CommonKADS Library for Expertise Modelling

Hybridness is a topical, if somewhat ambiguous, concept in a research environment where there is increasing acceptance of multiple co-existent research paradigms: artificial intelligence with its emphasis on reasoning with abstract symbols; the connectionist approach, with its exploration of the synergies of many interconnected simple structures; and Nouvelle Robotics, which places a focus on the interplay between systems generating skill or behaviour in complete agents. There is scope for considerable argument about principles, research programmes, the Nature of Things, as well as room for compromise and synthesis. This collection of papers, presented at AISB '95 (the 10th biennial conference on AI and the Simulation of Behaviour) reveals both argument and synthesis.

Information Modelling and Knowledge Bases X

Intelligent Systems can be defined as systems whose design, mainly based on computational techniques, is supported, in some parts, by operations and processing skills inspired by human reasoning and behaviour. Intelligent Systems must typically operate in a scenario in which non-linearities are the rule and not as a disturbing effect to be corrected. Finally, Intelligent Systems also have to incorporate advanced sensory technology in order to simplify man-machine interactions. Several algorithms are currently the ordinary tools of Intelligent Systems. This book contains a selection of contributions regarding Intelligent Systems by experts in diverse fields. Topics discussed in the book are: Applications of Intelligent Systems in Modelling and Prediction of Environmental Changes, Cellular Neural Networks for NonLinear Filtering, NNs for Signal Processing, Image Processing, Transportation Intelligent Systems, Intelligent Techniques in Power Electronics, Applications in Medicine and Surgery, Hardware Implementation and Learning of NNs.

Information Modelling and Knowledge Bases V

This is the first book to present the idea of Industry 5.0 in biommanufacturing and bioprocess engineering, both upstream and downstream. The Prospect of Industry 5.0 in Biommanufacturing details the latest technologies and how they can be used efficiently and explains process analysis from an engineering point of view. In addition, it covers applications and challenges. FEATURES Describes the previous Industrial Revolution, current Industry 4.0, and how new technologies will transition toward Industry 5.0 Explains how Industry 5.0 can be applied in biommanufacturing Demonstrates new technologies catered to Industry 5.0 Uses worked examples related to biological systems This book enables readers in industry and academia working in the biommanufacturing engineering sector to understand current trends and future directions in this field.

Advanced AI Techniques and Applications in Bioinformatics

The advanced AI techniques are essential for resolving various problematic aspects emerging in the field of bioinformatics. This book covers the recent approaches in artificial intelligence and machine learning methods and their applications in Genome and Gene editing, cancer drug discovery classification, and the protein folding algorithms among others. Deep learning, which is widely used in image processing, is also applicable in bioinformatics as one of the most popular artificial intelligence approaches. The wide range of applications discussed in this book is an indispensable resource for computer scientists, engineers, biologists, mathematicians, physicians, and medical informaticists. Features: Focuses on the cross-disciplinary relation between computer science and biology and the role of machine learning methods in resolving complex problems in bioinformatics Provides a comprehensive and balanced blend of topics and applications using various advanced algorithms Presents cutting-edge research methodologies in the area of AI methods when applied to bioinformatics and innovative solutions Discusses the AI/ML techniques, their use, and their potential for use in current and future bioinformatics applications Includes recent achievements in AI and bioinformatics contributed by a global team of researchers

Intelligent Network Management and Control

AI planning is a broad research topic, linked with such issues as robotics, control theory, operations research and learning. The purpose of EWSP '93 was twofold. Planning under certainty, or classical search-based planning is one direction in the submitted papers, with approaches ranging from the introduction of conditional actions to methods based on statistics and decision theory.

