

Emergence, Complexity and Computation ECC

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Robots and Lattice Automata

 Springer

Robots And Lattice Automata Emergence Complexity And Computation

Hitoshi Iba



Robots And Lattice Automata Emergence Complexity And Computation:

Robots and Lattice Automata Georgios Ch. Sirakoulis, Andrew Adamatzky, 2014-10-11 The book gives a comprehensive overview of the state of the art research and engineering in theory and application of Lattice Automata in design and control of autonomous Robots Automata and robots share the same notional meaning Automata originated from the latinization of the Greek word as self operating autonomous machines invented from ancient years can be easily considered the first steps of robotic like efforts Automata are mathematical models of Robots and also they are integral parts of robotic control systems A Lattice Automaton is a regular array or a collective of finite state machines or automata The Automata update their states by the same rules depending on states of their immediate neighbours In the context of this book Lattice Automata are used in developing modular reconfigurable robotic systems path planning and map exploration for robots as robot controllers synchronisation of robot collectives robot vision parallel robotic actuators All chapters are written in an accessible manner and lavishly illustrated The book will help computer and robotic scientists and engineers to understand mechanisms of decentralised functioning of robotic collectives and to design future and emergent reconfigurable parallel and distributed robotic systems

Advances in Cellular Automata Andrew Adamatzky, Georgios Ch. Sirakoulis, Genaro J. Martinez, 2025-04-26 This book embarks on a journey through the captivating universe of cellular automata and discover its distinct realm characterised by discrete time space and states where cells form regular patterns and offer insights into complex systems across various domains From theoretical foundations to practical applications each chapter unveils innovative ideas and implementations from solving initial value problems to exploring reversible computing and real time pattern generation Explore hyperbolic spaces analyse elementary automata and delve into network growth dynamics Shedding light on synchronisation control and computational structures this book is an invaluable resource for computer scientists modellers mathematicians engineers physicists and professionals across disciplines Immerse yourself in the intricate complexities and boundless potential of cellular automata whether unravelling pedestrian dynamics or exploring cryptographic applications

Parallel Computing Technologies Victor Malyshev, 2017-08-17 This book constitutes the proceedings of the 14th International Conference on Parallel Computing Technologies PaCT 2017 held in Nizhny Novgorod Russia in September 2017 The 25 full papers and 24 short papers presented were carefully reviewed and selected from 93 submissions The papers are organized in topical sections on mainstream parallel computing parallel models and algorithms in numerical computation cellular automata and discrete event systems organization of parallel computation parallel computing applications

Cellular Automata Samira El Yacoubi, Jarosław Wąs, Stefania Bandini, 2016-08-29 This book constitutes the proceedings of the 12th International Conference on Cellular Automata for Research and Industry ACRI 2016 held in Fez Morocco in September 2014 The 45 full papers and 4 invited talks presented in this volume were carefully reviewed and selected from 59 submissions This volume contains invited contributions and accepted papers from the main

track and from the three organized workshops The first part is organized according to three topics 1 Cellular Automata Theory and Implementation 2 Cellular Automata Dynamics and Synchronization 3 Asynchronous Cellular Automata and Asynchronous Discrete Models ACA The second part of the volume contains three topics 4 Modelling and Simulation with Cellular Automata 5 Crowds Traffic and Cellular Automata CT CA 6 Agent Based Simulation and Cellular Automata ABS CA

Intelligent Robotics and Applications Haibin Yu, Jinguo Liu, Lianqing Liu, Zhaojie Ju, Yuwang Liu, Dalin Zhou, 2019-08-01 The volume set LNAI 11740 until LNAI 11745 constitutes the proceedings of the 12th International Conference on Intelligent Robotics and Applications ICIRA 2019 held in Shenyang China in August 2019 The total of 378 full and 25 short papers presented in these proceedings was carefully reviewed and selected from 522 submissions The papers are organized in topical sections as follows Part I collective and social robots human biomechanics and human centered robotics robotics for cell manipulation and characterization field robots compliant mechanisms robotic grasping and manipulation with incomplete information and strong disturbance human centered robotics development of high performance joint drive for robots modular robots and other mechatronic systems compliant manipulation learning and control for lightweight robot Part II power assisted system and control bio inspired wall climbing robot underwater acoustic and optical signal processing for environmental cognition piezoelectric actuators and micro nano manipulations robot vision and scene understanding visual and motional learning in robotics signal processing and underwater bionic robots soft locomotion robot teleoperation robot autonomous control of unmanned aircraft systems Part III marine bio inspired robotics and soft robotics materials mechanisms modelling and control robot intelligence technologies and system integration continuum mechanisms and robots unmanned underwater vehicles intelligent robots for environment detection or fine manipulation parallel robotics human robot collaboration swarm intelligence and multi robot cooperation adaptive and learning control system wearable and assistive devices and robots for healthcare nonlinear systems and control Part IV swarm intelligence unmanned system computational intelligence inspired robot navigation and SLAM fuzzy modelling for automation control and robotics development of ultra thin film flexible sensors and tactile sensation robotic technology for deep space exploration wearable sensing based limb motor function rehabilitation pattern recognition and machine learning navigation localization Part V robot legged locomotion advanced measurement and machine vision system man machine interactions fault detection testing and diagnosis estimation and identification mobile robots and intelligent autonomous systems robotic vision recognition and reconstruction robot mechanism and design Part VI robot motion analysis and planning robot design development and control medical robot robot intelligence learning and linguistics motion control computer integrated manufacturing robot cooperation virtual and augmented reality education in mechatronics engineering robotic drilling and sampling technology automotive systems mechatronics in energy systems human robot interaction **Algorithms and Architectures for Parallel Processing** Jesus Carretero, Javier Garcia-Blas, Victor Gergel, Vladimir Voevodin, Iosif Meyerov, Juan A.

