An Algorithm Of Linear Speed Control Of A Stepper Motor In

This book constitutes the thoroughly refereed post-conference proceedings of the 7th International Conference on Bio-Inspired Models of Network, Information and Computing Systems (Bionetics 2012), held in Lugano, Switzerland, in December 2012. The 23 revised full papers presented were carefully reviewed and selected from 40 submissions. They cover topics such as networking, robotics and neural networks, molecular scale and bioinformatics, optimization and bio-inspired modeling in various fields.

Application-specific regular array processors have been widely used in signal and image processing, multimedia and communication systems, for example, in data compression and HDTV. One of the main problems of application-specific computing is how to map algorithms into hardware. The major achievement of the theory of regular arrays is that an algorithm, represented as a data dependence graph, is embedded into a Euclidean space, where the integer points are the elementary computations and the dependencies between computations are denoted by vectors between points. The process of mapping an algorithm into hardware is reduced to finding, for the given Euclidean space, a new coordinate system that can be associated with the physical properties of space and time - so called space-time. The power of the synthesis method is that it provides a bridge between "abstract" and "physical" representations of algorithms, thus providing a methodological basis for synthesizing computations in space and in time. This book will extend the existing synthesis theory by exploiting the associativity and commutativity of computations. The practical upshot being a controlled increase in the dimensionality of the Euclidean space representing an algorithm. This increase delivers more degrees of freedom in the choice of the space-time mapping and leads, subsequently, to more choice in the selection of cost-effective application-specific designs.

The two volumes LNCS 8805 and 8806 constitute the thoroughly refereed post-conference proceedings of 18 workshops held at the 20th International Conference on Parallel Computing, Euro-Par 2014, in Porto, Portugal, in August 2014. The 100 revised full papers presented were carefully reviewed and selected from 173 submissions. The volumes include papers from the following workshops: APCI&E (First Workshop on Applications of Parallel Computation in Industry and Engineering - BigDataCloud (Third Workshop on Big Data Management in Clouds) - DIHC (Second Workshop on Dependability and Interoperability in Heterogeneous Clouds) - FedICI (Second Workshop on Federative and Interoperable Cloud Infrastructures) - Hetero Par (12th International Workshop on Algorithms, Models and Tools for Parallel Computing on Heterogeneous Platforms) - HiBB (5th Workshop on High Performance Bioinformatics and Biomedicine) - LSDVE (Second Workshop on Large Scale Distributed Virtual Environments on Clouds and P2P) - MuCoCoS (7th International Workshop on Multi-/Many-core Computing Systems) - OMHI (Third Workshop on On-chip Memory Hierarchies and Interconnects) - PADAPS (Second Workshop on Parallel and Distributed Agent-Based Simulations) - PROPER (7th Workshop on Productivity and Performance) - Resilience (7th Workshop on Resiliency in High Performance Computing with Clusters, Clouds, and Grids) - REPPAR (First International Workshop on Reproducibility in Parallel Computing) - ROME (Second Workshop on Runtime and Operating Systems for the Many Core Era) - SPPEXA (Workshop on Software for Exascale Computing) - TASUS (First Workshop on Techniques and Applications for Sustainable Ultrascale Computing Systems) - UCHPC (7th Workshop on Un Conventional High Performance Computing) and VHPC (9th Workshop on Virtualization in High-Performance Cloud Computing.

This book constitutes the refereed proceedings of the 12th IAPR-TC-15 International Workshop on Graph-Based Representation in Pattern

Recognition, GbRPR 2019, held in Tours, France, in June 2019. The 22 full papers included in this volume together with an invited talk were carefully reviewed and selected from 28 submissions. The papers discuss research results and applications at the intersection of pattern recognition, image analysis, and graph theory. They cover topics such as graph edit distance, graph matching, machine learning for graph problems, network and graph embedding, spectral graph problems, and parallel algorithms for graph problems.

Annotation. This book constitutes the refereed proceedings of the joint conference on Machine Learning and Knowledge Discovery in Databases: ECML PKDD 2010, held in Barcelona, Spain, in September 2010. The 120 revised full papers presented in three volumes, together with 12 demos (out of 24 submitted demos), were carefully reviewed and selected from 658 paper submissions. In addition, 7 ML and 7 DM papers were distinguished by the program chairs on the basis of their exceptional scientific quality and high impact on the field. The conference intends to provide an international forum for the discussion of the latest high quality research results in all areas related to machine learning and knowledge discovery in databases. A topic widely explored from both ML and DM perspectives was graphs, with motivations ranging from molecular chemistry to social networks.

