M. Bernardo, Università di Urbino “Carlo Bo”, Italy; E. de Vink, Technische Universiteit Eindhoven, The Netherlands; A. Di Pierro, Università di Verona, Italy; H. Wiklicky, Imperial College London, UK (Eds)

Formal Methods for Dynamical Systems


This book presents 5 tutorial lectures given by leading researchers at the 13th edition of the International School on Formal Methods for the Design of Computer, Communication and Software Systems, SFM 2013, held in Bertinoro, Italy, in June 2013. SFM 2013 was devoted to dynamical systems and covered several topics including chaotic dynamics; information theory; systems biology; hybrid systems; quantum computing; and automata-based models and model checking.

Contents


Fields of interest

Software Engineering; Logics and Meanings of Fields of interest

Automata-based models and model checking.

Targets

High-level theoretical discussions of practical examples, in tandem with the theoretical discussions Gently introduces the reader to the basic ideas underpinning computer networking, before graduating building up to more advanced concepts Provides numerous step-by-step descriptions of practical examples, in tandem with the theoretical discussions Includes an extensive set of practical code examples, together with detailed comments and explanations

Features


Contents


Features


Fields of interest

Mathematical Logic and Formal Languages; Software Engineering

Target groups

Research

Product category

Monograph

Available

2013. VIII, 181 p. 49 illus. (Lecture Notes in Computer Science / Programming and Software Engineering, Volume 7938) Softcover

$72.00

ISBN 978-3-642-38873-6

Due July 2013

2013. XVI, 264 p. 72 illus. (Computer Communications and Networks) Hardcover

$109.00

ISBN 978-1-4471-5291-0

Due August 2013

2nd ed. 2014. XVIII, 500 p. 47 illus. Hardcover

$129.00

Fire Detection in Warehouse Facilities

Automatic sprinklers systems are the primary fire protection system in warehouse and storage facilities. The effectiveness of this strategy has come into question due to the challenges presented by modern warehouse facilities, including increased storage heights and areas, automated storage retrieval systems (ASRS), limitations on water supplies, and changes in firefighting strategies. The application of fire detection devices used to provide early warning and notification of incipient warehouse fire events is being considered as a component of modern warehouse fire protection. Fire Detection in Warehouse Facilities provides technical information to aid in the development of guidelines and standards for the use of fire detection technologies for modern warehouse fire protection. The authors share their thorough literature review, analyze characteristic fire hazards for modern warehouse facilities, and identify information gaps in the field. The book concludes with recommendations for the development of guidelines and standards for the use of detection technologies in warehouse fire protection design, including a research plan for implementation. This book is intended for practitioners seeking an understanding of the issues surrounding warehouse design and fire protection.

Fields of interest
- Computer Imaging, Vision, Pattern Recognition and Graphics
- Civil Engineering
- Signal, Image and Speech Processing

Target groups
- Professional/practitioner

Product category
- Brief

Benchmarking Peer-to-Peer Systems
Understanding Quality of Service in Large-Scale Distributed Systems

Peer-to-peer systems are now widely used and have become the focus of attention for many researchers over the past decade. A number of algorithms for decentralized search, content distribution, and media streaming have been developed. This book provides fundamental concepts for the benchmarking of those algorithms in peer-to-peer systems. It also contains a collection of characteristic benchmarking results.

Features
- Provides a comprehensive overview of the performance of peer-to-peer systems
- Details a clear benchmarking process, by which P2P systems may be compared
- Presents new results in the areas of performance modeling and analysis of peer-to-peer systems, and peer-to-peer applications, such as video streaming and games

Contents
- Introduction
- A Formal Model for Peer-to-Peer Systems
- Benchmarking Methodology
- Structured Search Overlays
- Content Delivery Overlays
- Decentralized Monitoring in Peer-to-Peer Systems
- Service Overlays
- Peer-to-Peer Overlays for Online Games
- Video-Streaming Overlays
- Summary and Conclusion

Fields of interest
- Computer Communication Networks
- System Performance and Evaluation
- Software Engineering

Target groups
- Research

Product category
- Contributed volume

Guide to Programming and Algorithms Using R

This easy-to-follow textbook provides a student-friendly introduction to programming and algorithms. Emphasis is placed on the threshold concepts that present barriers to learning, including the questions that students are often too embarrassed to ask. The book promotes an active learning style in which a deeper understanding is gained from evaluating, questioning, and discussing the material, and practised in hands-on exercises. Although R is used as the language of choice for all programs, strict assumptions are avoided in the explanations in order for these to remain applicable to other programming languages.