Rico-Gallego, Juan C. Díaz-Martín, Pedro Alonso, Juan Durillo, José Daniel García Sánchez, Alexey L. Lastovetsky, Fabrizio Marozzo, Qin Liu, Zakirul Alam Bhuiyan, Karl Förlinger, Josef Weidendorfer, José Gracia, 2016-11-30 This book constitutes the refereed workshop proceedings of the 16th International Conference on Algorithms and Architectures for Parallel Processing ICA3PP 2016 held in Granada Spain in December 2016 The 30 full papers presented were carefully reviewed and selected from 58 submissions They cover many dimensions of parallel algorithms and architectures encompassing fundamental theoretical approaches practical experimental projects and commercial components and systems trying to push beyond the limits of existing technologies including experimental efforts innovative systems and investigations that identify weaknesses in existing parallel processing technology

From Parallel to Emergent Computing Andrew Adamatzky, Selim Akl, Georgios Ch. Sirakoulis, 2019-03-13 Modern computing relies on future and emergent technologies which have been conceived via interaction between computer science engineering chemistry physics and biology This highly interdisciplinary book presents advances in the fields of parallel distributed and emergent information processing and computation The book represents major breakthroughs in parallel quantum protocols elastic cloud servers structural properties of interconnection networks internet of things morphogenetic collective systems swarm intelligence and cellular automata unconventionality in parallel computation algorithmic information dynamics localized DNA computation graph based cryptography slime mold inspired nano electronics and cytoskeleton computers Features Truly interdisciplinary spanning computer science electronics mathematics and biology Covers widely popular topics of future and emergent computing technologies cloud computing parallel computing DNA computation security and network analysis cryptography and theoretical computer science Provides unique chapters written by top experts in theoretical and applied computer science information processing and engineering From Parallel to Emergent Computing provides a visionary statement on how computing will advance in the next 25 years and what new fields of science will be involved in computing engineering This book is a valuable resource for computer scientists working today and in years to come

Cancer, Complexity, Computation Igor Balaz, Andrew Adamatzky, 2022-08-11 This book presents unique compendium of groundbreaking ideas where scientists from many different backgrounds are united in their interest in interdisciplinary approaches towards origins and development of cancers innovative ways of searching for cancer treatment and the role of cancer in the evolution Chapters give an unequivocal slice of all areas that relate to a quest for understanding cancer and its origin as many fold nonlinear system complexity of the cancer developments a search for cancer treatment using artificial intelligence and evolutionary optimisation novel modelling techniques molecular origin of cancer the role of cancer in evolution of species interpretation of cancer in terms of artificial life and artificial immune systems swarm intelligence cellular automata computational systems biology genetic networks cellular computing validation through in vitro vivo tumour models and tumour on chip devices The book is an inspiring blend of theoretical and experimental results concepts and paradigms Distinctive features The book advances widely popular topics

of cancer origin treatment and understanding of its progress The book is comprised of unique chapters written by world top experts in theoretical and applied oncology complexity theory mathematics computer science The book illustrates attractive examples of mathematical and computer models and experimental setups **Feynman And Computation** Anthony Hey,2018-03-08 Computational properties of use to biological organisms or to the construction of computers can emerge as collective properties of systems having a large number of simple equivalent components or neurons The physical meaning of content addressable memory is described by an appropriate phase space flow of the state of a system A model of such a system is given based on aspects of neurobiology but readily adapted to integrated circuits The collective properties of this model produce a content addressable memory which correctly yields an entire memory from any subpart of sufficient size The algorithm for the time evolution of the state of the system is based on asynchronous parallel processing Additional emergent collective properties include some capacity for generalization familiarity recognition categorization error correction and time sequence retention The collective properties are only weakly sensitive to details of the modeling or the failure of individual devices **Clever Design in Critical Times** Guilherme Meyer,Teresa M. Dobson,Stan Ruecker,Milena Radzikowska,2025-08-07 This edited volume identifies and establishes the idea of the Callidocene which the authors position as an epoch that both includes and extends beyond the current conception of the Anthropocene While the word Anthropocene has become strongly associated with concerns over humanity's impact on the planet contributors turn instead to the Callidocene intended to encompass human machine and system cleverness to emphasize the hopeful and positive aspects of human influence on the world Contributors posit that designers in particular have increasingly attempted to consider the impact of their work on society culture and the environment and this book will contribute to this conversation through its analyses of a wide range of topics including complexity in design media toxicity and community innovation in sustainability Collectively contributions to this volume highlight the potential of human cleverness to address or even reverse the damage we've inflicted on both ourselves and our planet Scholars of sociology environmental studies cultural studies media studies and communication will find this book of particular interest

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