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ANASTASIA ESTES

Emerging Trends and Applications MIT Press

This book covers challenges and solutions in establishing Industry 4.0 standards for Internet of Things. It proposes a clear view about the role of Internet of Things in establishing standards. The sensor design for industrial problem, challenges faced, and solutions are all addressed. The concept of digital twin and complexity in data analytics for predictive maintenance and fault prediction is also covered. The book is aimed at existing problems faced by the industry at present, with the goal of cost-efficiency and unmanned automation. It also concentrates on predictive maintenance and predictive failures. In addition, it includes design challenges and a survey of literature.

Evolutionary Robotics John Wiley & Sons

Biomimetic engineering takes the principles of biological organisms and copies, mimics or adapts these in the design and development of new materials and technologies. Biomimetic Technologies reviews the key materials and processes involved in this groundbreaking field, supporting theoretical background by outlining a range of applications. Beginning with an overview of the key principles and materials associated with biomimetic technologies in Part One, the book goes on to explore biomimetic sensors in more detail in Part Two, with bio-inspired tactile, hair-based, gas-sensing and sonar systems all reviewed. Biomimetic actuators are then the focus of Part Three, with vision systems, tissue growth and muscles all discussed. Finally, a wide range of applications are investigated in Part Four, where biomimetic technology and artificial intelligence are reviewed for such uses as bio-inspired climbing robots and multi-robot systems, microrobots with CMOS IC neural networks locomotion control, central pattern generators (CPG's) and biologically inspired antenna arrays. Includes a solid overview of modern artificial intelligence as background to the principles of biomimetic engineering Reviews a selection of key bio-inspired materials and sensors, highlighting their current strengths and future potential Features cutting-edge examples of biomimetic technologies employed for a broad range of applications

Internet of Things for Industry 4.0 Bio-Inspired Artificial Intelligence Theories, Methods, and Technologies

This book provides solution for challenges facing engineers in urban environments looking towards smart development and IoT. The authors address the challenges faced in developing smart applications along with the solutions. Topics addressed include reliability, security and financial issues in relation to all the smart and sustainable development solutions discussed. The solutions they provide are affordable, resistive to threats, and provide high reliability. The book pertains to researchers, academics, professionals, and students. Provides solutions to urban sustainable development problems facing engineers in developing and developed countries Discusses results with industrial problems and current issues in smart city development Includes solutions that are reliable, secure and financially sound

Theories, Methods, and Technologies Academic Press

Bio-Inspired Computation and Applications in Image Processing summarizes the latest developments in bio-inspired computation in image processing, focusing on nature-inspired algorithms that are linked with deep learning, such as ant colony optimization, particle swarm optimization, and bat and firefly algorithms that have recently emerged in the field. In addition to documenting state-of-the-art developments, this book also discusses future research trends in bio-inspired computation, helping researchers establish new research avenues to pursue. Reviews the latest developments in bio-inspired computation in image processing Focuses on the introduction and analysis of the key bio-inspired methods and techniques Combines theory with real-world applications in image processing Helps solve complex problems in image and signal processing Contains a diverse range of self-contained case studies in real-world applications

Bio-inspired Computation in Unmanned Aerial Vehicles Springer Nature

The book focuses on machine learning. Divided into three parts, the first part discusses the feature selection problem. The second part then describes the application of machine learning in the classification problem, while the third part presents an overview of real-world applications of swarm-based optimization algorithms. The concept of machine learning (ML) is not new in the field of computing. However, due to the ever-changing nature of requirements in today's world it has emerged in the form of completely new avatars. Now everyone is talking about ML-based solution strategies for a given problem set. The book includes research articles and expository papers on the theory and algorithms of machine learning and bio-inspiring optimization, as well as papers on numerical experiments and real-world applications.

Bio-Inspired Computing and Applications Springer Science & Business Media

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 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.

