for bio-engineering application

### **Artificial Intelligence Applications for Improved Software Engineering Development: New Prospects**

Artificial Intelligence (AI) is still seen by some as a controversial area of computer science research. This opinion is reinforced by the perception that AI is about the creation of a model of human intelligence in a computer and the fact that this has not yet been done. In fact, this demonstrably false impression of AI is nowhere further from the truth than in the areas of industry and engineering where AI techniques have become the norm in sectors including computer aided design,

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intelligent manufacturing, and control. AI techniques are fast becoming accepted in industry-related areas such as production of technical documentation, planning and scheduling of processes, fuzzy control and analysis (e.g., parameter extraction) of real-time engineering data. The papers in this volume represent work by both computer scientists and engineers separately and together. They directly and indirectly represent a real collaboration between computer science and engineering, covering a wide variety of fields related to intelligent systems technology ranging from neural networks; knowledge acquisition and representation; automated scheduling; machine learning; multimedia; genetic algorithms; fuzzy logic; robotics; automated reasoning; heuristic searching; automated problem solving; temporal, spatial and model-based reasoning; clustering; blackboard architectures; automated design; pattern recognition and image processing; automated planning; speech recognition; simulated annealing; and intelligent tutoring, as well as various computer applications of intelligent systems including financial analysis, artificial insemination, automated manufacturing, diagnosis, oil discoveries, communications and controls, health delivery, air travel and tourist information processing, and aircraft trajectory planning.

### **Artificial Intelligence**

Enhanced, more reliable, and better understood than in the past, artificial

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intelligence (AI) systems can make providing healthcare more accurate, affordable, accessible, consistent, and efficient. However, AI technologies have not been as well integrated into medicine as predicted. In order to succeed, medical and computational scientists must develop hybrid systems that can effectively and efficiently integrate the experience of medical care professionals with capabilities of AI systems. After providing a general overview of artificial intelligence concepts, tools, and techniques, *Medical Applications of Artificial Intelligence* reviews the research, focusing on state-of-the-art projects in the field. The book captures the breadth and depth of the medical applications of artificial intelligence, exploring new developments and persistent challenges.

### **Beyond Artificial Intelligence**

*Applications of Artificial Intelligence Techniques in the Petroleum Industry* gives engineers a critical resource to help them understand the machine learning that will solve specific engineering challenges. The reference begins with fundamentals, covering preprocessing of data, types of intelligent models, and training and optimization algorithms. The book moves on to methodically address artificial intelligence technology and applications by the upstream sector, covering exploration, drilling, reservoir and production engineering. Final sections cover current gaps and future challenges. Teaches how to apply machine learning algorithms that work best in exploration, drilling, reservoir or production

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engineering Helps readers increase their existing knowledge on intelligent data modeling, machine learning and artificial intelligence, with foundational chapters covering the preprocessing of data and training on algorithms Provides tactics on how to cover complex projects such as shale gas, tight oils, and other types of unconventional reservoirs with more advanced model input

### **Artificial Intelligence and Machine Learning Applications in Civil, Mechanical, and Industrial Engineering**

The computational paradigm considered here is a conceptual, theoretical and formal framework situated above machines and living creatures (two instantiations), sufficiently solid, and still non-exclusive, that allows us: 1. to help neuroscientists to formulate intentions, questions, experiments, methods and explanation mechanisms assuming that neural circuits are the psychological support of calculus; 2. to help scientists and engineers from the fields of artificial intelligence (AI) and knowledge engineering (KE) to model, formalize and program the computable part of human knowledge; 3. to establish an interaction framework between natural system computation (NSC) and artificial system computation (ASC) in both directions, from ASC to NSC (in computational neuroscience), and from NSC to ASC (in bioinspired computation). With these global purposes, we organized IWINAC 2005, the 1st International Work Conference on the Interplay

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Between Natural and Artificial Computation, which took place in Las Palmas de Gran Canaria, Canary Islands (Spain), during June 15-18, 2005, trying to contribute to both directions of the interplay: I: From Artificial to Natural Computation. What can computation, artificial intelligence (AI) and knowledge engineering (KE) contribute to the understanding of the nervous system, cognitive processes and social behavior? This is the scope of computational neuroscience and cognition, which uses the computational paradigm to model and improve our understanding of natural science.

