

Comparing System Dynamics And Agent Based Simulation For

This volume constitutes the thoroughly refereed post-conference proceedings of the 10th International Workshop on Agent-Oriented Software Engineering, AOSE 2009, held in Budapest, Hungary, in May 2009 as part of AAMAS 2009, the 8th International Conference on Autonomous Agents and Multiagent Systems. The 10 revised full papers presented were carefully selected from numerous initial submissions during two rounds of reviewing and improvement. The papers have been organized into three sections on multi-agent organizations, concrete development techniques, and - one step higher - going beyond the concrete technique and proposing a development method for designing concrete types of systems. This state-of-the-art survey is rounded off by five additional lectures addressing key areas in development: agent-oriented modelling languages, implementation of MAS, testing of MAS, software processes, and formal methods for the development of MAS. They permit analysis of the current state in the generation of specifications of MAS, the way these specifications can be implemented, how they can be validated, and what steps are necessary to do so.

This book constitutes the revised versions of the invited and selected papers from the Second Epistemological Perspectives on Simulation Workshop, EPOS 2006, which was held in Brescia, Italy, during October 5-6, 2006. The 11 papers presented together with 2 invited papers were carefully reviewed and selected from 35 submissions. The topics addressed were epistemological and methodological contents, such as the relevance of empirical foundations for agent-based simulations, the role of theory, the concepts and meaning of emergence, the trade-off between simplification and complexification of models.

John Morecroft's book is an ideal text for students interested in system modelling and its application to a range of real world problems. The book covers all that is necessary to develop expertise in system dynamics modelling and through the range of applications makes a persuasive case for the power and scope of the approach. As such it will appeal to practitioners as well as students. Robert Dyson, Professor of Operational Research, Associate Dean, Warwick Business School. Much more than an introduction, John Morecroft's Strategic Modelling and Business Dynamics uses interactive "management flight simulators" to create an engaging and effective learning environment in which readers, whatever their background, can develop their intuition about complex dynamic systems. The numerous examples provide a rich test-bed for the development of systems thinking and modelling skills John Sterman, Jay W. Forrester Professor of Management, MIT Sloan School of Management This book, with its vivid examples and simulators, will help to bring modelling, system dynamics and simulation into the mainstream of management education where they now belong. John A. Quelch, Professor of Marketing, Harvard Business School, Former Dean of London Business School This text fills the gap between texts focusing on the purely descriptive systems approach and the more technical system dynamics ones. Ann van Ackere, Professor of Decision Sciences, HEC Lausanne, Universit? de Lausanne Strategic modelling based on system dynamics is a powerful tool for understanding how firms adapt to a changing environment. The author demonstrates the appeal and power of business modelling to make sense of strategic initiatives and to anticipate their impacts through simulation. The book offers various simulators that allow readers to conduct their own policy experiments. Dr. Erich Zahn, Professor of Strategic Management, Betriebswirtschaftliches Institut, University of Stuttgart A website to accompany the book can be found at www.wiley.com/college/morecroft housing supplementary material for both students and lecturers.

"This set of books represents a detailed compendium of authoritative, research-based entries

that define the contemporary state of knowledge on technology"--Provided by publisher.

This volume focuses on critical issues surrounding the intersection of genetics, health, and society. It provides a critical examination of sociological and biomedical approaches to genomics, including strengths and limitations of each perspective.

This is the era of Big Data and computational social science. It is an era that requires tools which can do more than visualise data but also model the complex relation between data and human action and interaction. Agent-Based Models (ABM) - computational models which simulate human action and interaction – do just that. This textbook explains how to design and build ABM and how to link the models to Geographical Information Systems. It guides you from the basics through to constructing more complex models which work with data and human behaviour in a spatial context. All of the fundamental concepts are explained and related to practical examples to facilitate learning (with models developed in NetLogo with all code examples available on the accompanying website). You will be able to use these models to develop your own applications and link, where appropriate, to Geographical Information Systems. All of the key ideas and methods are explained in detail: geographical modelling; an introduction to ABM; the fundamentals of Geographical Information Science; why ABM and GIS; using QGIS; designing and building an ABM; calibration and validation; modelling human behaviour; visualisation and 3D ABM; using Big Geosocial Data, GIS and ABM. An applied primer, that provides fundamental knowledge and practical skills, it will provide you with the skills to build and run your own models, and to begin your own research projects.

