

Modeling Simulation And Visual Analysis Of Crowds A Multidisciplinary Perspective The International Series In Video Computing

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Geometric and Discrete Path Planning for Interactive Virtual Worlds - Marcelo Kallmann

2016-01-28

Path planning and navigation are indispensable components for controlling autonomous agents in interactive virtual worlds. Given the growing demands on the size and complexity of modern virtual worlds, a number of new techniques have been developed for achieving intelligent navigation for the next generation of interactive multi-agent simulations. This book reviews the evolution of several related techniques, starting from classical planning and computational geometry techniques and then gradually moving toward more advanced topics with focus on recent developments from the work of the authors. The covered topics range from discrete search and geometric representations to planning under different types of constraints and harnessing the power of graphics hardware in order to address Euclidean shortest paths and discrete search for multiple agents under limited

time budgets. The use of planning algorithms beyond path planning is also discussed in the areas of crowd animation and whole-body motion planning for virtual characters.

Pedestrian fundamental diagrams: Comparative analysis of experiments in different geometries - Jun Zhang 2012

Crowd Assisted Networking and Computing - Al-Sakib Khan Pathan 2018-09-03

Crowd computing, crowdsourcing, crowd-associated network (CrAN), crowd-assisted sensing are some examples of crowd-based concepts that harness the power of people on the web or connected via web-like infrastructure to do tasks that are often difficult for individual users or computers to do alone. This creates many challenging issues like assessing reliability and correctness of crowd generated information, delivery of data and information via crowd, middleware for supporting crowdsourcing and crowd computing tasks, crowd associated

networking and its security, Quality of Information (QoI) issues, etc. This book compiles the latest advances in the relevant fields.

Computer-Aided Architectural Design. "Hello, Culture" - Ji-Hyun Lee 2019-06-13

This book constitutes selected papers of the 18th International Conference on Computer-Aided Architectural Design Futures, CAAD Futures 2019, held in Daejeon, Republic of Korea, in June 2019. The 34 revised full papers presented were carefully reviewed and selected from 194 submissions. The papers are organized in topical sections on theory, methodology and practice of architectural and interior design; support systems for design decisions; tools, methods and implementation of urban design; rethinking space and spatial behavior; fabrication and materialization; and shape studies.

Modeling, Simulation and Visual Analysis of Crowds - Saad Ali 2013-11-23

Over the last several years there has been a growing interest in developing computational

methodologies for modeling and analyzing movements and behaviors of 'crowds' of people. This interest spans several scientific areas that includes Computer Vision, Computer Graphics, and Pedestrian Evacuation Dynamics. Despite the fact that these different scientific fields are trying to model the same physical entity (i.e. a crowd of people), research ideas have evolved independently. As a result each discipline has developed techniques and perspectives that are characteristically their own. The goal of this book is to provide the readers a comprehensive map towards the common goal of better analyzing and synthesizing the pedestrian movement in dense, heterogeneous crowds. The book is organized into different parts that consolidate various aspects of research towards this common goal, namely the modeling, simulation, and visual analysis of crowds. Through this book, readers will see the common ideas and vision as well as the different challenges and techniques, that will stimulate

novel approaches to fully grasping "crowds."

Fractional Order Crowd Dynamics - Kecai

Cao 2018-06-11

This book illustrates the application of fractional calculus in crowd dynamics via modeling and control groups of pedestrians. Decision-making processes, conservation laws of mass/momentum, and micro-macro models are employed to describe system dynamics while cooperative movements in micro scale, and fractional diffusion in macro scale are studied to control the group of pedestrians. Obtained work is included in the Intelligent Evacuation Systems that is used for modeling and to control crowds of pedestrians. With practical issues considered, this book is of interests to mathematicians, physicists, and engineers.

Traffic and Granular Flow '13 - Mohcine

Chraibi 2014-12-05

This book continues the biannual series of conference proceedings, which has become a classical reference resource in traffic and

granular research alike, and addresses the latest developments at the intersection of physics, engineering and computational science. These involve complex systems, in which multiple simple agents, be they vehicles or particles, give rise to surprising and fascinating phenomena.

The contributions collected in these proceedings cover several research fields, all of which deal with transport. Topics include highway, pedestrian and internet traffic; granular matter; biological transport; transport networks; data acquisition; data analysis and technological applications. Different perspectives, i.e., modeling, simulations, experiments, and phenomenological observations are considered.

