Artificial Intelligence Foundations Of Computational Agents Solution

Recent years have seen numerous applications across a variety of fields using various techniques of Computational Intelligence. This book, one of a series on the foundations of Computational Intelligence, is focused on learning and approximation.

The International Conference on "Computational Intelligence in Data Mining" (ICCIDM), after three successful versions, has reached to its fourth version with a lot of aspiration. The best selected conference papers are reviewed and compiled to form this volume. The proceedings discusses the latest solutions, scientific results and methods in solving intriguing problems in the fields of data mining, computational intelligence, big data analytics, and soft computing. The volume presents a sneak preview into the strengths and weakness of trending applications and research findings in the field of computational intelligence and data mining along with related field.

"Recent decades have witnessed the emergence of artificial intelligence as a serious science and engineering discipline. Artificial Intelligence: Foundations of Computational Agents is a textbook aimed at junior to senior undergraduate

students and first-year graduate students. It presents artificial intelligence (AI) using a coherent framework to study the design of intelligent computational agents. By showing how basic approaches fit into a multidimensional design space, readers can learn the fundamentals without losing sight of the bigger picture. The book balances theory and experiment, showing how to link them intimately together, and develops the science of AI together with its engineering applications. Although structured as a textbook, the book's straightforward, self-contained style will also appeal to a wide audience of professionals, researchers, and independent learners. AI is a rapidly developing field: this book encapsulates the latest results without being exhaustive and encyclopedic. It teaches the main principles and tools that will allow readers to explore and learn on their own. The text is supported by an online learning environment, AIspace, http://aispace.org, so that students can experiment with the main AI algorithms plus problems, animations, lecture slides, and a knowledge representation system, Allog, for experimentation and problem solving"--Provided by publisher.

One of the most intriguing questions about the new computer technology that has appeared over the past few decades is whether we humans will ever be able to make computers learn. As is painfully obvious to even the most casual computer user, most current computers do not. Yet if we could devise learning techniques

that enable computers to routinely improve their performance through experience, the impact would be enormous. The result would be an explosion of new computer applications that would suddenly become economically feasible (e. g. , personalized computer assistants that automatically tune themselves to the needs of individual users), and a dramatic improvement in the quality of current computer applications (e. g. , imagine an airline scheduling program that improves its scheduling method based on analyzing past delays). And while the potential economic impact of successful learning methods is sufficient reason to invest in research into machine learning, there is a second significant reason: studying machine learning helps us understand our own human learning abilities and disabilities, leading to the possibility of improved methods in education. While many open questions remain about the methods by which machines and humans might learn, significant progress has been made.

In this book the author argues that the basis of what we consider computer intelligence has algorithmic roots, and he presents this with a holistic view, showing examples and explaining approaches that encompass theoretical computer science and machine learning via engineered algorithmic solutions. The book will be of value to researchers, practitioners, and students.

This book constitutes the refereed post proceedings of the XIXth International

Conference of the Italian Association for Artificial Intelligence, AIxIA 2020, held in Milano, Italy, in November 2020. Due to the COVID-19 pandemic, the conference was "rebooted"/ re-organized w.r.t. the original format. The 27 full papers were carefully reviewed and selected from 89 submissions. The society aims at increasing the public awareness of Artificial Intelligence, encouraging the teaching and promoting research in the field.
Artificial IntelligenceCambridge University Press
As modern technologies continue to develop and evolve, the ability of users to adapt with new systems becomes a paramount concern. Research into new ways for humans to make use of advanced computers and other such technologies through artificial intelligence and computer simulation is necessary to fully realize the potential of tools in the 21st century. Advanced Methodologies and Technologies in Artificial Intelligence, Computer Simulation, and Human-Computer Interaction provides emerging research in advanced trends in robotics, AI, simulation, and human-computer interaction. Readers will learn about the positive applications of artificial intelligence and human-computer interaction in various disciples such as business and medicine. This book is a valuable resource for IT professionals, researchers, computer scientists, and researchers invested in assistive technologies, artificial intelligence, robotics, and computer

simulation.