Features
- Simple, concise and easy-to-read, with many discussions on common mistakes and answers to questions students may be too embarrassed to ask
- Contains instructive practical exercises at the end of each chapter, together with a selection of mini-projects that students may enjoy while programming
- Provides R program code for lecturers and instructors at an associated website

Contents
- Introduction
- Loops
- Recursions
- Complexity of Programs and Algorithms
- Sorting
- Solutions of Linear Systems of Equations
- File Processing
- Suggested Mini Projects

Fields of interest
- Programming Techniques
- Programming Languages
- Compilers, Interpreters
- Algorithms

Target groups
- Lower undergraduate

Product category
- Undergraduate textbook
Vision-based Pedestrian Protection Systems for Intelligent Vehicles

Pedestrian Protection Systems (PPSs) are on-board systems aimed at detecting and tracking people in the surroundings of a vehicle in order to avoid potentially dangerous situations. These systems, together with other Advanced Driver Assistance Systems (ADAS) such as lane departure warning or adaptive cruise control, are one of the most promising ways to improve traffic safety.

By the use of computer vision, cameras working either in the visible or infra-red spectra have been demonstrated as a reliable sensor to perform this task. Nevertheless, the variability of human’s appearance, not only in terms of clothing and sizes but also as a result of their dynamic shape, makes pedestrians one of the most complex classes even for computer vision. Moreover, the unstructured changing and unpredictable environment in which such on-board systems must work makes detection a difficult task to be carried out with the demanded robustness. In this brief, the state of the art in PPSs is introduced through the review of the most relevant papers of the last decade. A common computational architecture is presented as a framework to organize each method according to its main contribution.

Contents

Features
- Provides a comprehensive coverage of applying semantic models in user interface design
- Includes state-of-the-art research ontologies in interactive systems
- Presents many case studies in real world application domains

Semantic Models for Adaptive Interactive Systems

Providing insights into methodologies for designing adaptive systems based on semantic data, and introducing semantic models that can be used for building interactive systems, this book showcases many of the applications made possible by the use of semantic models.

Features
- Covers most fundamental topics in bioinformatics
- Written by distinguished researchers around the world
- Serves as guidance for Bioinformatics programs in China

Basics of Bioinformatics

Lecture Notes of the Graduate Summer School on Bioinformatics of China

This book outlines 11 courses and 15 research topics in bioinformatics, based on curriculums and talks in a graduate summer school on bioinformatics that was held in Tsinghua University.

Features
- Covers most fundamental topics in bioinformatics
- Written by distinguished researchers around the world
- Serves as guidance for Bioinformatics programs in China
A. Moreira, Universidade Nova de Lisboa, Caparica, Portugal; R. Chitchyan, J. Araujo, University of Leicester, UK; A. Rashid, Lancaster University, UK (Eds)

**Aspect-Oriented Requirements Engineering**

**Contents**

**Fields of interest**
Software Engineering; Management of Computing and Information Systems

**Target groups**
Research

**Product category**
Monograph

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G. O'Regan, SQC Consulting, Cork, Ireland

**Giants of Computing**

**A Compendium of Select, Pivotal Pioneers**

**Features**
- Provides an overview of a selection of individuals who have made important contributions to the field of computing in the early days.
- Presents the key contributions and biographical information on figures from a broad range of sub-disciplines and historical periods.
- Highlights the richness of the field of computing, and the wealth of contributions made by historical and contemporary figures.

**Contents**

**Fields of interest**
History of Computing; History of Science; Artificial Intelligence (incl. Robotics)

**Target groups**
Upper undergraduate

**Product category**
Undergraduate textbook

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T. Rauber, University of Bayreuth, Germany; G. Rünger, Chemnitz University of Technology, Germany

**Parallel Programming**

**for Multicore and Cluster Systems**

Innovations in hardware architecture, like hyper-threading or multicore processors, mean that parallel computing resources are available for inexpensive desktop computers. In only a few years, many standard software products will be based on concepts of parallel programming implemented on such hardware, and the range of applications will be much broader than that of scientific computing, up to now the main application area for parallel computing. Rauber and Rünger take up these recent developments in processor architecture by giving detailed descriptions of parallel programming techniques that are necessary for developing efficient programs for multicore processors as well as for parallel cluster systems and supercomputers.

**Features**
- Broad coverage of all aspects of parallel programming.
- Special emphasis on runtime efficiency and memory organization.
- Presented material has been used in courses for many years.
- Complemented by many examples and an additional website with teaching material.

