GREEN
Communications

Theoretical Fundamentals, Algorithms and Applications

Edited by
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Green Communications Theoretical Fundamentals Algorithms And Applications

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Green Communications Theoretical Fundamentals Algorithms And Applications:

Green Communications Jinsong Wu,Sundeep Rangan,Honggang Zhang,2016-04-19 Nowadays energy crisis and global warming problems are hanging over everyone s head urging much research work on energy saving In the ICT industry which is becoming a major consumer of global energy triggered by the telecommunication network operators experiencing energy cost as a significant factor in profit calculations researchers have start *Demand Response Application in Smart Grids* Sayyad Nojavan,Kazem Zare,2019-12-05 This book analyzes issues surrounding the efficient integration of demand response programs DRPs on operation problems in smart grids The benefits offered by demand response programs DRPs for load serving entities grid operators and electricity consumers are explained including decreased electricity prices and risk management In depth chapters discuss the flexibility of market operations market power mitigation and environmental benefits making this a must have reference for engineers and related practicing professionals working for organizations in the electricity market including reliability organizations distribution companies transmission companies and electric end users **Green Machine Learning Protocols for Future Communication Networks** Saim Ghafoor,Mubashir Husain Rehmani,2023-10-25 Machine learning has shown tremendous benefits in solving complex network problems and providing situation and parameter prediction However heavy resources are required to process and analyze the data which can be done either offline or using edge computing but also requires heavy transmission resources to provide a timely response The need here is to provide lightweight machine learning protocols that can process and analyze the data at run time and provide a timely and efficient response These algorithms have grown in terms of computation and memory requirements due to the availability of large data sets These models algorithms also require high levels of resources such as computing memory communication and storage The focus so far was on producing highly accurate models for these communication networks without considering the energy consumption of these machine learning algorithms For future scalable and sustainable network applications efforts are required toward designing new machine learning protocols and modifying the existing ones which consume less energy i e green machine learning protocols In other words novel and lightweight green machine learning algorithms protocols are required to reduce energy consumption which can also reduce the carbon footprint To realize the green machine learning protocols this book presents different aspects of green machine learning for future communication networks This book highlights mainly the green machine learning protocols for cellular communication federated learning based models and protocols for Beyond Fifth Generation networks approaches for cloud based communications and Internet of Things This book also highlights the design considerations and challenges for green machine learning protocols for different future applications *Communication Infrastructures for Cloud Computing* Mouftah, Hussein T.,Kantarci, Burak,2013-09-30 Cloud computing has provided multiple advantages as well as challenges to software and infrastructure services In order to be fully beneficial these challenges facing cloud specific communication protocols

must be addressed Communication Infrastructures for Cloud Computing presents the issues and research directions for a broad range of cloud computing aspects of software computing and storage systems This book will highlight a broad range of topics in communication infrastructures for cloud computing that will benefit researchers academics and practitioners in the active fields of engineering computer science and software **Green, Energy-Efficient and Sustainable Networks** Josip Lorincz,Antonio Capone,Luca Chiaraviglio,JinsongWu,2020-01-21 The book Green Energy Efficient and Sustainable Networks provides insights and solutions for a range of problems in the field of obtaining greener energy efficient and sustainable networks The book contains the outcomes of the Special Issue on Green Energy Efficient and Sustainable Networks of the Sensors journal Seventeen high quality papers published in the Special Issue have been collected and reproduced in this book demonstrating significant achievements in the field Among the published papers one paper is an editorial and one is a review while the remaining 15 works are research articles The published papers are self contained peer reviewed scientific works that are authored by more than 75 different contributors with both academic and industry backgrounds The editorial paper gives an introduction to the problem of information and communication technology ICT energy consumption and greenhouse gas emissions presenting the state of the art and future trends in terms of improving the energy efficiency of wireless networks and data centers as the major energy consumers in the ICT sector In addition the published articles aim to improve energy efficiency in the fields of software defined networking Internet of things machine learning authentication energy harvesting wireless relay systems routing metrics wireless sensor networks device to device communications heterogeneous wireless networks and image sensing The last paper is a review that gives a detailed overview of energy efficiency improvements and methods for the implementation of fifth generation networks and beyond This book can serve as a source of information in industrial teaching and or research and development activities The book is a valuable source of information since it presents recent advances in different fields related to greening and improving the energy efficiency and sustainability of those ICTs particularly addressed in this book **Multihomed Communication with SCTP (Stream Control Transmission Protocol)** Victor C.M. Leung,Eduardo Parente Ribeiro,Alan Wagner,Janardhan Iyengar,2012-12-19 Although multihomed communication is a rapidly emerging trend for next generation networks no known book explores multihomed communication with the Stream Control Transmission Protocol SCTP Filling this void Multihomed Communication with SCTP Stream Control Transmission Protocol explains this innovative feature that allows an endpoint to simultaneously maintain and use multiple points of connectivity to the network making it possible for fixed and mobile users to connect to the Internet via multiple service providers or last hop technologies Among the topics addressed the book covers Support of node mobility between networks Concurrent multipath transfer using SCTP multihoming Low delay communication and multimedia applications High performance computing using commodity hardware and software SCTP support in the INET framework and its analysis in the Wireshark packet analyzer SCTP application interface Ideal for