Crowd Simulation - Daniel Thalmann 2012-10-04

Research into the methods and techniques used in simulating crowds has developed extensively within the last few years, particularly in the areas of video games and film. Despite recent impressive results when simulating and rendering thousands of individuals, many

challenges still exist in this area. The comparison of simulation with reality, the realistic appearance of virtual humans and their behavior, group structure and their motion, and collision avoidance are just some examples of these challenges. For most of the applications of crowds, it is now a requirement to have real-time simulations - which is an additional challenge, particularly when crowds are very large. Crowd Simulation analyses these challenges in depth and suggests many possible solutions. Daniel Thalmann and Soraia Musse share their experiences and expertise in the application of:

- Population modeling
- Virtual human animation
- Behavioral models for crowds
- The connection between virtual and real crowds
- Path planning and navigation
- Visual attention models
- Geometric and populated semantic environments
- Crowd rendering

The second edition presents techniques and methods developed since the authors first covered the simulation of crowds in 2007. Crowd Simulation

includes in-depth discussions on the techniques of path planning, including a new hybrid approach between navigation graphs and potential-based methods. The importance of gaze attention - individuals appearing conscious of their environment and of others - is introduced, and a free-of-collision method for crowds is also discussed.

Proceedings of 2016 Chinese Intelligent Systems Conference - Yingmin Jia 2016-09-21
These proceedings present selected research papers from CISC'16, held in Xiamen, China. The topics include Multi-agent system, Evolutionary Computation, Artificial Intelligence, Complex systems, Computation intelligence and soft computing, Intelligent control, Advanced control technology, Robotics and applications, Intelligent information processing, Iterative learning control, Machine Learning, and etc. Engineers and researchers from academia, industry, and government can get an insight view of the solutions combining ideas from

multiple disciplines in the field of intelligent systems.

Modeling, Simulation and Visual Analysis of Crowds - Saad Ali 2013-11-22

Over the last several years there has been a growing interest in developing computational methodologies for modeling and analyzing movements and behaviors of 'crowds' of people. This interest spans several scientific areas that includes Computer Vision, Computer Graphics, and Pedestrian Evacuation Dynamics. Despite the fact that these different scientific fields are trying to model the same physical entity (i.e. a crowd of people), research ideas have evolved independently. As a result each discipline has developed techniques and perspectives that are characteristically their own. The goal of this book is to provide the readers a comprehensive map towards the common goal of better analyzing and synthesizing the pedestrian movement in dense, heterogeneous crowds. The book is organized into different parts that

consolidate various aspects of research towards this common goal, namely the modeling, simulation, and visual analysis of crowds. Through this book, readers will see the common ideas and vision as well as the different challenges and techniques, that will stimulate novel approaches to fully grasping "crowds." [New Trends in Databases and Information Systems](#) - Tatjana Welzer 2019-09-03 This book constitutes the thoroughly refereed short papers, workshops and doctoral consortium papers of the 23rd European Conference on Advances in Databases and Information Systems, ADBIS 2019, held in Bled, Slovenia, in September 2019. The 19 short research papers and the 5 doctoral consortium papers were carefully reviewed and selected from 103 submissions, and the 31 workshop papers were selected out of 67 submitted papers. The papers are organized in the following sections: Short Papers; Workshops Papers; Doctoral Consortium Papers; and cover

a wide spectrum of topics related to database and information systems technologies for advanced applications.

Interactive Storytelling - Frank Nack
2016-11-08

This book constitutes the refereed proceedings of the 9th International Conference on Interactive Digital Storytelling, ICIDS 2016, held in Los Angeles, CA, USA, in November 2016. The 26 revised full papers and 8 short papers presented together with 9 posters, 4 workshop, and 3 demonstration papers were carefully reviewed and selected from 88 submissions. The papers are organized in topical sections on analyses and evaluation systems; brave new ideas; intelligent narrative technologies; theoretical foundations; and usage scenarios and applications.