The contemporary world lives on the data produced at an unprecedented speed through social networks and the internet of things (IoT). Data has been called the new global currency, and its rise is transforming entire industries, providing a wealth of opportunities. Applied data science research is necessary to derive useful information from big data for the effective and efficient utilization to solve real-world problems. A broad analytical set allied with strong business logic is fundamental in today's corporations. Organizations work to obtain competitive advantage by analyzing the data produced within and outside their organizational limits to support their decision-making processes. This book aims to provide an overview of the concepts, tools, and techniques behind the fields of data science and artificial intelligence (AI) applied to business and industries. The Handbook of Research on Applied Data Science and Artificial Intelligence in Business and Industry discusses all stages of data science to AI and their application to real problems across industries—from science and engineering to academia and commerce. This book brings together practice and science to build successful data solutions, showing how to uncover hidden patterns and leverage them to improve all aspects of business performance by making sense of data from both web and offline environments. Covering topics including applied AI, consumer

behavior analytics, and machine learning, this text is essential for data scientists, IT specialists, managers, executives, software and computer engineers, researchers, practitioners, academicians, and students.

"Foundations of Intelligent Systems" presents selected papers from the 2013 International Conference on Intelligent Systems and Knowledge Engineering (ISKE2013). The aim of this conference is to bring together experts from different expertise areas to discuss the state-of-the-art in Intelligent Systems and Knowledge Engineering, and to present new research results and perspectives on future development. The topics in this volume include, but not limited to: Artificial Intelligence Theories, Pattern Recognition, Intelligent System Models, Speech Recognition, Computer Vision, Multi-Agent Systems, Machine Learning, Soft Computing and Fuzzy Systems, Biological Inspired Computation, Game Theory, Cognitive Systems and Information Processing, Computational Intelligence, etc. The proceedings are benefit for both researchers and practitioners who want to utilize intelligent methods in their specific research fields. Dr. Zhenkun Wen is a Professor at the College of Computer and Software Engineering, Shenzhen University, China. Dr. Tianrui Li is a Professor at the School of Information Science and Technology, Southwest Jiaotong University, Xi'an, China.

The development of computational models of design founded on the artificial intelligenceparadigm has provided an impetus for muchofcurrentdesign research. As artificial intelligence has matured and developed new approaches so the impact ofthese new approaches on design research has been felt. This can be seen in the wayconcepts from cognitive science has found theirway into artificial intelligence and hence into design research. And, also in the way in which agent-based systems arebeingincorporated into design systems. In design research there is an increasing blurring between notions drawn from artificial intelligence and those drawn from cognitive science. Whereas a number of years ago the focus was largely on applying artificial intelligence to designing as an activity, thus treating designing as a form ofproblem solving, today we are seeing a much wider variety ofconceptions of the role of artificial intelligence in helping to model and comprehend designing as a process. Thus, we see papers in this volume which have as their focus the development or implementationofframeworks for artificial intelligence in design - attempting to determine a unique locus for these ideas. We see papers which attempt to find foundations for the development of tools based on the artificial intelligence paradigm; often the foundations come from cognitive studiesofhuman designers.

Fundamental topics in machine learning are presented along with theoretical and

conceptual tools for the discussion and proof of algorithms.

In The Risk Perception of Artificial Intelligence, Hugo Neri examines how society has come to understand artificial intelligence by studying how cultural productions, intellectuals, and the media have shaped society's views, understandings, and fears of artificial intelligence. As an abstract term, artificial intelligence has been understood both as a discipline and a "robot's mind." In the twenty and twenty-first centuries, cultural representations in comics, television shows, and movies converged with public lectures about the risks of A.I. by prominent public figures such as Stephen Hawking and Elon Musk. Neri analyzes how this cultural and intellectual miscellany shapes the way we perceive artificial intelligence and whether this perception is universal or restricted to the Western world.