researchers and programmers this forward looking reference describes SCTP multihoming concepts and implementation applications of multihoming across different domains and proposed extensions such as multipath transfer and mobility Although the book is aimed at those with an advanced background it also covers the fundamental concepts and mechanisms of SCTP multihoming to help anyone get up to speed on SCTP **Green Information Technology** Mohammad Dastbaz,Colin Pattinson,Babak Akhgar,2015-03-09 We are living in the era of Big Data and the computing power required to deal with Big Data both in terms of its energy consumption and technical complexity is one of the key areas of research and development The U S Environmental Protection Agency estimates that centralized computing infrastructures data centres currently use 7 giga watts of electricity during peak loads This translates into about 61 billion kilowatt hours of electricity used By the EPA s estimates power hungry data centres consume the annual output of 15 average sized power plants One of the top constraints to increasing computing power besides the ability to cool is simply delivering enough power to a given physical space Green Information Technology A Sustainable Approach offers in a single volume a broad collection of practical techniques and methodologies for designing building and implementing a green technology strategy in any large enterprise environment which up until now has been scattered in difficult to find scholarly resources Included here is the latest information on emerging technologies and their environmental impact how to effectively measure sustainability discussions on sustainable hardware and software design as well as how to use big data and cloud computing to drive efficiencies and establish a framework for sustainability in the information technology infrastructure Written by recognized experts in both academia and industry Green Information Technology A Sustainable Approach is a must have guide for researchers computer architects computer engineers and IT professionals with an interest in greater efficiency with less environmental impact Introduces the concept of using green procurement and supply chain programs in the IT infrastructure Discusses how to use big data to drive efficiencies and establish a framework for sustainability in the information technology infrastructure Explains how cloud computing can be used to consolidate corporate IT environments using large scale shared infrastructure reducing the overall environmental impact and unlocking new efficiencies Provides specific use cases for Green IT such as data center energy efficiency and cloud computing sustainability and risk   Advances in Greener Energy Technologies Akash Kumar Bhoi,Karma Sonam Sherpa,Akhtar Kalam,Gyoo-Soo Chae,2020-05-15 This book presents ongoing research activities of currently available renewable energy technologies and the approaches towards clean technology for enabling a socio economic model for the present and future generations to live in a clean and healthy environment The book provides chapter wise implementation of research works in the area of green energy technologies with proper methods used with solution strategies and energy efficiency approaches by combining theory and practical applications Readers are introduced to practical problems of green computation and hybrid resources optimization with solution based approaches from the current research outcomes The book will be of use to researchers professionals and policy makers alike **Cognitive**

Communications David Grace,Honggang Zhang,2012-07-25 This book discusses in depth the concept of distributed artificial intelligence DAI and its application to cognitive communications In this book the authors present an overview of cognitive communications encompassing both cognitive radio and cognitive networks and also other application areas such as cognitive acoustics The book also explains the specific rationale for the integration of different forms of distributed artificial intelligence into cognitive communications something which is often neglected in many forms of technical contributions available today Furthermore the chapters are divided into four disciplines wireless communications distributed artificial intelligence regulatory policy and economics and implementation The book contains contributions from leading experts academia and industry in the field Key Features Covers the broader field of cognitive communications as a whole addressing application to communication systems in general e g cognitive acoustics and Distributed Artificial Intelligence DAI Illustrates how different DAI based techniques can be used to self organise the radio spectrum Explores the regulatory policy and economic issues of cognitive communications in the context of secondary spectrum access Discusses application and implementation of cognitive communications techniques in different application areas e g Cognitive Femtocell Networks CFN Written by experts in the field from both academia and industry Cognitive Communications will be an invaluable guide for research community PhD students researchers in the areas of wireless communications and development engineers involved in the design and development of mobile portable and fixed wireless systems wireless network design engineer Undergraduate and postgraduate students on elective courses in electronic engineering or computer science and the research and engineering community will also find this book of interest *Ad Hoc Mobile Wireless Networks* Subir Kumar Sarkar,T.G. Basavaraju,C. Puttamadappa,2016-04-19 The military the research community emergency services and industrial environments all rely on ad hoc mobile wireless networks because of their simple infrastructure and minimal central administration Now in its second edition Ad Hoc Mobile Wireless Networks Principles Protocols and Applications explains the concepts mechanism design and **Transmission Techniques for 4G Systems** Mário Marques da Silva,Americo Correia,Rui Dinis,Nuno Souto,Joao Carlos Silva,2012-11-26 Fourth Generation 4G wireless communication systems support current and emergent multimedia services such as mobile TV social networks and gaming high definition TV video teleconferencing and messaging services These systems feature the All over IP concept and boast improved quality of service Several important R D activities are currently under way in the field of wireless communications for 4G systems but the coverage is widespread in the literature Transmission Techniques for 4G Systems presents a compilation of the latest developments in the field of wireless communications for 4G systems including evolved Multimedia Broadcast and Multicast Service eMBMS Topics include Transmission schemes suitable for future broadband wireless systems Advances in transmission techniques and receiver design to support emergent wireless needs for 4G requirements Multiple Input Multiple Output MIMO base station cooperation macro diversity and inter cell interference cancellation Multihop relay