Augmented Reality, Virtual Reality, and Computer Graphics - Lucio Tommaso De Paolis
2017-06-09

The 2-volume set LNCS 10324 and 10325

constitutes the refereed proceedings of the 4th International Conference on Augmented Reality, Virtual Reality, and Computer Graphics, AVR 2017, held in Ugento, Italy, in June 2017. The 54 full papers and 24 short papers presented were carefully reviewed and selected from 112 submissions. The papers are organized in the following topical sections: virtual reality; augmented and mixed reality; computer graphics; human-computer interaction; applications of VR/AR in medicine; and applications of VR/AR in cultural heritage.

[Proceedings of the International Conference on ISMAC in Computational Vision and Bio-Engineering 2018 \(ISMAC-CVB\)](#) - Durai Pandian
2019-01-01

These are the proceedings of the International Conference on ISMAC-CVB, held in Palladam, India, in May 2018. The book focuses on research to design new analysis paradigms and computational solutions for quantification of information provided by object recognition,

scene understanding of computer vision and different algorithms like convolutional neural networks to allow computers to recognize and detect objects in images with unprecedented accuracy and to even understand the relationships between them. The proceedings treat the convergence of ISMAC in Computational Vision and Bioengineering technology and includes ideas and techniques like 3D sensing, human visual perception, scene understanding, human motion detection and analysis, visualization and graphical data presentation and a very wide range of sensor modalities in terms of surveillance, wearable applications, home automation etc. ISMAC-CVB is a forum for leading academic scientists, researchers and research scholars to exchange and share their experiences and research results about all aspects of computational vision and bioengineering.

Outdoor and Large-Scale Real-World Scene Analysis - Frank Dellaert 2012-09-22

This book constitutes the thoroughly refereed post-proceedings of the 15th International Workshop on Theoretic Foundations of Computer Vision, held as a Dagstuhl Seminar in Dagstuhl Castle, Germany, in June/July 2011. The 19 revised full papers presented were carefully reviewed and selected after a blind peer-review process. The topic of this Workshop was Outdoor and Large-Scale Real-World Scene Analysis, which covers all aspects, applications and open problems regarding the performance or design of computer vision algorithms capable of working in outdoor setups and/or large-scale environments. Developing these methods is important for driver assistance, city modeling and reconstruction, virtual tourism, telepresence, and motion capture.

Computer Vision for Assistive Healthcare - Leo Marco 2018-05-15

Computer Vision for Assistive Healthcare describes how advanced computer vision techniques provide tools to support common

human needs, such as mental functioning, personal mobility, sensory functions, daily living activities, image processing, pattern recognition, machine learning and how language processing and computer graphics cooperate with robotics to provide such tools. Users will learn about the emerging computer vision techniques for supporting mental functioning, algorithms for analyzing human behavior, and how smart interfaces and virtual reality tools lead to the development of advanced rehabilitation systems able to perform human action and activity recognition. In addition, the book covers the technology behind intelligent wheelchairs, how computer vision technologies have the potential to assist blind people, and about the computer vision-based solutions recently employed for safety and health monitoring. Gives the state-of-the-art computer vision techniques and tools for assistive healthcare Includes a broad range of topic areas, ranging from image processing, pattern recognition, machine learning to

robotics, natural language processing and computer graphics Presents a wide range of application areas, ranging from mobility, sensory substitution, and safety and security, to mental and physical rehabilitation and training Written by leading researchers in this growing field of research Describes the outstanding research challenges that still need to be tackled, giving researchers good indicators of research opportunities

Computer Analysis of Images and Patterns -
Nicolas Tsapatsoulis 2021-10-30

The two volume set LNCS 13052 and 13053 constitutes the refereed proceedings of the 19th International Conference on Computer Analysis of Images and Patterns, CAIP 2021, held virtually, in September 2021. The 87 papers presented were carefully reviewed and selected from 129 submissions. The papers are organized in the following topical sections across the 2 volumes: 3D vision, biomedical image and pattern analysis; machine learning; feature

extractions; object recognition; face and gesture, guess the age contest, biometrics, cryptography and security; and segmentation and image restoration.

Interactive Storytelling - Henrik Schoenau-Fog
2015-11-28

This book constitutes the refereed proceedings of the 8th International Conference on Interactive Digital Storytelling, ICIDS 2015, held in Copenhagen, Denmark, in November/December 2015. The 18 revised full papers and 13 short papers presented together with 9 posters, 9 workshop descriptions, and 3 demonstration papers were carefully reviewed and selected from 80 submissions. The papers are organized in topical sections on theoretical and design foundations, technical advances, analyses and evaluation systems, and current and future usage scenarios and applications.