**Contents**

**Fields of interest**
Programming Techniques; Computer Communication Networks; Computational Science and Engineering

**Target groups**
Upper undergraduate

**Product category**
Graduate/Advanced undergraduate textbook

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**Due August 2013**
2013. XII, 336 p. Hardcover
$129.00
ISBN 978-3-642-38639-8

**Due July 2013**
2013. XX, 314 p. 113 illus., 57 in color. Hardcover
$59.99

**Due June 2013**
2nd ed. 2013. XIII, 516 p. Hardcover
$69.99
ISBN 978-3-642-37800-3
**Resource Management for Device-to-Device Underlay Communication**

Device-to-Device (D2D) communication will become a key feature supported by next generation cellular networks, a topic of enormous importance to modern communication. Currently, D2D serves as an underlay to the cellular network as a means to increase spectral efficiency. Although D2D communication brings large benefits in terms of system capacity, it also causes interference as well as increased computation complexity to cellular networks as a result of spectrum sharing. Thus, efficient resource management must be performed to guarantee a target performance level of cellular communication. This brief presents the state-of-the-art research on resource management for D2D communication underlaying cellular networks. Those who work with D2D communication will use this book’s information to help ensure their work is as efficient as possible. Along with the survey of existing work, this book also includes the fundamental theories, key techniques, and applications.

**Contents**

- Introduction
- Physical-layer Techniques
- Radio Resource Management
- Cross-layer Optimization
- Summary

**Fields of interest**

Computer Communication Networks; Communications Engineering, Networks

**Target groups**

Research

**Product category**

Brief

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**Measuring SIP Proxy Server Performance**

Internet Protocol (IP) telephony is an alternative to the traditional Public Switched Telephone Networks (PSTN), and the Session Initiation Protocol (SIP) is quickly becoming a popular signaling protocol for VoIP-based applications. SIP is a peer-to-peer multimedia signaling protocol standardized by the Internet Engineering Task Force (IETF), and it plays a vital role in providing IP telephony services through its use of the SIP Proxy Server (SPS), a software application that provides call routing services by parsing and forwarding all the incoming SIP packets in an IP telephony network.

**Features**

- Proposes new models for the implementation of SIP proxy servers that greatly improve their performance and scale
- Highlights applications for session-initiation protocol for video and streaming technologies
- Presents real-world industrial case studies that can be used as a benchmark for close comparisons and further optimizations

**Contents**

- Introduction
- PSTN and VoIP Services Context
- Related Work
- Performance Measurements of M/M/1 and M/D/1 based SPS
- SPS Software Architecture Study
- Measurements and Analysis of M/M/c Based SPS Model
- Performance of the SPS in LAN and WAN Environment
- SPS Performance Overheads with SIP Security
- Statistical Analysis of Experimental Data Sets
- Summary and Future Work

**Fields of interest**

Computer Communication Networks; Communications Engineering, Networks; Information Systems and Communication Service

**Target groups**

Research

**Product category**

Monograph

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**Trustworthy Execution on Mobile Devices**

This brief considers the various stakeholders in today’s mobile device ecosystem, and analyzes why widely-deployed hardware security primitives on mobile device platforms are inaccessible to application developers and end-users. Existing proposals are also evaluated for leveraging such primitives, and proves that they can indeed strengthen the security properties available to applications and users, without reducing the properties currently enjoyed by OEMs and network carriers. Finally, this brief makes recommendations for future research that may yield practical and deployable results.

**Contents**

- Introduction
- Demand for Applications Requiring Hardware Security
- Desired Security Features
- Available Hardware Primitives
- Isolated Execution Environments
- API Architectures
- Analysis and Recommendations
- Summary

**Fields of interest**

Systems and Data Security; Computer Communication Networks; Data Encryption

**Target groups**

Research

**Product category**

Brief

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Due July 2013

2013. VII, 81 p. 46 illus. (SpringerBriefs in Computer Science) Softcover

$39.99

ISBN 978-1-4614-8192-8

Due July 2013

2013. XXII, 206 p. 115 illus., 106 in color. Hardcover

$109.00

ISBN 978-3-319-00989-6

Due July 2013

2013. X, 66 p. 15 illus. (SpringerBriefs in Computer Science) Softcover

$39.99

ISBN 978-1-4614-8189-8
Quality is not a fixed or universal property of software; it depends on the context and goals of its stakeholders. Hence, when you want to develop a high-quality software system, the first step must be a clear and precise specification of quality. Yet even if you get it right and complete, you can be sure that it will become invalid over time. So the only solution is continuous quality control: the steady and explicit evaluation of a product’s properties with respect to its updated quality goals. This book guides you in setting up and running continuous quality control in your environment. Starting with a general introduction on the notion of quality, it elaborates what the differences between process and product quality are and provides definitions for quality-related terms often used without the required level of precision. On this basis, the work then discusses quality models as the foundation of quality control, explaining how to plan desired product qualities and how to ensure they are delivered throughout the entire lifecycle. Next it presents the main concepts and techniques of continuous quality control, discussing the quality control loop and its main techniques such as reviews or testing.