OECD Digital Education Outlook 2021 Pushing the Frontiers with Artificial Intelligence, Blockchain and Robots
Research on ontology is becoming increasingly widespread in the computer science community. While this term has been rather confined to the philosophical sphere in the past, it is now gaining a specific role in areas such as Artificial Intelligence, Computational Linguistics, and Databases. Its importance has been recognized in fields as diverse as knowledge engineering, knowledge representation, qualitative modeling, language engineering, database design, information integration, object-oriented analysis, information retrieval and extraction, knowledge management and organization, agent-based systems design. Current applications areas are disparate, including enterprise integration, natural language translation, medicine, mechanical engineering, electronic commerce, geographic information systems, legal information systems, and biological information systems. Various workshops addressing the engineering aspects of ontology have been held in the recent years. However, ontology by 'its very nature' ought to be a unifying discipline. Insights in this field have potential impact on the whole area of information systems (taking this term in its broadest sense), as testified by the interest recently shown by international standards organizations. In order to provide a solid general foundation for this work, it is therefore important to focus on the common scientific principles and open problems arising from current tools, methodologies, and applications of ontology.

Risks of Artificial Intelligence

This book presents research in an interdisciplinary field, resulting from the vigorous and fruitful cross-pollination between traditional deontic logic and computer science. AI researchers have used deontic logic as one of the tools in modelling legal reasoning. Computer scientists have discovered that computer systems (including their interaction with other computer systems and with human agents) can often be productively modelled as norm-governed. So, for example, deontic logic has been applied by computer scientists for specifying bureaucratic systems, access and security policies, and soft design or integrity constraints, and for modelling fault tolerance. In turn, computer scientists and AI researchers have also discovered (and made it clear to the rest of us) that various formal tools (e.g. nonmonotonic, temporal and dynamic logics) developed in computer science and artificial intelligence have interesting applications to traditional issues in deontic logic. This volume presents some of the best work done in this area, with the selection at once reflecting the general interdisciplinary (and international) character that this area of research has taken on, as well as reflecting the more specific recent inter-disciplinary developments between traditional deontic logic and computer science.

Künstliche Intelligenz in der Gesellschaft

Dealing with the theme of prospects for artificial intelligence as the general science of intelligence, this work covers a wide range of topics. It attempts to identify trends and projects into the future, instead of simply surveying past achievements.

Prospects for artificial intelligence

Model-based Reasoning about Learner Behaviour

Artificial Intelligence in Education, 1997

If the intelligence of artificial systems were to surpass that of humans, humanity would face significant risks. The time has come to consider these issues, and this consideration must include progress in artificial intelligence (AI) as much as insights from AI theory. Featuring contributions from leading experts and thinkers in artificial intelligence, Risks of Artificial Intelligence is the first volume of collected chapters dedicated to examining the risks of AI. The book evaluates predictions of the future of AI, proposes ways to ensure that AI systems will be beneficial to humans, and then critically evaluates such proposals. The book covers the latest research on the risks and future impacts of AI. It starts with an introduction to the problem of risk and the future of artificial intelligence, followed by a discussion (Armstrong/Sokalia/Oehigeartaigh) on how predictions of its future have fared to date. Omohundro makes the point that even an innocuous artificial agent can easily turn into a serious threat for humans. T. Goertzel explains how to succeed in the design of artificial agents. But will these be a threat for humanity, or a useful tool? Ways to assure beneficial outcomes through 'machine ethics' and 'utility functions' are discussed by Brundage and Yampolskiy. B. Goertzel and Potapov/Rodionov propose 'learning' and 'empathy' as paths towards safer AI while Korvat explains how the impact of AI may be bounded. Sandberg explains the implications of human-like AI via the technique of brain emulation. Dewey discusses strategies to deal with the 'fast takeoff' of artificial intelligence and, finally, Bishop explains why there is no need to worry because computers will remain in a state of 'artificial stupidity'. Sharing insights from leading thinkers in artificial intelligence, this book provides you with an expert-level perspective of what is on the horizon for AI, whether it will be a threat for humanity, and how we might counteract this threat.

Qualitative Spatial Reasoning

Spatiotemporal models are emerging as a very important topic in several disciplines, including neurobiology and artificial neural networks. Many hard problems exist in this area. Examples include understanding the capabilities of nonlinear dynamical systems on a lattice and of networks of spiking neurons (both natural and artificial), training such systems, implementing them in hardware, understanding biological signals like the EEG, etc. Besides the state-of-the-art in the area of spatiotemporal models, the book also covers the neurobiological, and the artificial systems communities.