Pattern Recognition and Machine Intelligence - Bhabesh Deka 2019-11-25

The two-volume set of LNCS 11941 and 11942

constitutes the refereed proceedings of the 8th International Conference on Pattern Recognition and Machine Intelligence, PReMI 2019, held in Tezpur, India, in December 2019. The 131 revised full papers presented were carefully reviewed and selected from 341 submissions. They are organized in topical sections named: Pattern Recognition; Machine Learning; Deep Learning; Soft and Evolutionary Computing; Image Processing; Medical Image Processing; Bioinformatics and Biomedical Signal Processing; Information Retrieval; Remote Sensing; Signal and Video Processing; and Smart and Intelligent Sensors.

Traffic and Granular Flow 2019 - Iker Zuriguel
2020-11-16

This book gathers contributions on a variety of flowing collective systems. While primarily focusing on pedestrian dynamics, they also reflect the latest developments in areas such as vehicular traffic and granular flows and address related emerging topics such as self-propelled

particles, data transport, swarm behavior, intercellular transport, and collective dynamics of biological systems. Combining fundamental research and practical applications in the various fields discussed, the book offers a valuable asset for researchers and practitioners alike.

Simulating Heterogeneous Crowds with Interactive Behaviors - Nuria Pelechano

2016-10-26

This book provides a deep understanding of state-of-art methods for simulation of heterogeneous crowds in computer graphics. It will cover different aspects that are necessary to achieve plausible crowd behaviors. The book will be a review of the most recent literature in this field that can help professionals and graduate students interested in this field to get up to date with the latest contributions, and open problems for their possible future research. The chapter contributors are well known researchers and practitioners in the field and they include their

latest contributions in the different topics required to achieve believable heterogeneous crowd simulation.

Intelligent Robotics and Applications - YongAn Huang 2017-08-04

The three volume set LNAI 10462, LNAI 10463, and LNAI 10464 constitutes the refereed proceedings of the 10th International Conference on Intelligent Robotics and Applications, ICIRA 2017, held in Wuhan, China, in August 2017. The 235 papers presented in the three volumes were carefully reviewed and selected from 310 submissions. The papers in this second volume of the set are organized in topical sections on industrial robot and robot manufacturing; mechanism and parallel robotics; machine and robot vision; robot grasping and control.

Robot Operating System (ROS) - Anis Koubaa 2016-02-09

The objective of this book is to provide the reader with a comprehensive coverage on the

Robot Operating Systems (ROS) and latest related systems, which is currently considered as the main development framework for robotics applications. The book includes twenty-seven chapters organized into eight parts. Part 1 presents the basics and foundations of ROS. In Part 2, four chapters deal with navigation, motion and planning. Part 3 provides four examples of service and experimental robots. Part 4 deals with real-world deployment of applications. Part 5 presents signal-processing tools for perception and sensing. Part 6 provides software engineering methodologies to design complex software with ROS. Simulations frameworks are presented in Part 7. Finally, Part 8 presents advanced tools and frameworks for ROS including multi-master extension, network introspection, controllers and cognitive systems. This book will be a valuable companion for ROS users and developers to learn more ROS capabilities and features.

Traffic Safety - George Yanniss 2016-06-15

Transport systems are facing an impossible dilemma: satisfy an increasing demand for mobility of people and goods, while decreasing their fossil-energy requirements and preserving the environment. Additionally, transport has an opportunity to evolve in a changing world, with new services, technologies but also new requirements (fast delivery, reliability, improved accessibility). The subject of traffic is organized into two separate but complementary volumes: Volume 3 on Traffic Management and Volume 4 on Traffic Safety. Traffic Safety, Volume 4 of the Research for Innovative Transports Set, presents a collection of updated papers from the TRA 2014 Conference, highlighting the diversity of research in this field. Theoretical chapters and practical case studies address topics such as road safety management and policies, accident analysis and modeling, vulnerable road users' safety, road infrastructure safety, ITS and railway safety.

Pattern Recognition - Xiaoyi Jiang 2014-10-14

This book constitutes the refereed proceedings of the 36th German Conference on Pattern Recognition, GCPR 2014, held in Münster, Germany, in September 2014. The 58 revised full papers and 8 short papers were carefully reviewed and selected from 153 submissions. The papers are organized in topical sections on variational models for depth and flow, reconstruction, bio-informatics, deep learning and segmentation, feature computation, video interpretation, segmentation and labeling, image processing and analysis, human pose and people tracking, interpolation and inpainting.