This book constitutes the refereed proceedings of the 10th International Conference on Parallel Problem Solving from Nature, PPSN 2008, held in Dortmund, Germany, in September 2008. The 114 revised full papers presented were carefully reviewed and selected from 206 submissions. The conference covers a wide range of topics, such as evolutionary computation, quantum computation, molecular computation, neural computation, artificial life, swarm intelligence, artificial ant systems, artificial immune systems, self-organizing systems, emergent behaviors, and applications to real-world problems. The paper are organized in topical sections on formal theory, new techniques, experimental analysis, multiobjective optimization, hybrid methods, and applications.

This volume covers both classical results and the most recent theoretical developments in the field of randomized search heuristics such as runtime analysis, drift analysis and convergence.

This book provides a non-technical introduction to High Performance Computing applications together with advice about how beginners can start to write parallel programs. The authors show what HPC can offer geographers and social scientists and how it can be used in GIS. They provide examples of where it has already been used and suggestions for other areas of application in geography and the social sciences. Case studies drawn from geography explain the key principles and help to understand the logic and thought processes that lie behind the parallel programming.

This book on optimization includes forewords by Michael I. Jordan, Zongben Xu and Zhi-Quan Luo. Machine learning relies heavily on optimization to solve problems with its learning models, and first-order optimization algorithms are the mainstream approaches. The acceleration of first-order optimization algorithms is crucial for the efficiency of machine learning. Written by leading experts in the field, this book provides a comprehensive introduction to, and state-of-the-art review of accelerated first-order optimization algorithms for machine learning. It discusses a variety of methods, including deterministic and stochastic algorithms, where the algorithms can be synchronous or asynchronous, for unconstrained and constrained problems, which can be convex or non-convex. Offering a rich blend of ideas, theories and proofs, the book is up-to-date and self-contained. It is an excellent reference resource for users who are seeking faster optimization

algorithms, as well as for graduate students and researchers wanting to grasp the frontiers of optimization in machine learning in a short time.

Over the last fifteen years GIS has become a fully-fledged technology, deployed across a range of application areas. However, although computer advances in performance appear to continue unhindered, data volumes and the growing sophistication of analysis procedures mean that performance will increasingly become a serious concern in GIS. Parallel computing offers a potential solution. However, traditional algorithms may not run effectively in a parallel environment, so utilization of parallel technology is not entirely straightforward. This groundbreaking book examines some of the current strategies facing scientists and engineers at this crucial interface of parallel computing and GIS.; The book begins with an introduction to the concepts, terminology and techniques of parallel processing, with particular reference to GIS. High level programming paradigms and software engineering issues underlying parallel software developments are considered and emphasis is given to designing modular reusable software libraries. The book continues with problems in designing parallel software for GIS applications, potential vector and raster data structures and details the algorithmic design for some major GIS operations. An implementation case study is included, based around a raster generalization problem, which illustrates some of the principles involved. Subsequent chapters review progress in parallel database technology in a GIS environment and the use of parallel techniques in various application areas, dealing with both algorithmic and implementation issues.; "Parallel Processing Algorithms for GIS" should be a useful text for a new generation of GIS professionals whose principal concern is the challenge of embracing major computer performance enhancements via parallel computing. Similarly, it should be an important volume for parallel computing professionals who are increasingly aware that GIS offers a major application domain for their technology.

The three-volume set, LNCS 2667, LNCS 2668, and LNCS 2669, constitutes the refereed proceedings of the International Conference on Computational Science and Its Applications, ICCSA 2003, held in Montreal, Canada, in May 2003. The three volumes present more than 300 papers and span the whole range of computational science from foundational issues in computer science and mathematics to advanced applications in virtually all sciences making use of computational techniques. The proceedings give a unique account of recent results in computational science.