This book gathers the peer-reviewed papers presented at the seventh edition of the international workshop "Service Orientation in Holonic and Multi-Agent Manufacturing - SOHOMA'17", held on October 19-20, 2017 and organized by the University of Nantes, France in collaboration with the CIMR Research Centre in Computer Integrated Manufacturing and Robotics at the University Politehnica of Bucharest, Romania, the LAMIH Laboratory of Industrial and Human Automation Control, Mechanical Engineering and Computer Science at the University of Valenciennes and Hainaut-Cambrésis, France and the CRAN Research Centre for Automatic Control, Nancy at the University of Lorraine, France. The main objective of SOHOMA'17 was to foster innovation in smart and sustainable manufacturing and logistics systems and in this context to promote concepts, methods and solutions addressing trends in service orientation of agent-based control technologies with distributed intelligence. The book is organized in eight parts, each with a number of chapters describing research in current domains of the digital transformation in manufacturing and trends in future service and computing oriented manufacturing control: Part 1: Advanced Manufacturing Control, Part 2: Big Data Management, Part 3: Cyber-Physical Production Systems, Part 4: Cloud- and Cyber-Physical Systems for Smart and Sustainable Manufacturing, Part 5: Simulation for Physical Internet and Intelligent & Sustainable Logistics Systems, Part 6: Formal Methods and Advanced Scheduling for Future Industrial Systems, Part 7: Applications and Demonstrators, Part 8: Production and Logistic Control Systems. The contributions focus on how the digital transformation, such as the one advocated by "Industry 4.0" or "Industry of the future" concepts, can improve the maintainability and the sustainability of manufacturing processes, products, and logistics. Digital transformation relates to the interaction between the physical and informational worlds and is realized by virtualization of products, processes and resources managed as services.

Mitigating climate change is one of the most profound challenges facing humankind. In industrialized countries, the residential housing sector produces roughly one-fourth of the greenhouse gas emissions. One solution to reduce these emissions is the availability of building codes that require high levels of energy efficiency. Given the current scientific knowledge, more research is needed to gain a proper systemic understanding of the underlying socio-economic and technical system. Such an understanding is crucial for

developing high energy-efficiency standards because this system develops gradually over time and cannot be changed swiftly. This book creates a feedback-rich simulation model for analyzing the effects of different administrative policies on energy demand, the improvement of energy efficiency by means of building codes, and reductions in the greenhouse gas emissions. The dynamic model can contribute substantially to the discourse on energy policies and guide effective administrative interventions. The book will be a valuable resource for officials in the public energy administration, as well as researchers in the areas of innovation, diffusion processes, co-evolution, standardization, and simulation modelling.

Model-Based Approaches to Learning provides a new perspective called learning by system modeling. This book explores the learning impact of students when constructing models of complex systems.

Operational Research (OR) deals with the use of advanced analytical methods to support better decision-making. It is multidisciplinary with strong links to management science, decision science, computer science and many application areas such as engineering, manufacturing, commerce and healthcare. In the study of emergent behaviour in complex adaptive systems, Agent-based Modelling & Simulation (ABMS) is being used in many different domains such as healthcare, energy, evacuation, commerce, manufacturing and defense. This collection of articles presents a convenient introduction to ABMS with papers ranging from contemporary views to representative case studies. The OR Essentials series presents a unique cross-section of high quality research work fundamental to understanding contemporary issues and research across a range of Operational Research (OR) topics. It brings together some of the best research papers from the esteemed Operational Research Society and its associated journals, also published by Palgrave Macmillan.

Comparing System Dynamics and Agent-based Simulation Agent-based Modeling and Simulation Springer

This book contains a selection of papers presented during a special workshop on Complexity Science organized as part of the 9th International Conference on GIScience 2016. Expert researchers in the areas of Agent-Based Modeling, Complexity Theory, Network Theory, Big Data, and emerging methods of Analysis and Visualization for new types of data explore novel complexity science approaches to dynamic geographic phenomena and their applications, addressing challenges and enriching research methodologies in geography in a Big Data Era.

For reseach in all subjects and among different philisopical paradigms, research methodologies form one of the key issues to rely on. This volume brings a series of papers together, which present different research methodologies as applied in supply chain management. This comprises review oriented papers that look at what kind of methodologies have been applied, as well as methodological papers discussing new developments needed to successfully conduct research in supply chain management. The third group is made up of applications of the respective methodologies, which serve as examples on how the different methodological approaches can be applied. All papers have undergone a review process to

ensure their quality. Therefore, we hope that this book will serve as a valid source for current and future researchers in the field. While the workshop on "Research Methodologies in Supply Chain Management" took place at the Supply Chain Management Center, Carl von Ossietzky University in Oldenburg, Germany, it is based on a collaboration with the Supply Chain Management Group of the Department of Operations Management at the Copenhagen Business School and the Department of Production Management at the Vienna University of Economics and Business Administration. We would like to thank all those who contributed to the workshop and this book.