Data Association for Multi-Object Visual Tracking - Margrit Betke 2022-05-31

In the human quest for scientific knowledge, empirical evidence is collected by visual perception. Tracking with computer vision takes on the important role to reveal complex patterns of motion that exist in the world we live in. Multi-object tracking algorithms provide new information on how groups and individual group

members move through three-dimensional space. They enable us to study in depth the relationships between individuals in moving groups. These may be interactions of pedestrians on a crowded sidewalk, living cells under a microscope, or bats emerging in large numbers from a cave. Being able to track pedestrians is important for urban planning; analysis of cell interactions supports research on biomaterial design; and the study of bat and bird flight can guide the engineering of aircraft. We were inspired by this multitude of applications to consider the crucial component needed to advance a single-object tracking system to a multi-object tracking system—data association. Data association in the most general sense is the process of matching information about newly observed objects with information that was previously observed about them. This information may be about their identities, positions, or trajectories. Algorithms for data association search for matches that optimize

certain match criteria and are subject to physical conditions. They can therefore be formulated as solving a "constrained optimization problem"—the problem of optimizing an objective function of some variables in the presence of constraints on these variables. As such, data association methods have a strong mathematical grounding and are valuable general tools for computer vision researchers. This book serves as a tutorial on data association methods, intended for both students and experts in computer vision. We describe the basic research problems, review the current state of the art, and present some recently developed approaches. The book covers multi-object tracking in two and three dimensions. We consider two imaging scenarios involving either single cameras or multiple cameras with overlapping fields of view, and requiring across-time and across-view data association methods. In addition to methods that match new measurements to already established

tracks, we describe methods that match trajectory segments, also called tracklets. The book presents a principled application of data association to solve two interesting tasks: first, analyzing the movements of groups of free-flying animals and second, reconstructing the movements of groups of pedestrians. We conclude by discussing exciting directions for future research.

Handbook of Research on Design, Control, and Modeling of Swarm Robotics - Tan, Ying
2015-12-09

Studies on robotics applications have grown substantially in recent years, with swarm robotics being a relatively new area of research. Inspired by studies in swarm intelligence and robotics, swarm robotics facilitates interactions between robots as well as their interactions with the environment. The Handbook of Research on Design, Control, and Modeling of Swarm Robotics is a collection of the most important research achievements in swarm robotics thus

far, covering the growing areas of design, control, and modeling of swarm robotics. This handbook serves as an essential resource for researchers, engineers, graduates, and senior undergraduates with interests in swarm robotics and its applications.

Image Analysis and Recognition - Aurélio Campilho 2016-06-30

This book constitutes the thoroughly refereed proceedings of the 13th International Conference on Image Analysis and Recognition, ICIAR 2016, held in Póvoa de Varzim, Portugal, in July 2016. The 79 revised full papers and 10 short papers presented were carefully reviewed and selected from 167 submissions. The papers are organized in the following topical sections: Advances in Data Analytics and Pattern Recognition with Applications, Image Enhancement and Restoration, Image Quality Assessment, Image Segmentation, Pattern Analysis and Recognition, Feature Extraction, Detection and Recognition, Matching, Motion

and Tracking, 3D Computer Vision, RGB-D Camera Applications, Visual Perception in Robotics, Biometrics, Biomedical Imaging, Brain Imaging, Cardiovascular Image Analysis, Image Analysis in Ophthalmology, Document Analysis, Applications, and Obituaries. The chapter 'Morphological Separation of Clustered Nuclei in Histological Images' is published open access under a CC BY 4.0 license at link.springer.com.
[Pedestrian and Evacuation Dynamics 2012](#) - Ulrich Weidmann 2014-04-23

The 6th International Conference on Pedestrian and Evacuation Dynamics (PED2012) showcased research on human locomotion. This book presents the proceedings of PED2012. Humans have walked for eons; our drive to settle the globe began with a walk out of Africa. However, much remains to discover. As the world moves toward sustainability while racing to assess and accommodate climate change, research must provide insight on the physical requirements of walking, the dynamics of pedestrians on the

move and more. We must understand, predict and simulate pedestrian behaviour, to avoid dangerous situations, to plan for emergencies, and not least, to make walking more attractive and enjoyable. PED2012 offered 70 presentations and keynote talks as well as 70 poster presentations covering new and improved mathematical models, describing new insights on pedestrian behaviour in normal and emergency cases and presenting research based on sensors and advanced observation methods. These papers offer a starting point for innovative new research, building a strong foundation for the next conference and for future research.