The Monte Carlo method is now widely used and commonly accepted as an important and useful tool in solid state physics and related fields. It is broadly recognized that the technique of "computer simulation" is complementary to both analytical theory and experiment, and can significantly contribute to ad vancing the understanding of various scientific problems. Widespread applications of the Monte Carlo method to various fields of the statistical mechanics of condensed matter physics have already been reviewed in two previously published books, namely Monte Carlo Methods in Statistical

Physics (Topics Curro Phys. , Vol. 7, 1st edn. 1979, 2ndedn. 1986) and Applications of the Monte Carlo Method in Statistical Physics (Topics Curro Phys. , Vol. 36, 1st edn. 1984, 2nd edn. 1987). Meanwhile the field has continued its rapid growth and expansion, and applications to new fields have appeared that were not treated at all in the above two books (e. g. studies of irreversible growth phenomena, cellular automata, interfaces, and quantum problems on lattices). Also, new methodic aspects have emerged, such as aspects of efficient use of vector com puters or parallel computers, more efficient analysis of simulated systems con figurations, and methods to reduce critical slowing down at i>hase transitions. Taken together with the extensive activity in certain traditional areas of research (simulation of classical and quantum fluids, of macromolecular materials, of spin glasses and quadrupolar glasses, etc.

This Festschrift volume, published in honour of J. Ian Munro, contains contributions written by some of his colleagues, former students, and friends. In celebration of his 66th birthday the colloquium "Conference on Space Efficient Data Structures, Streams and Algorithms" was held in Waterloo, ON, Canada, during August 15-16, 2013. The articles presented herein cover some of the main topics of Ian's research interests. Together they give a good overall perspective of the last 40 years of research in algorithms and data structures.

This monograph presents examples of best practices when combining bioinspired algorithms with parallel architectures. The book includes recent work by leading researchers in the field and offers a map with the main paths already explored and new ways towards the future. Parallel Architectures and Bioinspired Algorithms will be of value to both specialists in Bioinspired Algorithms, Parallel and Distributed Computing, as well as computer science students trying to understand the present and the future of Parallel Architectures and Bioinspired Algorithms.

The present book includes a set of selected extended papers from the 11th International Conference on Informatics in Control, Automation and Robotics (ICINCO 2014), held in Vienna, Austria, from 1 to 3 September 2014. The conference brought together researchers, engineers and practitioners interested in the application of informatics to Control, Automation and Robotics. Four simultaneous tracks will be held, covering Intelligent Control Systems, Optimization, Robotics, Automation, Signal Processing, Sensors, Systems Modelling and Control, and Industrial Engineering, Production and Management. Informatics applications are pervasive in many areas of Control, Automation and Robotics. ICINCO 2014 received 301 submissions, from 49 countries, in all continents. After a double blind paper review performed by the Program Committee, 20% were accepted as full papers and thus selected for oral presentation. Additional papers were accepted as short papers and posters. A further selection was made after the Conference, based also on the assessment of presentation quality and audience interest, so that this book includes the extended and revised versions of the very best papers of ICINCO 2014. Commitment to high quality standards is a major concern of ICINCO that will be

maintained in the next editions, considering not only the stringent paper acceptance ratios but also the quality of the program committee, keynote lectures, participation level and logistics.

RoboCup 2002, the 6th Robot World Cup Soccer and Rescue Competitions and Conference, took place during June 19–25, 2002, at the Fukuoka Dome (main venue) in Fukuoka, Japan. It was, by far, the RoboCup event with the largestnumberofregisteredparticipants(1004persons,distributedin188teams from 29 countries) and visitors (around 120,000 persons). As was done in its previous editions since 1997, the event included several robotic competitions and aninternationalsymposium.Thepapersandposterspresentedatthesymposium

constitutethemainpartofthisbook.Leaguereportsinthe?nalsectiondescribe signi?cant advances in each league and the results. The symposium organizers received 76 submissions, among which 17 papers (22%) were accepted for oral presentation at the symposium (?rst section of the book), and 21 papers (29%) were accepted as posters (second section of the book). Most papers were evaluated by three reviewers each, chosen from the members of the International Program Committee (IPC). The IPC consisted of a balanced combination of regular RoboCup participants and researchers from outside this community. The reviewers worked hard to guarantee a fair review process – the result of their work was a high-quality symposium with very - teresting presentations.

Proceedings -- Parallel Computing.