Information Modelling and Knowledge Bases VI

This book constitutes the proceedings of the Second International Conference on Pattern Recognition and Artificial Intelligence, ICPRAI 2020, which took place in Zhongshan, China, in October 2020. The 49 full and 14 short
papers presented were carefully reviewed and selected for inclusion in the book. The papers were organized in topical sections as follows: handwriting and text processing; features and classifiers; deep learning; computer vision and image processing; medical imaging and applications; and forensic studies and medical diagnosis.

Reusable Components for Knowledge Modelling


Prospects for Artificial Intelligence

Intelligent agent and distributed AI (DAI) approaches attach specific conditions to cooperative exchanges between intelligent systems, that go far beyond simple functional interoperability. Ideally, systems that pursue local or global goals, coordinate their actions, share knowledge, and resolve conflicts during their interactions within groups of similar or dissimilar agents can be viewed as cooperative coarse-grained systems. The infrastructure of telecommunications is a world in transition. There are a number of trends that contribute to this: convergence of traditional telephony and data network worlds, blurring of boundaries between public and private networks, complementary evolution of wireline, wireless, and cable network infrastructures, the emergence of integrated broadband multimedia networks and, of course, the information superhighway. Up to now, despite the effort that has gone into this area, the field of intelligent agents research has not yet led to many fielded systems. Telecommunications applications pose strong requirements to agents such as: reliability, real-time performance, openness, security management and other integrated management, and mobility. In order to fulfill its promise, intelligent agents need to be fully dependable and typically require an integrated set of capabilities. This is the challenge that exists for intelligent agents technology in this application domain.

Artificial Intelligence and Economic Analysis


Hybrid Intelligent Systems

LISTENING TO MUSIC is designed to help develop and refine the listening skills of your students and inspire a lifelong appreciation of music. Author and award-winning scholar-teacher Craig Wright, who has taught Music Appreciation courses for more than 35 years, is consistently praised by reviewers and other professors for his unparalleled accuracy and his clear, direct, conversational style. Throughout the book, Wright connects with today's students by incorporating comparisons between pop and classical music and by using examples from popular artists to illustrate core concepts. This chronological text succinctly covers traditional Western music from medieval to modern, discussing examples from each historical period within their social contexts and the construction of each piece. Later chapters cover popular music, its impact on musical globalization, and comparisons between Western and non-Western music. LISTENING TO MUSIC is the only text that provides Craig Wright's own Listening Exercises, in the book and online, which help students focus on important musical elements and episodes. A free CD, packaged with each printed copy of the text, includes all of the musical examples for the Part 1 listening exercises. A full set of optional online student resources includes Active Listening Guides, streaming music, an interactive eBook, quizzing, and more--all to challenge your students. All of the music discussed in the text is also available on CD and on Sony Music download cards. Available with InfoTrac Student Collections http://gocengage.com/infotrac.

Hybrid Problems, Hybrid Solutions

Simulators are becoming standard equipment for interactive learning environments. They allow for attractive teaching with a large degree of freedom for the learner. However, without proper guidance, the learner easily gets lost in a simulation environment. Providing guidance requires an image of what the learner is doing. Acquiring this image by diagnosing the behaviour of the learner is a complex and resource-intensive task for which yet no general approach exists. In this book, we apply existing ideas and techniques from the field of model-based reasoning and diagnosis to interactive learning environments. We present a framework for subject matter modelling and diagnosis of learner behaviour. The framework defines generic techniques for automatically generating subject matter models from qualitative simulations. A generic model-based engine employs these models for diagnosing the learner's behaviour. The framework provides a powerful and reusable approach to individualising guidance in educational systems.

Chaos and Society

An Introduction to Artificial Intelligence in Education

The major theme of this book is Intelligent Agents. An agent is a hardware or software system that is autonomous, interactive with and reactive to its environment and other agents. An agent can also be pro-active in taking the
initiative in goal-directed behaviour. Intelligent Agents are one of the most important and exciting areas of research and development in computer science today.