Artificial Intelligence Applications in

Specialty Crops - Yiannis Ampatzidis

2022-03-02

Computer Vision and Image Processing - Satish

Kumar Singh 2021-03-25

This three-volume set (CCIS 1367-1368)

constitutes the refereed proceedings of the 5th

International Conference on Computer Vision and Image Processing, CVIP 2020, held in Prayagraj, India, in December 2020. Due to the COVID-19 pandemic the conference was partially held online. The 134 papers were carefully reviewed and selected from 352 submissions. The papers present recent research on such topics as biometrics, forensics, content protection, image enhancement/super-resolution/restoration, motion and tracking, image or video retrieval, image, image/video processing for autonomous vehicles, video scene understanding, human-computer interaction, document image analysis, face, iris, emotion, sign language and gesture recognition, 3D image/video processing, action and event detection/recognition, medical image and video analysis, vision-based human GAIT analysis, remote sensing, and more.

Computational Science - ICCS 2018 - Yong

Shi 2018-06-11

The three-volume set LNCS 10860, 10861 and

10862 constitutes the proceedings of the 18th International Conference on Computational Science, ICCS 2018, held in Wuxi, China, in June 2018. The total of 155 full and 66 short papers presented in this book set was carefully reviewed and selected from 404 submissions. The papers were organized in topical sections named: Part I: ICCS Main Track Part II: Track of Advances in High-Performance Computational Earth Sciences: Applications and Frameworks; Track of Agent-Based Simulations, Adaptive Algorithms and Solvers; Track of Applications of Matrix Methods in Artificial Intelligence and Machine Learning; Track of Architecture, Languages, Compilation and Hardware Support for Emerging ManYcore Systems; Track of Biomedical and Bioinformatics Challenges for Computer Science; Track of Computational Finance and Business Intelligence; Track of Computational Optimization, Modelling and Simulation; Track of Data, Modeling, and Computation in IoT and Smart Systems; Track of

Data-Driven Computational Sciences; Track of Mathematical-Methods-and-Algorithms for Extreme Scale; Track of Multiscale Modelling and Simulation Part III: Track of Simulations of Flow and Transport: Modeling, Algorithms and Computation; Track of Solving Problems with Uncertainties; Track of Teaching Computational Science; Poster Papers

Description Logics in Multimedia Reasoning

- Leslie F. Sikos 2017-06-28

This book illustrates how to use description logic-based formalisms to their full potential in the creation, indexing, and reuse of multimedia semantics. To do so, it introduces researchers to multimedia semantics by providing an in-depth review of state-of-the-art standards, technologies, ontologies, and software tools. It draws attention to the importance of formal grounding in the knowledge representation of multimedia objects, the potential of multimedia reasoning in intelligent multimedia applications, and presents both theoretical discussions and

best practices in multimedia ontology engineering. Readers already familiar with mathematical logic, Internet, and multimedia fundamentals will learn to develop formally grounded multimedia ontologies, and map concept definitions to high-level descriptors. The core reasoning tasks, reasoning algorithms, and industry-leading reasoners are presented, while scene interpretation via reasoning is also demonstrated. Overall, this book offers readers an essential introduction to the formal grounding of web ontologies, as well as a comprehensive collection and review of description logics (DLs) from the perspectives of expressivity and reasoning complexity. It covers best practices for developing multimedia ontologies with formal grounding to guarantee decidability and obtain the desired level of expressivity while maximizing the reasoning potential. The capabilities of such multimedia ontologies are demonstrated by DL implementations with an emphasis on

multimedia reasoning applications.

Computational Intelligence - Christine L. Mumford 2009-07-21

This book is about synergy in computational intelligence (CI). It is a collection of chapters that covers a rich and diverse variety of computer-based techniques, all involving some aspect of computational intelligence, but each one taking a somewhat pragmatic view. Many complex problems in the real world require the application of some form of what we loosely call "intelligence" for their solution.