This book has been motivated by an urgent need for designing and implementation of innovative control algorithms and systems for tracked vehicles. Nowadays the unmanned vehicles are becoming more and more common. Therefore there is a need for innovative mechanical constructions capable of adapting to various applications regardless the ground, air or water/underwater environment. There are multiple various activities connected with tracked vehicles. They can be distributed among three main groups: design and control algorithms, sensoric and vision based in-formation, construction and testing mechanical parts of unmanned vehicles. Scientists and researchers involved in mechanics, control algorithms, image processing, computer vision, data fusion, or IC will find this book useful.

TheexplosivegrowthoftheInternetandtheWebhavecreatedanever-growing demand for information systems, and ever-growing challenges for Information Systems Engineering. The series of Conferences on Advanced Information S- tems Engineering (CAiSE) was launched in Scandinavia by Janis Bubenko and Arne Solvberg in 1989, became an important European conference, and was held annually in major European sites throughout the 1990s. Now, in its 14th year,CAiSEwasheldforthe?rsttimeoutsideEurope,showcasinginternational researchon information systems and their engineering. Not surprisingly, this year the conference enjoyed unprecedented attention. In total, the conference received 173 paper submissions, the highest number ever for a CAiSE conference. Of those, 42 were accepted as regular papers and 26 as short (poster) papers. In addition, the conference received 12 proposals for workshops of which 8 were approved, while 4 tutorials were selected from 15 submissions. The technical program was put together by an international committee of 81 experts. In total, 505 reviews were submitted, with every member of the committeecontributing.Decisionsonallsubmissionswerereachedataprogram committee meeting in Toronto on January 26-27,2002. Workshop and tutorial proposals were handled separately by committees chaired by Patrick

Martin (workshops), and Jarek Gryz and Richard Paige (tutorials). We wish to extend a great "THANK YOU!" to all members of the program and organizing committees for their volunteer contributions of time and exp- tise. The fact that so many busy (and famous!) people took the trouble to help uswiththeorganizationofthisconferenceandtheformationofitstechnicalp- gram speaks well for the future of CAiSE and the ?eld of Information Systems Engineering.

This book is a printed edition of the Special Issue "State-of-the-Art Sensors Technology in Spain 2017" that was published in Sensors

This is the joint refereed proceedings of the 9th International Workshop on Approximation Algorithms for Combinatorial Optimization Problems, APPROX 2006 and the 10th International Workshop on Randomization and Computation, RANDOM 2006. The book presents 44 carefully reviewed and revised full papers. Among the topics covered are design and analysis of approximation algorithms, hardness of approximation problems, small spaces and data streaming algorithms, embeddings and metric space methods, and more.

The 2004 International Conference on Parallel and Distributed Computing, - plications and Technologies (PDCAT 2004) was the ?fth annual conference, and was held at the Marina Mandarin Hotel, Singapore on December 8–10, 2004. Since the inaugural PDCAT held in Hong Kong in 2000, the conference has - come a major forum for scientists, engineers, and practitioners throughout the world to present the latest research, results, ideas, developments, techniques, and applications in all areas of parallel and distributed computing. The technical program was comprehensive and featured keynote speeches, te- nical paper presentations, and exhibitions showcased by industry vendors. The technical program committee was overwhelmed with submissions of papers for presentation, from countries worldwide. We received 242 papers and after - viewing them, based on stringent selection criteria, we accepted 173 papers. The papers in the proceedings focus on parallel and distributed computing viewed from the three perspectives of networking and architectures, software systems and technologies, and algorithms and applications. We acknowledge the great contribution from all of our local and international committee members and - perreviewerswhodevotedtheirtimeinthereviewprocessandprovidedvaluable feedback for the authors. PDCAT 2004 could never have been successful without the support and ass- tance of several institutions and many people. We sincerely appreciate the s- port from the National Grid O?ce and IEEE, Singapore for technical co-sponsorship.The?nancialsponsorshipsfromtheindustrialsponsors,Hewlett- Packard Singapore; IBM Singapore; Sun Microsystems; SANDZ Solutions; S- icon Graphics, and Advanced Digital Information Corporation, are gratefully acknowledged.