This series is directed to diverse managerial professionals who are leading the transformation of individual domains by using expert information and domain knowledge to drive decision support systems (DSSs). The series offers a broad range of subjects addressed in specific areas such as health care, business management, banking, agriculture, environmental improvement, natural resource and spatial management, aviation administration, and hybrid applications of information technology aimed to interdisciplinary issues. This book series is composed of three volumes: Volume 1 consists of general concepts and methodology of DSSs; Volume 2 consists of applications of DSSs in the biomedical domain; Volume 3 consists of hybrid applications of DSSs in multidisciplinary domains. The book is shaped upon decision support strategies in the new infrastructure that assists the readers in full use of the creative technology to manipulate input data and to transform information into useful decisions for decision makers.

HICSS 2005 consists of over 550 papers in nine major tracks. HICSS provides a unique source of ideas, advances, and applications among academicians and practitioners in the information, computing, and system sciences. The HICSS series of conferences is now in the 38th year. Very few conferences have been able to grow and develop as HICSS has over this period. The computer age is barely 50 years old, and HICSS has been an important event in the world of computer science and information technology during most of that time.

"This reference set provides a complete understanding of the development of applications and concepts in clinical, patient, and hospital information systems"--Provided by publisher.

"This book consists of selections from the Encyclopedia of complexity and systems science edited by Robert A. Myers"--T.p. verso.

Human resources management is essential for any workplace environment and is deemed most effective when a strategic focus is in place to ensure that people can facilitate that achievement of organizational goals. But, effective human resource management also contains an element of risk management for an organization which, as a minimum, ensures legislative compliance. Human Resources Management: Concepts, Methodologies, Tools, and Applications compiles the most sought after case studies, architectures, frameworks, methodologies, and research related to human resources management. Including over 100 chapters from professional, this three-volume collection presents an in-depth analysis on the fundamental aspects, tools and technologies, methods and design, applications, managerial

impact, social/behavioral perspectives, critical issues, and emerging trends in the field, touching on effective and ineffective management practices when it comes to human resources. This multi-volume work is vital and highly accessible across the hybrid domain of business and management, essential for any library collection.

This book constitutes the refereed proceedings of the 11th International Conference on Artificial Immune Systems, ICARIS 2012, held in Taormina, Italy, in August 2012. The 19 revised selected papers presented were carefully reviewed and selected for inclusion in this book. In addition 4 papers of the workshop on bio and immune inspired algorithms and models for multi-level complex systems are included in this volume. Artificial immune systems (AIS) is a diverse and maturing area of research that bridges the disciplines of immunology, biology, medical science, computer science, physics, mathematics and engineering. The scope of AIS ranges from modelling and simulation of the immune system through to immune-inspired algorithms and *in silico*, *in vitro* and *in vivo* solutions.

Agent-based simulation has become increasingly popular as a modeling approach in the social sciences because it enables researchers to build models where individual entities and their interactions are directly represented. The Second Edition of Nigel Gilbert's *Agent-Based Models* introduces this technique; considers a range of methodological and theoretical issues; shows how to design an agent-based model, with a simple example; offers some practical advice about developing, verifying and validating agent-based models; and finally discusses how to plan an agent-based modelling project, publish the results and apply agent-based modeling to formulate and evaluate social and economic policies. An accompanying simulation using NetLogo and commentary on the program can be downloaded on the book's website: <https://study.sagepub.com/researchmethods/qass/gilbert-agent-based-models-2e>

This book contains all refereed papers that were accepted to the fourth edition of the « Complex Systems Design & Management » (CSD&M 2013) international conference which took place in Paris (France) from December 4-6, 2013. These proceedings cover the most recent trends in the emerging field of complex systems sciences & practices from an industrial and academic perspective, including the main industrial domains (transport, defense & security, electronics, energy & environment, e-services), scientific & technical topics (systems fundamentals, systems architecture & engineering, systems metrics & quality, systemic tools) and system types (transportation systems, embedded systems, software & information systems, systems of systems, artificial ecosystems). The CSD&M 2013 conference is organized under the guidance of the CESAMES non-profit organization.