### **Computational Intelligence for Multimedia Big Data on the Cloud with Engineering Applications**

The field of artificial intelligence has been maturing for a number of years and has inspired many researchers to produce innovative intelligent systems to demonstrate the capability of intelligent machines and their success in solving human problems. Only recently, however, have intelligent systems shown progress in demonstrating success in real-life applications, particularly in industrial environments. Many organizations have successfully used at least some limited aspects of intelligent research in their day-to-day operations. The objectives of this volume are to focus on these real-life applications and report a comprehensive view of the theoretical and applied aspects of intelligent systems technology. The

most recent work in industrial, commercial, military, and academic environments is summarized, including 61 state-of-the-art reports on active research applied to real world problems.

### **Industrial and Engineering Applications of Artificial Intelligence and Expert Systems**

This book gathers selected papers from Artificial Intelligence and Industrial Applications (A2IA'2020), the first installment of an annual international conference organized by ENSAM-Meknes at Moulay Ismail University, Morocco. The 29 papers presented here were carefully reviewed and selected from 141 submissions by an international scientific committee. They address various aspects of artificial intelligence such as digital twin, multiagent systems, deep learning, image processing and analysis, control, prediction, modeling, optimization and design, as well as AI applications in industry, health, energy, agriculture, and education. The book is intended for AI experts, offering them a valuable overview and global outlook for the future, and highlights a wealth of innovative ideas and recent, important advances in AI applications, both of a foundational and practical nature. It will also appeal to non-experts who are curious about this timely and important subject.

## **Applications of Artificial Intelligence in Process Systems Engineering**

Applications of Artificial Intelligence in Process Systems Engineering offers a broad perspective on the issues related to artificial intelligence technologies and their applications in chemical and process engineering. The book comprehensively introduces the methodology and applications of AI technologies in process systems engineering, making it an indispensable reference for researchers and students. As chemical processes and systems are usually non-linear and complex, thus making it challenging to apply AI methods and technologies, this book is an ideal resource on emerging areas such as cloud computing, big data, the industrial Internet of Things and deep learning. With process systems engineering's potential to become one of the driving forces for the development of AI technologies, this book covers all the right bases. Explains the concept of machine learning, deep learning and state-of-the-art intelligent algorithms Discusses AI-based applications in process modeling and simulation, process integration and optimization, process control, and fault detection and diagnosis Gives direction to future development trends of AI technologies in chemical and process engineering

## **Readings in Artificial Intelligence and Software Engineering**

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"This book examines the application of artificial intelligence and machine learning civil, mechanical, and industrial engineering"--

### **Industrial and Engineering Applications of Artificial Intelligence and Expert Systems**

This book presents the Proceedings of the Tenth International Conference on Industrial and Engineering Applications of Artificial Intelligence and Expert Systems, focusing on the theoretical aspects of intelligent systems research as well as extensions of theory of intelligent thinking machines.

### **Industrial and Engineering Applications of Artificial Intelligence and Expert Systems - Invited and Additional Papers**

This book has a complete set of applications of artificial neural networks that allow the reader to gain experience about the new systems for implementing and developing artificial intelligence (AI) methods, which can run in several digital systems. On the other hand, the book shows the newest algorithms of artificial intelligence that provide a wide spectrum of research areas in which AI can be deployed. There are a lot of books that address AI applications. However, this book shows the newest applications reached according with the technological changes

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that are presented nowadays. Those changes drastically appear in digital systems or other parallel areas that allow to improve the performance of AI algorithms. Hence, sometimes, the AI algorithms have to be redesigned in order to run in microcontrollers or FPGAs. The topics covered generate a structured book, so it could be used as a textbook, but it is designed to be accessible to a wide audience interested in AI.

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