As technology continues to become more sophisticated, mimicking natural processes and phenomena also becomes more of a reality. Continued research in the field of natural computing enables an understanding of the world around us, in addition to opportunities for man-made computing to mirror the natural processes and systems that have existed for centuries. Nature-Inspired Computing: Concepts, Methodologies, Tools, and Applications takes an interdisciplinary approach to the topic of natural computing, including emerging technologies being developed for the purpose of simulating natural phenomena, applications across industries, and the future outlook of biologically and nature-inspired technologies. Emphasizing critical research in a comprehensive multi-volume set, this publication is designed for use by IT professionals, researchers, and graduate students studying intelligent computing.

Advances in microelectronic technology have made massively parallel computing a reality and triggered an outburst of research activity in parallel processing architectures and algorithms. Distributed memory multiprocessors - parallel computers that consist of microprocessors connected in a regular topology - are increasingly being used to solve large problems in many application areas. In order to use these computers for a specific application, existing algorithms need to be restructured for the architecture and new algorithms developed. The

performance of a computation on a distributed memory multiprocessor is affected by the node and communication architecture, the interconnection network topology, the I/O subsystem, and the parallel algorithm and communication protocols. Each of these parametersis a complex problem, and solutions require an understanding of the interactions among them. This book is based on the papers presented at the NATO Advanced Study Institute held at Bilkent University, Turkey, in July 1991. The book is organized in five parts: Parallel computing structures and communication, Parallel numerical algorithms, Parallel programming, Fault tolerance, and Applications and algorithms.

Advancements in the nature-inspired swarm intelligence algorithms continue to be useful in solving complicated problems in nonlinear, non-differentiable, and un-continuous functions as well as being applied to solve real-world applications. Recent Algorithms and Applications in Swarm Intelligence Research highlights the current research on swarm intelligence algorithms and its applications. Including research and survey and application papers, this book serves as a platform for students and scholars interested in achieving their studies on swarm intelligence algorithms and their applications.

This six-volume-set (CCIS 231, 232, 233, 234, 235, 236) constitutes the refereed proceedings of the International Conference on Computing, Information and Control, ICCIC 2011, held in Wuhan, China, in September 2011. The papers are organized in two volumes on Innovative Computing and Information (CCIS 231 and 232), two volumes on Computing and Intelligent Systems (CCIS 233 and 234), and in two volumes on Information and Management Engineering (CCIS 235 and 236).

Presenting the latest findings in the field of numerical analysis and optimization, this volume balances pure research with practical applications of the subject. Accompanied by detailed tables, figures, and examinations of useful software tools, this volume will equip the reader to perform detailed and layered analysis of complex datasets. Many real-world complex problems can be formulated as optimization tasks. Such problems can be characterized as large scale, unconstrained, constrained, non-convex, non-differentiable, and discontinuous, and therefore require adequate computational methods, algorithms, and software tools. These same tools are often employed by researchers working in current IT hot topics such as big data, optimization and other complex numerical algorithms on the cloud, devising special techniques for supercomputing systems. The list of topics covered include, but are not limited to: numerical analysis, numerical optimization, numerical linear algebra, numerical differential equations, optimal control, approximation theory, applied mathematics, algorithms and software developments, derivative free optimization methods and programming models. The volume also examines challenging applications to various types of computational optimization methods which usually occur in statistics, econometrics, finance, physics, medicine, biology, engineering and industrial sciences. Throughout time, scientists have looked to nature in order to understand and model solutions for complex real-world

problems. In particular, the study of self-organizing entities, such as social insect populations, presents a new opportunity within the field of artificial intelligence. Emerging Research on Swarm Intelligence and Algorithm Optimization discusses current research analyzing how the collective behavior of decentralized systems in the natural world can be applied to intelligent system design. Discussing the application of swarm principles, optimization techniques, and key algorithms being used in the field, this publication serves as an essential reference for academicians, upper-level students, IT developers, and IT theorists.

In recent years, there has been growing interest in industrial systems, especially in robotic manipulators and mobile robot systems. As the cost of robots goes down and become more compact, the number of industrial applications of robotic systems increases. Moreover, there is need to design industrial systems with intelligence, autonomous decision making capabilities, and self-diagnosing properties. Intelligent Industrial Systems: Modeling, Automation and Adaptive Behavior analyzes current trends in industrial systems design, such as intelligent, industrial, and mobile robotics, complex electromechanical systems, fault diagnosis and avoidance of critical conditions, optimization, and adaptive behavior. This book discusses examples from major areas of research for engineers and researchers, providing an extensive background on robotics and industrial systems with intelligence, autonomy, and adaptive behavior giving emphasis to industrial systems design.