Foundations of Computational Intelligence Volume 6: Data Mining: Theoretical Foundations and Applications Finding information hidden in data is as theoretically difficult as it is practically important. With the objective of discovering unknown patterns from data, the methodologies of data mining were derived from statistics, machine learning, and artificial intelligence, and are being used successfully in application areas such as bioinformatics, business, health care, banking, retail, and many others. Advanced representation schemes and

computational intelligence techniques such as rough sets, neural networks; decision trees; fuzzy logic; evolutionary algorithms; arti- cial immune systems; swarm intelligence; reinforcement learning, association rule mining, Web intelligence paradigms etc. have proved valuable when they are - plied to Data Mining problems. Computational tools or solutions based on intel- gent systems are being used with great success in Data Mining applications. It is also observed that strong scientific advances have been made when issues from different research areas are integrated. This Volume comprises of 15 chapters including an overview chapter providing an up-to-date and state-of-the research on the applications of Computational Int- ligence techniques for Data Mining. The book is divided into 3 parts: Part-I: Data Click Streams and Temporal Data Mining Part-II: Text and Rule Mining Part-III: Applications Part I on Data Click Streams and Temporal Data Mining contains four chapters that describe several approaches in Data Click Streams and Temporal Data Mining.

The purpose of this book is to provide an overview of AI research, ranging from basic work to interfaces and applications, with as much emphasis on results as on current issues. It is aimed at an audience of master students and Ph.D. students, and can be of interest as well for researchers and engineers who want to know more about AI. The book is split into three volumes: - the first volume brings together twenty-three chapters

dealing with the foundations of knowledge representation and the formalization of reasoning and learning (Volume 1. Knowledge representation, reasoning and learning) - the second volume offers a view of AI, in fourteen chapters, from the side of the algorithms (Volume 2. AI Algorithms) - the third volume, composed of sixteen chapters, describes the main interfaces and applications of AI (Volume 3. Interfaces and applications of AI). This third volume is dedicated to the interfaces of AI with various fields, with which strong links exist either at the methodological or at the applicative levels. The foreword of this volume reminds us that AI was born for a large part from cybernetics. Chapters are devoted to disciplines that are historically sisters of AI: natural language processing, pattern recognition and computer vision, and robotics. Also close and complementary to AI due to their direct links with information are databases, the semantic web, information retrieval and human-computer interaction. All these disciplines are privileged places for applications of AI methods. This is also the case for bioinformatics, biological modeling and computational neurosciences. The developments of AI have also led to a dialogue with theoretical computer science in particular regarding computability and complexity. Besides, AI research and findings have renewed philosophical and epistemological questions, while their cognitive validity raises questions to psychology. The volume also discusses some of the interactions between science and artistic creation in literature and in music. Lastly, an epilogue concludes the three volumes of this Guided Tour of AI Research by providing an

overview of what has been achieved by AI, emphasizing AI as a science, and not just as an innovative technology, and trying to dispel some misunderstandings.

This book focuses on the legal regulation, mainly from an international law perspective, of autonomous artificial intelligence systems, of their creations, as well as of the interaction of human and artificial intelligence. It examines critical questions regarding both the ontology of autonomous AI systems and the legal implications: what constitutes an autonomous AI system and what are its unique characteristics? How do they interact with humans? What would be the implications of combined artificial and human intelligence? It also explores potentially the most important questions: what are the implications of these developments for collective security –from both a state-centered and a human perspective, as well as for legal systems? Why is international law better positioned to make such determinations and to create a universal framework for this new type of legal personality? How can the matrix of obligations and rights of this new legal personality be construed and what would be the repercussions for the international community? In order to address these questions, the book discusses cognitive aspects embedded in the framework of law, offering insights based on both de lege lata and de lege ferenda perspectives.

The book investigates the determinants which are influencing the acceptance of artificial intelligence (AI) in an organizational context, focusing on the German financial services industry. An AI-specific acceptance model is being developed based on

technology acceptance models as well as being enriched with practical insights from industry experts. Ultimately, the acceptance of artificial intelligence is influenced by multiple, interrelated variables, which can be classified into five major dimensions: organizational, individual, financial, technological and societal factors.