The AI conference series is the premier event sponsored by the Canadian Society for the Computational Studies of Intelligence / Société canadienne pour l'étude d'intelligence par ordinateur. Attendees enjoy our typically Canadian atmosphere –hospitable and stimulating. The Canadian AI conference showcases the excellent research work done by Canadians, their international colleagues, and others choosing to join us each spring. International participation is always high; this year almost 40% of the submitted papers were from non-Canadian researchers. We accepted 24 papers and 8 poster papers from 52 full-length papers submitted. We also accepted eight of ten abstracts submitted to the Graduate Student Symposium. All of these accepted papers appear in this volume. The Canadian AI Conference is the oldest continuously-held national AI conference in the world. (ECCAI's predecessor, AISB, held meetings in 1974, but these have since become international.) Conferences have been held biennially since 1976, and annually since 2000. AI 2002 again joined its sister Canadian computer science conferences, Vision Interface and Graphics Interface, enriching the experience for all participants. The joint meeting allows us to stay informed about other areas, to make new contacts, and perhaps to investigate cross-disciplinary research. This year the conferences were held on the beautiful campus of the University of Calgary, and many participants took the opportunity to tour nearby Banff and the magnificent Rocky Mountains.

This book constitutes the post-conference proceedings of the Third International Workshop on Machine Learning, Optimization, and Big Data, MOD 2017, held in Volterra, Italy, in September 2017. The 50 full papers presented were carefully reviewed and selected from 126 submissions. The papers cover topics in the field of machine learning, artificial intelligence, computational optimization and data science presenting a substantial array of ideas, technologies, algorithms, methods and applications.

Seascape Ecology provides a comprehensive look at the state-of-the-science in the application of landscape ecology to the seas and provides guidance for future research priorities. The first book devoted exclusively to this rapidly emerging and increasingly important discipline, it is comprised of contributions from researchers at the forefront of seascape ecology working around the world. It presents the principles, concepts, methodology, and techniques informing seascape ecology and reports on the latest developments in the application of the approach to marine ecology and management. A growing number of marine scientists, geographers, and marine managers are asking questions about the marine environment that are best addressed with a landscape ecology perspective. Seascape Ecology represents the first serious effort to fill the gap in the literature on the subject. Key topics and features of interest include: The origins and history of seascape ecology and various approaches to spatial patterning in the sea The links between seascape patterns and ecological processes, with special attention paid to the roles played by seagrasses and salt marshes and animal movements through seascapes Human influences on seascape ecology—includes models for assessing human-seascape interactions A special epilogue in which three eminent scientists who have been instrumental in shaping the course of landscape ecology offer their insights and perspectives Seascape Ecology is a must-read for researchers and professionals in an array of disciplines, including marine biology, environmental science, geosciences, marine and coastal management, and environmental protection. It is also an excellent supplementary text for university courses in those fields.

The Handbook of Applied System Science is organized around both methodological approaches in systems science, and the substantive topic to which these approaches have been applied. The volume begins with an essay that introduces three system science methods: agent-based modeling, system dynamics, and network analysis. The remainder of the volume is organized around three broad topics: (1) health and human development, (2) environment and sustainability, and (3) communities and social change. Each part begins with a brief introductory essay, and includes nine chapters that demonstrate the application of system science methods to address research questions in these areas. This handbook will be useful for work in Public Health, Sociology, Criminal Justice, Social Work, Political Science, Environmental Studies, Urban Studies, and Psychology.

Fifteen papers were presented at the first workshop on Multi-Agent Systems and Agent-Based Simulation held as part of the Agents World conference in Paris, July 4-- 6, 1998. The workshop was designed to bring together two developing communities: the multi-agent systems researchers who were the core participants at Agents World, and social scientists interested in using MAS as a research tool. Most of the social sciences were represented, with contributions touching on sociology, management science, economics, psychology, environmental science, ecology, and linguistics. The workshop was organised in association with SimSoc, an informal group of social scientists who have arranged an irregular series of influential workshops on using simulation in the social sciences beginning in 1992. While the papers were quite heterogeneous in substantive domain and in their disciplinary origins, there were several themes which

recurred during the workshop. One of these was considered in more depth in a round table discussion led by Jim Doran at the end of the workshop on 'Representing cognition for social simulation', which addressed the issue of whether and how cognition should be modelled. Quite divergent views were expressed, with some participants denying that individual cognition needed to be modelled at all, and others arguing that cognition must be at the centre of social simulation.

"This book provides theoretical frameworks and the latest empirical research findings used by medical professionals in the implementation of multi-agent systems"--Provided by publisher.

In recent years, there has been a growing debate, particularly in the UK and Europe, over the merits of using discrete-event simulation (DES) and system dynamics (SD); there are now instances where both methodologies were employed on the same problem. This book details each method, comparing each in terms of both theory and their application to various problem situations. It also provides a seamless treatment of various topics--theory, philosophy, detailed mechanics, practical implementation--providing a systematic treatment of the methodologies of DES and SD, which previously have been treated separately.