Few can be solved by the naive application of a single technique, however good it is. Authors in this collection recognize the limitations of individual paradigms, and propose some practical and novel ways in which different CI techniques can be combined with each other, or with more traditional computational techniques, to produce powerful problem-solving environments which exhibit synergy, i. e. , systems in which the whole is greater than the sum of the parts .

Computational intelligence is a relatively new term, and there is some disagreement as to its precise definition. Some practitioners limit its scope to schemes involving evolutionary algorithms, neural networks, fuzzy logic, or hybrids of these. For others, the definition is a little more flexible, and will include paradigms such as Bayesian belief networks, multi-agent systems, case-based reasoning and so on. Generally, the term has a similar meaning to the well-known phrase “Artificial Intelligence” (AI), although CI is perceived more as a “bottom up” approach from which intelligent behaviour can emerge, whereas AI tends to be studied from the “top down”, and derive from pondering upon the “meaning of intelligence”. (These and other key issues will be discussed in more detail in Chapter 1.

Image Analysis and Processing - ICIAP 2022

- Stan Sclaroff 2022-05-14

The proceedings set LNCS 13231, 13232, and 13233 constitutes the refereed proceedings of

the 21st International Conference on Image Analysis and Processing, ICIAP 2022, which was held during May 23-27, 2022, in Lecce, Italy. The 168 papers included in the proceedings were carefully reviewed and selected from 307 submissions. They deal with video analysis and understanding; pattern recognition and machine learning; deep learning; multi-view geometry and 3D computer vision; image analysis, detection and recognition; multimedia; biomedical and assistive technology; digital forensics and biometrics; image processing for cultural heritage; robot vision; etc.

Understanding Complex Urban Systems -

Christian Walloth 2016-03-11

This book is devoted to the modeling and understanding of complex urban systems. This second volume of Understanding Complex Urban Systems focuses on the challenges of the modeling tools, concerning, e.g., the quality and quantity of data and the selection of an appropriate modeling approach. It is meant to

support urban decision-makers—including municipal politicians, spatial planners, and citizen groups—in choosing an appropriate modeling approach for their particular modeling requirements. The contributors to this volume are from different disciplines, but all share the same goal: optimizing the representation of complex urban systems. They present and discuss a variety of approaches for dealing with data-availability problems and finding appropriate modeling approaches—and not only in terms of computer modeling. The selection of articles featured in this volume reflect a broad variety of new and established modeling approaches such as: - An argument for using Big Data methods in conjunction with Agent-based Modeling; - The introduction of a participatory approach involving citizens, in order to utilize an Agent-based Modeling approach to simulate urban-growth scenarios; - A presentation of semantic modeling to enable a flexible application of modeling methods and a flexible

exchange of data; - An article about a nested-systems approach to analyzing a city's interdependent subsystems (according to these subsystems' different velocities of change); - An article about methods that use Luhmann's system theory to characterize cities as systems that are composed of flows; - An article that demonstrates how the Sen-Nussbaum Capabilities Approach can be used in urban systems to measure household well-being shifts that occur in response to the resettlement of urban households; - A final article that illustrates how Adaptive Cycles of Complex Adaptive Systems, as well as innovation, can be applied to gain a better understanding of cities and to promote more resilient and more sustainable urban futures.

Simulating Crowds in Egress Scenarios -

Vinícius J. Cassol 2017-12-08

This book describes, from a computer science viewpoint the software, methods of simulating and analysing crowds with a particular focus on

the effects of panic in emergency situations. The power of modern technology impacts on modern life in multiple ways every day. A variety of scientific models and computational tools have been developed to improve human safety and comfort in built environments. In particular, understanding pedestrian behaviours during egress situations is of considerable importance in such contexts. Moreover, some places are built for large numbers of people (such as train stations and airports and high volume special activities such as sporting events). Simulating Crowds in Egress Scenarios discusses the use of computational crowd simulation to reproduce and evaluate egress performance in specific scenarios. Several case studies are included, evaluating the work and different analyses, and comparisons of simulation data versus data obtained from real-life experiments are given.