The latest advances in Artificial Intelligence and (deep) Machine Learning in particular revealed a major drawback of modern intelligent systems, namely the inability to explain their decisions in a way that humans can easily understand. While eXplainable AI rapidly became an active area of research in response to this need for improved understandability and trustworthiness, the field of Knowledge Representation and Reasoning (KRR) has on the other hand a long-standing tradition in managing information in a symbolic, human-understandable form. This book provides the first comprehensive collection of research contributions on the role of knowledge graphs for eXplainable AI (KG4XAI), and the papers included here present academic and industrial research focused on the theory, methods and implementations of AI systems that use structured knowledge to generate reliable explanations. Introductory material on knowledge graphs is included for those readers with only a minimal background in the field, as well as specific chapters devoted to advanced methods, applications and case-studies that use knowledge graphs as a part of knowledge-based, explainable systems (KBX-systems). The final chapters explore current challenges and future research directions in the area of knowledge graphs for eXplainable AI. The book not

only provides a scholarly, state-of-the-art overview of research in this subject area, but also fosters the hybrid combination of symbolic and subsymbolic AI methods, and will be of interest to all those working in the field.

In the 11 contributions, theorists historically associated with each position identify the basic tenets of their position.Have the classical methods and ideas of AI outlived their usefulness? Foundations of Artificial Intelligence critically evaluates the fundamental assumptions underpinning the dominant approaches to AI. In the 11 contributions, theorists historically associated with each position identify the basic tenets of their position. They discuss the underlying principles, describe the natural types of problems and tasks in which their approach succeeds, explain where its power comes from, and what its scope and limits are. Theorists generally skeptical of these positions evaluate the effectiveness of the method or approach and explain why it works - to the extent they believe it does - and why it eventually fails.ContentsFoundations of AI: The Big Issues, D. Kirsh - Logic and Artificial Intelligence, N. J. Nilsson - Rigor Mortis: A Response to Nilsson's 'Logic and Artificial Intelligence, ' L. Birnbaum - Open Information Systems Semantics for Distributed Artificial Intelligence, C. Hewitt - Social Conceptions of Knowledge and Action: DAI Foundations and Open Systems Semantics, L. Gasser - Intelligence without Representation, R. A. Brooks - Today the Earwig, Tomorrow Man? D. Kirsh - On the Thresholds of Knowledge, D. B. Lenat, E. A. Feigenbaum - The Owl and the Electric Encyclopedia, B. C. Smith - A Preliminary Analysis of the Soar

Architecture as a Basis for General Intelligence, P. S. Rosenbloom, J. E. Laird, A. Newell, R. McCarl - Approaches to the Study of Intelligence, D. A. Norman Technological tools and computational techniques have enhanced the healthcare industry. These advancements have led to significant progress and novel opportunities for biomedical engineering. Nature-Inspired Intelligent Techniques for Solving Biomedical Engineering Problems is a pivotal reference source for emerging scholarly research on trends and techniques in the utilization of nature-inspired approaches in biomedical engineering. Featuring extensive coverage on relevant areas such as artificial intelligence, clinical decision support systems, and swarm intelligence, this publication is an ideal resource for medical practitioners, professionals, students, engineers, and researchers interested in the latest developments in biomedical technologies.

The practical benefits of computational logic need not be limited to mathematics and computing. As this book shows, ordinary people in their everyday lives can profit from the recent advances that have been developed for artificial intelligence. The book draws upon related developments in various fields from philosophy to psychology and law. It pays special attention to the integration of logic with decision theory, and the use of logic to improve the clarity and coherence of communication in natural languages such as English. This book is essential reading for teachers and researchers who may be out of touch with the latest developments in computational logic. It will also be useful

in any undergraduate course that teaches practical thinking, problem solving or communication skills. Its informal presentation makes the book accessible to readers from any background, but optional, more formal, chapters are also included for those who are more technically oriented.