An Introduction MIT Press

Artificial Intelligence in the Age of Neural Networks and Brain Computing demonstrates that existing disruptive implications and applications of AI is a development of the unique attributes of neural networks, mainly machine learning, distributed architectures, massive parallel processing, black-box inference, intrinsic nonlinearity and smart autonomous search engines. The book covers the major basic ideas of brain-like computing behind AI, provides a framework to deep learning, and launches novel and intriguing paradigms as future alternatives. The success of AI-based commercial products proposed by top industry leaders, such as Google, IBM, Microsoft, Intel and Amazon can be interpreted using this book. Developed from the 30th anniversary of the International Neural Network Society (INNS) and the 2017 International Joint Conference on Neural Networks (IJCNN) Authored by top experts, global field pioneers and researchers working on cutting-edge applications in signal processing, speech recognition, games, adaptive control and decision-making Edited by high-level academics and researchers in intelligent systems and neural networks

Nature-Inspired Optimization Algorithms Springer

"This book provides the latest research, investigation, and development in the area of living systems intelligence, human-level cognition & artificial systems, nature and bioinspiration, machine learning techniques, Deep Learning techniques and applications, and systems that exhibit intelligent autonomous behavioral characteristics"--

Biologically Inspired Design Springer Nature

This book covers the latest technological advances in neuro-computational intelligence in biological processes where the primary focus is on biologically inspired neuro-computational techniques. The theoretical and practical aspects of biomedical neural computing, brain-inspired computing, bio-computational models, artificial intelligence (AI) and machine learning (ML) approaches in biomedical data analytics are covered along with their qualitative and quantitative features. The contents cover numerous computational applications, methodologies and emerging challenges in the field of bio-soft computing and bio-signal processing. The authors have taken meticulous care in describing the fundamental concepts, identifying the research gap and highlighting the problems with the strategical computational approaches to address the ongoing challenges in bio-inspired models and algorithms. Given the range of topics covered, this book can be a valuable resource for students, researchers as well as practitioners interested in the rapidly evolving field of neurocomputing and biomedical data analytics.

Third International Work-Conference on the Interplay Between Natural and Artificial Computation, IWINAC 2009, Santiago de Compostela, Spain, June 22-26, 2009, Proceedings, Part II MIT Press

An account of the creation of new forms of life and intelligence in cybernetics, artificial life, and artificial intelligence that analyzes both the similarities and the differences among these sciences in actualizing life. The Allure of Machinic Life

The Allure of Machinic Life Princeton University Press

Bio-inspired computation, especially those based on swarm intelligence, has become increasingly popular in the last decade. Bio-Inspired Computation in Telecommunications reviews the latest developments in bio-inspired computation from both theory and application as they relate to telecommunications and image processing, providing a complete resource that analyzes and discusses the latest and future trends in research directions. Written by recognized experts, this is a must-have guide for researchers, telecommunication engineers, computer scientists and PhD students.

Bio-Inspired Computational Algorithms and Their Applications Elsevier

The three-volume set LNCS 6838, LNAI 6839, and LNBI 6840 constitutes the thoroughly refereed post-conference proceedings of the 7th International Conference on Intelligent Computing, ICIC 2011, held in Zhengzhou, China, in August 2011. This volume contains 93 revised full papers, from a total of 281 presentations at the conference - carefully reviewed and selected from 832 initial submissions. The papers address all issues in Advanced Intelligent Computing, especially Methodologies and Applications, including theories, methodologies, and applications in science and technology. They include a range of techniques such as artificial intelligence, pattern recognition, evolutionary computing, informatics theories and applications, computational neuroscience and bioscience, soft computing, human computer interface issues, etc.

10th International Work-Conference on Artificial Neural Networks, IWANN 2009, Salamanca, Spain, June 10-12, 2009. Proceedings, Part I Elsevier

The growing presence of biologically-inspired processing has caused significant changes in data retrieval. With the ubiquity of these technologies, more effective and streamlined data processing techniques are available. Bio-Inspired Computing for Information Retrieval Applications is a key resource on the latest advances and research regarding current techniques that have evolved from biologically-inspired processes and its application to a variety of problems. Highlighting multidisciplinary studies on data processing, swarm-based clustering, and evolutionary computation, this publication is an ideal reference source for researchers, academics, professionals, students, and practitioners.

An Introductory Analysis with Applications to Biology, Control, and Artificial Intelligence McGraw-Hill Companies

Continuing his exploration of the organization of complexity and the science of design, this new edition of Herbert Simon's classic work on artificial

intelligence adds a chapter that sorts out the current themes and tools—chaos, adaptive systems, genetic algorithms—for analyzing complexity and complex systems. There are updates throughout the book as well. These take into account important advances in cognitive psychology and the science of design while confirming and extending the book's basic thesis: that a physical symbol system has the necessary and sufficient means for intelligent action. The chapter "Economic Reality" has also been revised to reflect a change in emphasis in Simon's thinking about the respective roles of organizations and markets in economic systems.