Social-Behavioral Modeling for Complex Systems - Paul K. Davis 2019-04-09

This volume describes frontiers in social-

behavioral modeling for contexts as diverse as national security, health, and on-line social gaming. Recent scientific and technological advances have created exciting opportunities for such improvements. However, the book also identifies crucial scientific, ethical, and cultural challenges to be met if social-behavioral modeling is to achieve its potential. Doing so will require new methods, data sources, and technology. The volume discusses these, including those needed to achieve and maintain high standards of ethics and privacy. The result should be a new generation of modeling that will advance science and, separately, aid decision-making on major social and security-related subjects despite the myriad uncertainties and complexities of social phenomena. Intended to be relatively comprehensive in scope, the volume balances theory-driven, data-driven, and hybrid approaches. The latter may be rapidly iterative, as when artificial-intelligence methods are coupled with theory-driven insights to build

models that are sound, comprehensible and usable in new situations. With the intent of being a milestone document that sketches a research agenda for the next decade, the volume draws on the wisdom, ideas and suggestions of many noted researchers who draw in turn from anthropology, communications, complexity science, computer science, defense planning, economics, engineering, health systems, medicine, neuroscience, physics, political science, psychology, public policy and sociology. In brief, the volume discusses: Cutting-edge challenges and opportunities in modeling for social and behavioral science Special requirements for achieving high standards of privacy and ethics New approaches for developing theory while exploiting both empirical and computational data Issues of reproducibility, communication, explanation, and validation Special requirements for models intended to inform decision making about complex social systems

Group and Crowd Behavior for Computer Vision - Vittorio Murino 2017-04-18

Group and Crowd Behavior for Computer Vision provides a multidisciplinary perspective on how to solve the problem of group and crowd analysis and modeling, combining insights from the social sciences with technological ideas in computer vision and pattern recognition. The book answers many unresolved issues in group and crowd behavior, with Part One providing an introduction to the problems of analyzing groups and crowds that stresses that they should not be considered as completely diverse entities, but as an aggregation of people. Part Two focuses on features and representations with the aim of recognizing the presence of groups and crowds in image and video data. It discusses low level processing methods to individuate when and where a group or crowd is placed in the scene, spanning from the use of people detectors toward more ad-hoc strategies to individuate group and crowd formations. Part Three

discusses methods for analyzing the behavior of groups and the crowd once they have been detected, showing how to extract semantic information, predicting/tracking the movement of a group, the formation or disaggregation of a group/crowd and the identification of different kinds of groups/crowds depending on their behavior. The final section focuses on identifying and promoting datasets for group/crowd analysis and modeling, presenting and discussing metrics for evaluating the pros and cons of the various models and methods. This book gives computer vision researcher techniques for segmentation and grouping, tracking and reasoning for solving group and crowd modeling and analysis, as well as more general problems in computer vision and machine learning. Presents the first book to cover the topic of modeling and analysis of groups in computer vision Discusses the topics of group and crowd modeling from a cross-disciplinary perspective, using social science anthropological theories translated into

computer vision algorithms Focuses on group and crowd analysis metrics Discusses real industrial systems dealing with the problem of analyzing groups and crowds

Emotion, Personality and Cultural Aspects in Crowds - Rodolfo Migon Favaretto 2019-10-25

This practically-focused book presents a computational model for detection and analysis of pedestrian features in crowds from video sequences. The study of human behavior is a subject of great scientific interest and probably an inexhaustible source of research. The analysis of pedestrians and groups in crowds is relevant in several areas of application, such as security, entertainment, environmental and public spaces planning and social sciences. Cultural and personality aspects are attributes that can influence personal behavior and affect the group in which individuals belong. In this sense, we consider different ways of characterizing individuals and groups in crowds with respect to their relationship with the geometrical space

and time. We discuss and describe an approach to extract and analyse, from the Computer Science point of view, emotions, personalities and cultural aspects from crowds and groups of pedestrians, using Computer Vision techniques. Extracting characteristics from real pedestrians and crowds, benefits other areas, such as: architecture and design (planning spaces to maximize pedestrian and group-environment fit); security and surveillance (design of evacuation plans considering characteristics of the crowds

and detection of abnormal events); entertainment (more realistic crowds in movies and games reproducing characteristics from real pedestrians and crowds); social sciences (understanding of human behavior), among others. A big challenge in this area of research is the comparison with real life data. In this book, we successfully compared the results of the proposed approach with Psychology literature, where several studies aimed to analysis human behavior.