The analogy of immune system computation works in a similar manner to the concept of neural network computing. The authors present an overview of how the immune system can be perceived from a computational perspective and used in real applications.

This book constitutes the refereed proceedings of the 15th International Conference on Principles and Practice of Multi-Agent Systems, PRIMA 2012, held in Kuching, Sarawak, Malaysia, in September 2012. The conference was collocated with the 12th Pacific Rim International Conference on Artificial Intelligence, PRICAI. The 17 revised full papers presented were carefully reviewed and selected from 42 submissions. The papers are organized in topical sections on foundations, auctions and negotiation, coalition formation and teamwork, norms and institutions, and applications.

The two-volume set LNAI 8856 and LNAI 8857 constitutes the proceedings of the 13th Mexican International Conference on Artificial Intelligence, MICAI 2014, held in Tuxtla, Mexico, in November 2014. The total of 87 papers plus 1 invited talk presented in these proceedings were carefully reviewed and selected from 348 submissions. The first volume deals with advances in human-inspired computing and its applications. It contains 44 papers structured into seven sections: natural language processing, natural language processing applications, opinion mining, sentiment analysis, and social network applications, computer vision, image processing, logic, reasoning, and multi-agent systems, and intelligent tutoring systems. The second volume deals with advances in nature-inspired computation and machine learning and contains also 44 papers structured into eight sections: genetic and evolutionary algorithms, neural networks, machine learning, machine learning applications to audio and text, data mining, fuzzy logic, robotics, planning, and scheduling, and biomedical applications.

In our increasingly globally interconnected world, understanding and appreciating the sociocultural context within which individuals make their decisions is critical to developing successful partnerships. The collection of chapters in this volume illustrates how advances in information and social media technologies, as well as modeling and simulation tools, combined with the social sciences, can be leveraged to better

understand how sociocultural context influences decision making. The chapters in this volume were contributed by leading experts from academia, industry, and government and provide: Insights into cross-cultural decision making based on recent international events, with grounding in an historical context Discussions of cutting-edge modeling techniques used today by professionals across multiple organizations and agencies Descriptions of specific cross-cultural decision making tools designed for use by laypeople and professionals Case studies on the role of cross-cultural decision making grounded in current events and (in many cases) military applications.

An accessible synthesis of a decade of multidisciplinary research into how diverse actors exercise authority in environmental decision making.

This book both analyzes and synthesizes new cutting-edge theories and methods for future design implementations in smart cities through interdisciplinary synergizing of architecture, technology, and the Internet of Things (IoT). Implementation of IoT enables the collection and data exchange of objects embedded with electronics, software, sensors, and network connectivity. Recently IoT practices have moved into uniquely identifiable objects that are able to transfer data directly into networks. This book features new technologically advanced ideas, highlighting properties of smart future city networks. Chapter contributors include theorists, computer scientists, mathematicians, and interdisciplinary planners, who currently work on identifying theories, essential elements, and practices where the IoT can impact the formation of smart cities and sustainability via optimization, network analyses, data mining, mathematical modeling and engineering. Moreover, this book includes research-based theories and real world practices aimed toward graduate researchers, experts, practitioners and the general public interested in architecture, engineering, mathematical modeling, industrial design, computer science technologies, and related fields.

"This book presents a comprehensive resource elucidating the adoption and usage of health informatics"--Provided by publisher.

"This book provides original research on the theoretical and applied aspects of artificial life, as well as addresses scientific, psychological, and social issues of synthetic life-like behavior and abilities"--Provided by publisher.

The two-volume set of LNCS 10385 and 10386, constitutes the proceedings of the 8th International Conference on Advances in Swarm Intelligence, ICSI 2017, held in Fukuoka, Japan, in July/August 2017. The total of 133 papers presented in these volumes was carefully reviewed and selected from 267 submissions. The paper were organized in topical sections as follows: Part I: theories and models of swarm intelligence; novel swarm-based optimization algorithms; particle swarm optimization; applications of particle swarm optimization; ant colony optimization; artificial bee colony algorithms; genetic algorithms; differential evolution; fireworks algorithm; brain storm optimization algorithm; cuckoo search; and firefly algorithm. Part II: multi-objective optimization; portfolio optimization; community detection; multi-agent systems and swarm robotics; hybrid optimization algorithms and applications; fuzzy and swarm approach; clustering and forecast; classification and detection; planning and routing problems; dialog system applications; robotic control; and other applications.

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