Advances in Molecular Bioinformatics

Information modelling is the essential part of information systems design. Design methods, specification languages, and tools tend to become application dependent, aiming at integration of methodologies stretching from traditional database design to knowledge bases, and including use of logical languages, and process oriented reactive systems description. The topics of the articles cover a wide variety of themes in the domain of information modelling, specifications of information systems and knowledge bases, ranging from foundations and theories to systems construction and application studies. The contributions are grouped into the following major categories:

- Genetic Algorithms in Optimisation, Simulation and Modelling

Information Modelling and Knowledge Bases VIII

The management and control of networks can no longer be envisaged without the introduction of artificial intelligence at all stages. Intelligent Network Management and Control deals with topical issues related mainly to intelligent network design, deployment of security services in SDN (Software-Defined Networking), optimization of networks using artificial intelligence techniques and multi-criteria optimization methods for selecting networks in a heterogeneous environment. This book also focuses on selecting cloud computing services, intelligent unloading of calculations in the context of mobile cloud computing, intelligent resource management in a smart grid-cloud system for better energy efficiency, new architectures for the Internet of Vehicles (IoV), the application of artificial intelligence in cognitive radio networks and intelligent radio input to meet the on-road communication needs of autonomous vehicles.

Formal Ontology in Information Systems

Information modelling is the essential part of information system design. Design methods, specification languages, and tools tend to become application dependent, aiming at integration of methodologies stretching from traditional database design to advanced knowledge bases, and including use of logical languages, and process oriented system description. The topics of the articles cover a wide variety of themes in the domain of information modelling, specifications of information systems and knowledge bases, ranging from foundations and theories to systems construction and application studies. The contributions represent the following major themes: the use of ontologies in knowledge modelling concept modelling and conceptual modelling database modelling: applications of object-oriented modelling view integration and consistency checking modelling multimedia and multimedia models design methods process modelling formal systems.

Genetic Algorithms in Optimisation, Simulation and Modelling

Information Modelling and Knowledge Bases IX

This important book presents new and original work at the frontiers of economics, namely the interface between artificial intelligence (AI) and neoclassical economics. Artificial Intelligence and Economic Analysis focuses on three quite distinct lines of AI orientated research in economics: applications intended to extend neoclassical theory, applications intended to undermine neoclassical theory and applications which ignore neoclassical theory in the quest for new modelling techniques and fields of analysis. The contributors - all of whom are well established in the field - do not simply report established results but seek to identify those areas where the science of artificial intelligence could enrich standard economic analysis. It includes material from mainstream economists who are willing to express their own views about the limits of mainstream economic modelling and AI based economic modelling. The book makes an important contribution to a new and exciting area of economics which holds much hope for the future.

Worldwide Intelligent Systems

This book highlights the recent research on hybrid intelligent systems and their various practical applications. It presents 58 selected papers from the 20th International Conference on Hybrid Intelligent Systems (HIS 2020) and 20 papers from the 12th World Congress on Nature and Biologically Inspired Computing (NaBIC 2020), which was held online, from December 14 to 16, 2020. A premier conference in the field of artificial intelligence, HIS - NaBIC 2020 brought together researchers, engineers and practitioners whose work involves intelligent systems, network security and their applications in industry. Including contributions by authors from 25 countries, the book offers a valuable reference guide for all researchers, students and practitioners in the fields of science and engineering.

The Prospect of Industry 5.0 in Biomanufacturing

The theme of this book is Knowledge and Media in Learning Systems, and papers that explore the emerging roles of intelligent multimedia and distributed technologies as well as computer supported collaboration within that theme are included. The spread of topics is very wide encompassing both well-established areas such as student modelling as well as more novel topics such as distributed intelligent tutoring on the World Wide Web. Far from
undermining the need to understand how learning and teaching interact, the newer media continue to emphasise the interdependence of these two processes. Collaboration and tools for collaboration are the major topics of interest. Understanding how human learners collaborate, how peer tutoring works and how the computer can play a useful role as either a more able or even a less able learning partner are all explored here.