Euro-Par – the European Conference on Parallel Computing – is an international conference series dedicated to the promotion and advancement of all aspects of parallel computing. The major themes can be divided into the broad categories of hardware, software, algorithms, and applications for parallel computing. The objective of Euro-Par is to provide a forum within which to promote the dev- opment of parallel computing both as an industrial technique and an academic discipline, extending the frontiers of both the state of the art and the state of the practice. This is particularlyimportant at a time when parallel computing is undergoing strong and sustained development and experiencing real ind- trial take up. The main audience for and participants in Euro-Par are seen as researchers in academic departments, government laboratories, and industrial organisations. Euro-Par aims to become the primarychoice of such professionals for the presentation of new results in their speci?c areas. Euro-Par is also int- ested in applications that demonstrate the e?ectiveness of the main Euro-Par themes. Euro-Par has its own Internet domain with a permanent web site where the historyof the conference series is described: http://www. euro-par. org. The Euro-Par conference series is sponsored bythe Association of Computer Machineryand the International Federation of Information Processing. Euro-Par 2001 Euro-Par 2001 was organised bythe Universityof Manchester and UMIST. Due to increasing industry 4.0 practices, massive industrial process data is now available for researchers for modelling

and optimization. Artificial Intelligence methods can be applied to the ever-increasing process data to achieve robust control against foreseen and unforeseen system fluctuations. Smart computing techniques, machine learning, deep learning, computer vision, for example, will be inseparable from the highly automated factories of tomorrow. Effective cybersecurity will be a must for all Internet of Things (IoT) enabled work and office spaces. This book addresses metaheuristics in all aspects of Industry 4.0. It covers metaheuristic applications in IoT, cyber physical systems, control systems, smart computing, artificial intelligence, sensor networks, robotics, cybersecurity, smart factory, predictive analytics and more. Key features: Includes industrial case studies. Includes chapters on cyber physical systems, machine learning, deep learning, cybersecurity, robotics, smart manufacturing and predictive analytics. surveys current trends and challenges in metaheuristics and industry 4.0. Metaheuristic Algorithms in Industry 4.0 provides a guiding light to engineers, researchers, students, faculty and other professionals engaged in exploring and implementing industry 4.0 solutions in various systems and processes.

Contains 17 papers written by an international group of academic and industrial specialists in computer science. Some of the topics addressed include the design and implementation of video servers in video-on-demand systems; a framework for the development of globally convergent adaptive learning rate algorithms; a vector-based approach to analysis of file space properties; load balancing for unstructured mesh applications; musical composition based on genetic algorithms and fuzzy transformations of traditional Greek music patterns; and frequency-adaptive join for shared nothing machines. Most papers consist of an abstract, key words, an introduction, discussion, conclusions, suggestions for future research, and references. Several contributions are printed in a rather dark, compacted font that is difficult to read. c. Book News Inc.

This book constitutes the strictly refereed proceedings of the 14th International Conference on Automated Deduction, CADE-14, held in Townsville, North Queensland, Australia, in July 1997. The volume presents 25 revised full papers selected from a total of 87 submissions; also included are 17 system descriptions and two invited contributions. The papers cover a wide range of current issues in the area including resolution, term rewriting, unification theory, induction, high-order logics, nonstandard logics, AI methods, and applications to software verification, geometry, and social science.

Parallel computers have started to completely revolutionize scientific computation. Articles in this volume represent applied mathematics, computer science, and application aspects of parallel scientific computing. Major advances are discussed dealing with multiprocessor architectures, parallel algorithm development and analysis, parallel systems and programming languages. The optimization of the application of massively parallel architectures to real world problems will

provide the impetus for the development of entirely new approaches to these technical situations.