Use machine learning and Oracle Business Intelligence Enterprise Edition (OBIEE) as a comprehensive BI solution. This book follows a when-to, why-to, and how-to approach to explain the key steps involved in utilizing the artificial intelligence components now available for a successful OBIEE implementation. Oracle Business Intelligence with Machine Learning covers various technologies including using Oracle OBIEE, R Enterprise, Spatial Maps, and machine learning for advanced visualization and analytics. The machine learning material focuses on learning representations of input data suitable for a given prediction problem. This book focuses on the practical aspects of implementing machine learning solutions using the rich Oracle BI ecosystem. The primary objective of this book is to bridge the gap between the academic state-of-the-art and the industry state-of-the-practice by introducing you to machine learning with OBIEE. What You Will Learn See machine learning in OBIEE Master the fundamentals of machine learning and how it pertains to BI and advanced analytics Gain an introduction to Oracle R Enterprise Discover the practical considerations of implementing

machine learning with OBIEE Who This Book Is For Analytics managers, BI architects and developers, and data scientists.

This in-depth introduction for students and researchers shows how to use ASP for intelligent tasks, including answering queries, planning, and diagnostics.

This is a comprehensive book on the theories of artificial intelligence with an emphasis on their applications. It combines fuzzy logic and neural networks, as well as hidden Markov models and genetic algorithm, describes advancements and applications of these machine learning techniques and describes the problem of causality. This book should serves as a useful reference for practitioners in artificial intelligence.

As the 4th Industrial Revolution is restructuring human societal organization into, so-called, Society 5.0, the field of Machine Learning (and its sub-field of Deep Learning) and related technologies is growing continuously and rapidly, developing in both itself and towards applications in many other disciplines. Researchers worldwide aim at incorporating cognitive abilities into machines, such as learning and problem solving. When machines and software systems have been enhanced with Machine Learning/Deep Learning components, they become better and more efficient at performing specific tasks. Consequently, Machine Learning/Deep Learning stands out as a research discipline due to its

worldwide pace of growth in both theoretical advances and areas of application, while achieving very high rates of success and promising major impact in science, technology and society. The book at hand aims at exposing its readers to some of the most significant Advances in Machine Learning/Deep Learning-based Technologies. The book consists of an editorial note and an additional ten (10) chapters, all invited from authors who work on the corresponding chapter theme and are recognized for their significant research contributions. In more detail, the chapters in the book are organized into five parts, namely (i) Machine Learning/Deep Learning in Socializing and Entertainment, (ii) Machine Learning/Deep Learning in Education, (iii) Machine Learning/Deep Learning in Security, (iv) Machine Learning/Deep Learning in Time Series Forecasting, and (v) Machine Learning in Video Coding and Information Extraction. This research book is directed towards professors, researchers, scientists, engineers and students in Machine Learning/Deep Learning-related disciplines. It is also directed towards readers who come from other disciplines and are interested in becoming versed in some of the most recent Machine Learning/Deep Learning-based technologies. An extensive list of bibliographic references at the end of each chapter guides the readers to probe further into the application areas of interest to them.

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This book builds on decades of research and provides contemporary theoretical foundations for practical applications to intelligent technologies and advances in artificial intelligence (AI). Reflecting the growing realization that computational models of human reasoning and interactions can be improved by integrating heterogeneous information resources and AI techniques, its ultimate goal is to promote integrated computational approaches to intelligent computerized systems. The book covers a range of interrelated topics, in particular, computational reasoning, language, syntax, semantics, memory, and context information. The respective chapters use and develop logically oriented methods and techniques, and the topics selected are from those areas of logic that contribute to AI and provide its mathematical foundations. The intended readership includes researchers working in the areas of traditional logical foundations, and on new approaches to intelligent computational systems.