Pattern Recognition and Artificial Intelligence

This book examines the implementation and applications of genetic algorithms (GA) to the domain of AI. In recent years the trend towards, real world applications is gaining ground especially in GA. The general purpose nature of GA is examined from an interdisciplinary point of view. Despite the differences that may exist in between representations across domain problems the commonality of in the design of GA is upheld. This work provides an overview of the current developments in Europe a section is devoted to the programming of Parallel Genetic Algorithms (including GAME) and a section on Optimisation and Complex Modelling. Readers: researchers in AI, mathematics and computing.

Advances in Intelligent Systems

Network Pharmacology

Telecommunications firms worldwide are actively involved in AI applications for resolving network management and telecommunications problems. This book adresses the following major functional areas: planning, scheduling, monitoring, control, fault classification and diagnosis, training and help desks. Recent and emerging AI techniques are applied, including neural networks, expert systems, integrating rule-based systems with case-based reasoning systems, genetic algorithms, distributed AI and intelligent tutoring systems. Readers: researchers and professionals in telecommunication, AI experts and graduate students.

Intelligent Agents for Telecommunications Applications

Knowledge-based Software Engineering

How might digital technology and notably smart technologies based on artificial intelligence (AI), learning analytics, robotics, and others transform education? This book explores such question. It focuses on how smart technologies currently change education in the classroom and the management of educational organisations and systems.

Spatiotemporal Models in Biological and Artificial Systems

Presenting an analysis of different approaches for predicting the service life of buildings, this monograph discusses various statistical tools and mathematical models, some of which have rarely been applied to the field. It explores methods including deterministic, factorial, stochastic and computational models and applies these to façade claddings. The models allow (i) identification of patterns of degradation, (ii) estimation of service life, (iii) analysis of loss of performance employing probability functions, and (iv) estimation of service life using a probability distribution. The final chapter discusses the differences between the different methodologies and their advantages and limitations. The authors also argue that a better understanding of the service life of buildings results in more efficient building maintenance and reduced environmental costs. It not only provides an invaluable resource to students, researchers and industry professionals interested in service life prediction and sustainable construction, but is also of interest to environmental and materials scientists.

SCAI '97

This is the fifth volume in a sub-series based on the joint effort of Nordic and Japanese scientists in the field of information modelling and knowledge bases.
Methodologies for Service Life Prediction of Buildings

The re-use of abstract models of problem solving is a major step towards cost-effective and quality-assured knowledge-based system development. The techniques are discussed in this text.

New Directions in AI Planning

With the aim of automatically reasoning with spatial aspects in a cognitive way, several qualitative models have been developed recently in the Qualitative Spatial Reasoning field. However, there is no model to reason with several spatial aspects in a uniform way. Moreover, most of these models simplify spatial objects to points. In this book we present a novel approach for integrating the qualitative concepts of orientation, distance, and cardinal directions, using points as well as extended objects as primitive of reasoning, based on Constraint Logic Programming. The resulting model has been applied to build a qualitative Navigation Simulator on the structured environment of the city of Castellon.

Current Trends in AI Planning

Norms, Logics and Information Systems

This sixth IMKB volume attempts to synthesize research done over a longer period of time in a reference book format. The work presents in survey articles the efforts to study foundations and applications of conceptual modelling in various environments. The motivation of these efforts is the fact that conceptual modelling and knowledge representation together with various kinds of inference systems are important subfields in the design and use of information systems. The modelling problem is essential in many disciplines, such as database design, knowledge engineering, logic, artificial intelligence, cognitive science, philosophy, linguistics, etc. A central and comprehensive bibliography is included.

Artificial Intelligence

This text collects contributions from different countries to a wide range of topics in software engineering. Special emphasis is given to application of knowledge-base methods to software engineering problems. The papers tackle such areas as architecture of software and design patterns.