Models that include a notion of time are ubiquitous in disciplines such as the natural sciences, engineering, philosophy, and linguistics, but in computing the abstractions provided by the traditional models are problematic and the discipline has spawned many novel models. This book is a systematic thorough presentation of the results of several decades of research on developing, analyzing, and applying time models to computing and engineering. After an opening motivation introducing the topics, structure and goals, the authors introduce the notions of formalism and model in general terms along with some of their fundamental classification criteria. In doing so they present the fundamentals of propositional and predicate logic, and essential issues that arise when modeling time across all types of system. Part I is a summary of the models that are traditional in engineering and the natural sciences, including fundamental computer science: dynamical systems and control theory; hardware design; and software algorithmic and complexity analysis. Part II covers advanced and specialized formalisms dealing with time modeling in heterogeneous software-intensive systems: formalisms that share finite state machines as common "ancestors"; Petri nets in many variants; notations based on mathematical logic, such as temporal logic; process algebras; and "dual-language approaches" combining two notations with different characteristics to model and verify complex systems, e.g., model-checking frameworks. Finally, the book concludes with summarizing remarks and hints towards future developments and open challenges. The presentation uses a rigorous, yet not overly technical, style, appropriate for readers with heterogeneous backgrounds, and each chapter is supplemented with detailed bibliographic remarks and carefully chosen exercises of varying difficulty and scope. The book is aimed at graduate students and researchers in computer science, while researchers and practitioners in other scientific and engineering disciplines interested in time modeling with a computational flavor will also find the book of value, and the comparative and conceptual approach makes this a valuable introduction for non-experts. The authors assume a basic knowledge of calculus, probability theory, algorithms, and programming, while a more advanced knowledge of automata, formal languages, and mathematical logic is useful.

This handbook brings together in a single volume expert contributions on the many aspects of MO data recording, including the materials in use, techniques for achieving recording function, and storage device subsystems. As a multiple author treatment, it brings perspective from many viewpoints and institutions. The insights delivered should be valuable to a wide audience from students to practitioners in all areas of information storage.

This special volume contains the Proceedings of a Workshop on "Parallel Algorithms and Transputers for Optimization" which was held at the University of Siegen, on November 9, 1990. The purpose of the Workshop was to bring together those doing research on 2.lgorithms for parallel and distributed optimization and those representatives from industry and

business who have an increasing demand for computing power and who may be the potential users of nonsequential approaches. In contrast to many other conferences, especially North-American, on parallel processing and supercomputers the main focus of the contributions and discussion was "problem oriented". This view reflects the following philosophy: How can the existing computing infrastructure (PC's, workstations, local area networks) of an institution or a company be used for parallel and/or distributed problem solution in optimization. This volume of the LECfURE NOTES ON ECONOMICS AND MA THEMA TICAL SYSTEMS contains most of the papers presented at the workshop, plus some additional invited papers covering other important topics related to this workshop. The papers appear here grouped according to four general areas. (1) Solution of optimization problems using massive parallel systems (data parallelism). The authors of these papers are: Lootsma; Gehne. (II) Solution of optimization problems using coarse-grained parallel approaches on multiprocessor systems (control parallelism). The authors of these papers are: Bierwirth, Mattfeld, and Stoppler; Schwartz; Boden, Gehne, and Grauer; and Taudes and Netousek.

THE CONTEXT OF PARALLEL PROCESSING The field of digital computer architecture has grown explosively in the past two decades. Through a steady stream of experimental research, tool-building efforts, and theoretical studies, the design of an instruction-set architecture, once considered an art, has been transformed into one of the most quantitative branches of computer technology. At the same time, better understanding of various forms of concurrency, from standard pipelining to massive parallelism, and invention of architectural structures to support a reasonably efficient and user-friendly programming model for such systems, has allowed hardware performance to continue its exponential growth. This trend is expected to continue in the near future. This explosive growth, linked with the expectation that performance will continue its exponential rise with each new generation of hardware and that (in stark contrast to software) computer hardware will function correctly as soon as it comes off the assembly line, has its down side. It has led to unprecedented hardware complexity and almost intolerable dev- opment costs. The challenge facing current and future computer designers is to institute simplicity where we now have complexity; to use fundamental theories being developed in this area to gain performance and ease-of-use benefits from simpler circuits; to understand the interplay between technological capabilities and limitations, on the one hand, and design decisions based on user and application requirements on the other.

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 fgaining ground especially in GA. The general purpose nature of GA is examined from an interdiciplinary 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 progrmamming of Parallel Genetic Algorithms (including GAME) and a section on Optimisation and Complex Modelling. Readers: researchers in AI, mathematics and computing.

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