**Fields of interest**
Software Engineering; Management of Computing and Information Systems; Quality Control, Reliability, Safety and Risk

**Target groups**
Professional/practitioner

**Product category**
Professional book

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Starting with novel algorithms for optimally updating bounding volume hierarchies of objects undergoing arbitrary deformations, the author presents a new data structure that allows, for the first time, the computation of the penetration volume. The penetration volume is related to the water displacement of the overlapping region, and thus corresponds to a physically motivated and continuous force. The practicability of the approaches used is shown by realizing new applications in the field of robotics and haptics, including a user study that evaluates the influence of the degrees of freedom in complex haptic interactions.

**Features**
- State of the art review of the current data structures for collision detection
- Features a novel geometric data structure for collision detection at haptic rates between arbitrary rigid objects
- Presents new applications based on the latest research

**Contents**
Series Editors’ Foreword - Preface - Part I – That was Then, This is Now - Introduction - A Brief Overview of Collision Detection - Part II – Algorithms and Data Structures - Kinetic Data Structures for Collision Detection - Sphere Packings for Arbitrary Objects - Inner Sphere Trees - Part III – Evaluation and Application - Evaluation and Analysis of Collision Detection Algorithms - Applications - Part IV – Every End is Just a New Beginning - Epilogue

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**Fields of interest**
Simulation and Modeling; Algorithms; User Interfaces and Human Computer Interaction

**Target groups**
Research

**Product category**
Monograph

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This brief surveys existing techniques to address the problem of long delays and high power consumption for web browsing on smartphones, which can be due to the local computational limitation at the smartphone (e.g., running java scripts or flash objects) level. To address this issue, an architecture called Virtual-Machine based Proxy (VMP) is introduced, shifting the computing from smartphones to the VMP which may reside in the cloud. Mobile Web Browsing Using the Cloud illustrates the feasibility of deploying the proposed VMP system in 3G networks through a prototype using Xen virtual machines (in cloud) and Android Phones with ATT UMTS network. Techniques to address scalability issues, resource management techniques to optimize the performance of the VMs on the proxy side, compression techniques to further reduce the bandwidth consumption, and adaptation techniques to address poor network conditions on the smartphone are also included.

**Contents**
Introduction - Related Work - Motivation - Virtual Machine Based Proxy (VMP) - Performance Measurements - Conclusions and Future Research Directions

**Fields of interest**
Computer Communication Networks; Communications Engineering, Networks

**Target groups**
Research

**Product category**
Brief
Studies on Urban Vehicular Ad-hoc Networks

With the advancement of wireless technology, vehicular ad hoc networks (VANETs) are emerging as a promising approach to realizing "smart cities" and addressing many important transportation problems such as road safety, efficiency, and convenience. This brief provides an introduction to the large trace data set collected from thousands of taxis and buses in Shanghai, the largest metropolis in China. It also presents the challenges, design issues, performance modeling and evaluation of a wide spectrum of VANET research topics, ranging from realistic vehicular mobility models and opportunistic routing, to real-time vehicle tracking and urban sensing applications. In addition to the latest research and techniques, the reader will also learn the trace-driven methodologies and tools of performance modeling and analysis, network protocol design and optimization, and network simulation, thus keeping pace with the fast moving VANET research and development.

Contents

Fields of interest
Computer Communication Networks; Communications Engineering, Networks

Target groups
Research

Product category
Brief

Network Analysis Literacy

A Practical Approach to Network Analysis Project Design

Network analysis provides a perspective on how to find and quantify significant structures in the interaction patterns between different types of actors and on how to relate these structures to properties of the actors. It has proven itself to be useful for the analysis of biological and social networks, but also for networks describing complex systems in economy, psychology, geography, and various other fields. Today, network analysis packages in the open-source platform R and other open-source software projects enable scientists from all fields to quickly apply network analytic methods to their data sets. Altogether these applications offer such a wealth of network analytic methods that it can be overwhelming for someone just entering this field. This book provides a road map through this jungle of network analytic methods, offers advice on how to pick the best method for a given network analytic project, and how to avoid common pitfalls. It introduces the methods which are most often used to analyze complex networks, e.g., different types of random graph models, centrality indices, clustering algorithms, global network measures, and networks motifs.

Features
▸ teaches users how to pose a defined network analytic questions ▸ shows how to build a network suitable for solving the questions posed to it ▸ aids in choosing or designing the best random graph model for comparing analytical results ▸ how to design the best model for describing a given graph

Fields of interest
Computer Appl. in Social and Behavioral Sciences; Interdisciplinary Studies; Socio- and Econophysics, Population and Evolutionary Models

Target groups
Research

Product category
Monograph

Due August 2013
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2014. 400 p. 60 illus., 10 in color. Hardcover
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