Bio-inspired Information and Communication Technologies CRC Press

The book focuses on original approaches intended to support the development of biologically inspired cognitive architectures. It bridges together different disciplines, from classical artificial intelligence to linguistics, from neuro- and social sciences to design and creativity, among others. The chapters, based on contributions presented at the Eleventh Annual Meeting of the BICA Society, held on November 10-14, 2020, in Natal, Brazil, discuss emerging methods, theories and ideas towards the realization of general-purpose humanlike artificial intelligence or fostering a better understanding of the ways the human mind works. All in all, the book provides engineers, mathematicians, psychologists, computer scientists and other experts with a timely snapshot of recent research and a source of inspiration for future developments in the broadly intended areas of artificial intelligence and biological inspiration.

Artificial Intelligence MIT Press

"This book examines modern artificial intelligence to display how it may be applied to computer games. It spans the divide that exists between the academic research community working with advanced artificial intelligence and the games programming community which must create and release new and interesting games, creating an invaluable collection supporting both technological research and the gaming industry"--Provided by publisher.

Computational Intelligence CRC Press

Computer scientist Moshe Sipper takes readers on a thrilling journey to the terra nova of computing to provide a compelling look at cutting-edge computers, robots, and machines now and in the decades ahead.

Bioinspired Applications in Artificial and Natural Computation Springer

The two-volume set LNCS 5601 and LNCS 5602 constitutes the refereed proceedings of the Third International Work-Conference on the Interplay between Natural and Artificial Computation, IWINAC 2009, held in Santiago de Compostela, Spain, in June 2009. The 108 revised papers presented are thematically divided into two volumes. The first volume includes papers relating the most recent collaborations with Professor Mira and contributions mainly related with theoretical, conceptual and methodological aspects linking AI and knowledge engineering with neurophysiology, clinics and

cognition. The second volume contains all the contributions connected with biologically inspired methods and techniques for solving AI and knowledge engineering problems in different application domains.

Brain and Nature-Inspired Learning, Computation and Recognition Basic Books

Spiking neural networks (SNN) are biologically inspired computational models that represent and process information internally as trains of spikes. This monograph book presents the classical theory and applications of SNN, including original author's contribution to the area. The book introduces for the first time not only deep learning and deep knowledge representation in the human brain and in brain-inspired SNN, but takes that further to develop new types of AI systems, called in the book brain-inspired AI (BI-AI). BI-AI systems are illustrated on: cognitive brain data, including EEG, fMRI and DTI; audio-visual data; brain-computer interfaces; personalized modelling in bio-neuroinformatics; multisensory streaming data modelling in finance, environment and ecology; data compression; neuromorphic hardware implementation. Future directions, such as the integration of multiple modalities, such as quantum-, molecular- and brain information processing, is presented in the last chapter. The book is a research book for postgraduate students, researchers and practitioners across wider areas, including computer and information sciences, engineering, applied mathematics, bio- and neurosciences.

A New Theory of Intelligence MIT Press

A comprehensive introduction to new approaches in artificial intelligence and robotics that are inspired by self-organizing biological processes and structures. New approaches to artificial intelligence spring from the idea that intelligence emerges as much from cells, bodies, and societies as it does from evolution, development, and learning. Traditionally, artificial intelligence has been concerned with reproducing the abilities of human brains; newer approaches take inspiration from a wider range of biological structures that are capable of autonomous self-organization. Examples of these new approaches include evolutionary computation and evolutionary electronics, artificial neural networks, immune systems, biorobotics, and swarm intelligence—to mention only a few. This book offers a comprehensive introduction to the emerging field of biologically inspired artificial intelligence that can be used as an upper-level text or as a reference for researchers. Each chapter presents computational approaches inspired by a different biological system; each begins with background information about the biological system and then proceeds to develop computational models that make use of biological concepts. The chapters cover evolutionary computation and electronics; cellular systems; neural systems, including neuromorphic engineering; developmental systems; immune systems; behavioral systems—including several approaches to robotics, including behavior-based, bio-mimetic, epigenetic, and evolutionary robots; and collective systems, including swarm robotics as well as cooperative and competitive co-evolving systems. Chapters end with a concluding overview and suggested reading.