Foundations of Computational Intelligence Volume 4: Bio-Inspired Data Mining Theoretical Foundations and Applications Recent advances in the computing and electronics technology, particularly in sensor devices, databases and distributed systems, are leading to an

exponential growth in the amount of data stored in databases. It has been estimated that this amount doubles every 20 years. For some applications, this increase is even steeper. Databases storing DNA sequence, for example, are doubling their size every 10 months. This growth is occurring in several applications areas besides bioinformatics, like financial transactions, government data, environmental mo- toring, satellite and medical images, security data and web. As large organizations recognize the high value of data stored in their databases and the importance of their data collection to support decision-making, there is a clear demand for - phisticated Data Mining tools. Data mining tools play a key role in the extraction of useful knowledge from databases. They can be used either to confirm a parti- lar hypothesis or to automatically find patterns. In the second case, which is - lated to this book, the goal may be either to describe the main patterns present in dataset, what is known as descriptive Data Mining or to find patterns able to p- dict behaviour of specific attributes or features, known as predictive Data Mining. While the first goal is associated with tasks like clustering, summarization and association, the second is found in classification and regression problems.

Although recommendation systems have become a vital research area in the fields of cognitive science, approximation theory, information retrieval and management sciences, they still require improvements to make recommendation methods more effective and intelligent. Intelligent Techniques in Recommendation Systems: Contextual Advancements and New Methods is a comprehensive collection of research on the latest advancements of intelligence techniques and their application to recommendation systems and how this could improve this field of study.

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

An intelligent agent interacting with the real world will encounter individual people, courses, test results, drugs prescriptions, chairs, boxes, etc., and needs to reason about properties of these individuals and relations among them as well as cope with uncertainty. Uncertainty has been studied in probability theory and graphical models, and relations have been studied in logic, in particular in the predicate calculus and its extensions. This book examines the foundations of combining logic and probability into what are called relational probabilistic models. It introduces representations, inference, and learning techniques for probability, logic, and their combinations. The book focuses on two representations in detail: Markov logic networks, a relational extension of undirected graphical models and weighted first-order predicate calculus formula, and Problog, a probabilistic extension of logic programs that can also be viewed as a Turing-complete relational extension of Bayesian networks.

This volume contains the refereed proceedings of the 11th International Conference on Logic Programming and Nonmonotonic Reasoning, LPNMR 2011, held in May 2011 in Vancouver, Canada. The 16 revised full papers (13 technical papers, 1 application description, and 2 system descriptions) and 26 short papers (16 technical papers, 3 application description, and 7 system descriptions) which were carefully reviewed and selected from numerous submissions, are presented together with 3 invited talks. Being a forum for exchanging ideas on declarative logic programming, nonmonotonic reasoning, and knowledge representation, the conference aims to facilitate interactions between those researchers and practitioners interested in the design and implementation of logic-based programming languages and database systems, and

those who work in the area of knowledge representation and nonmonotonic reasoning. This book assesses the normative and practical challenges for artificial intelligence (AI) regulation, offers comprehensive information on the laws that currently shape or restrict the design or use of AI, and develops policy recommendations for those areas in which regulation is most urgently needed. By gathering contributions from scholars who are experts in their respective fields of legal research, it demonstrates that AI regulation is not a specialized sub-discipline, but affects the entire legal system and thus concerns all lawyers. Machine learning-based technology, which lies at the heart of what is commonly referred to as AI, is increasingly being employed to make policy and business decisions with broad social impacts, and therefore runs the risk of causing wide-scale damage. At the same time, AI technology is becoming more and more complex and difficult to understand, making it harder to determine whether or not it is being used in accordance with the law. In light of this situation, even tech enthusiasts are calling for stricter regulation of AI. Legislators, too, are stepping in and have begun to pass AI laws, including the prohibition of automated decision-making systems in Article 22 of the General Data Protection Regulation, the New York City AI transparency bill, and the 2017 amendments to the German Cartel Act and German Administrative Procedure Act. While the belief that something needs to be done is widely shared, there is far less clarity about what exactly can or should be done, or what effective regulation might look like. The book is divided into two major parts, the first of which focuses on features common to most AI systems, and explores how they relate to the legal framework for data-driven technologies, which already exists in the form of (national and supra-national) constitutional law, EU data protection and competition law, and anti-discrimination law. In the second part, the book

examines in detail a number of relevant sectors in which AI is increasingly shaping decision-making processes, ranging from the notorious social media and the legal, financial and healthcare industries, to fields like law enforcement and tax law, in which we can observe how regulation by AI is becoming a reality.

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