techniques hierarchical constellations and multi resolution techniques Advances using block transmission techniques for different propagation and multi user environments System level evaluation of 4G using different transmission techniques Exploring the key requirements of emergent services this volume provides fundamentals and theory along with transmission and detection techniques and schemes transversal to many digital communication systems including wireless cellular and satellite If you re interested in or involved with 4G multimedia systems this is the book you need on the latest R D wireless activities so you can plan design and develop prototypes and future systems *Intelligent Sensor Networks* Fei Hu,Qi Hao,2012-12-15 Although governments worldwide have invested significantly in intelligent sensor network research and applications few books cover intelligent sensor networks from a machine learning and signal processing perspective Filling this void Intelligent Sensor Networks The Integration of Sensor Networks Signal Processing and Machine Learning focuses on the close integration of sensing networking and smart signal processing via machine learning Based on the world class research of award winning authors the book provides a firm grounding in the fundamentals of intelligent sensor networks including compressive sensing and sampling distributed signal processing and intelligent signal learning Presenting recent research results of world renowned sensing experts the book is organized into three parts Machine Learning describes the application of machine learning and other AI principles in sensor network intelligence covering smart sensor transducer architecture and data representation for intelligent sensors Signal Processing considers the optimization of sensor network performance based on digital signal processing techniques including cross layer integration of routing and application specific signal processing as well as on board image processing in wireless multimedia sensor networks for intelligent transportation systems Networking focuses on network protocol design in order to achieve an intelligent sensor networking covering energy efficient opportunistic routing protocols for sensor networking and multi agent driven wireless sensor cooperation Maintaining a focus on intelligent designs the book details signal processing principles in sensor networks It elaborates on critical platforms for intelligent sensor networks and illustrates key applications including target tracking object identification and structural health monitoring It also includes a paradigm for validating the extent of spatiotemporal associations among data sources to enhance data cleaning in sensor networks a sensor stream reduction application and also considers the use of Kalman filters for attack detection in a water system sensor network that consists of water level sensors and velocity sensors **Leading Effective Virtual Teams** Nancy M. Settle-Murphy,2012-12-13 A proliferation of new technologies has lulled many into thinking that we actually have to think less about how we communicate In fact communicating and collaborating across time distance and cultures has never been more complex or difficult Written as a series of bulleted tips drawn from client experiences and best practices Leading Effective 5G Networks Anwer Al-Dulaimi,Xianbin Wang,Chih-Lin I,2018-10-02 A reliable and focused treatment of the emergent technology of fifth generation 5G networks This book provides an understanding of the most recent developments in 5G from both theoretical

and industrial perspectives It identifies and discusses technical challenges and recent results related to improving capacity and spectral efficiency on the radio interface side and operations management on the core network side It covers both existing network technologies and those currently in development in three major areas of 5G spectrum extension spatial spectrum utilization and core network and network topology management It explores new spectrum opportunities the capability of radio access technology and the operation of network infrastructure and heterogeneous QoE provisioning 5G Networks Fundamental Requirements Enabling Technologies and Operations Management is split into five sections Physical Layer for 5G Radio Interface Technologies Radio Access Technology for 5G Networks 5G Network Interworking and Core Network Advancements Vertical 5G Applications and R code design for multi user MIMO network slicing for 5G networks machine type communication in the 5G era provisioning unlicensed LAA interface for smart grid applications moving toward all IT 5G end to end infrastructure and more This valuable resource Provides a comprehensive reference for all layers of 5G networks Focuses on fundamental issues in an easy language that is understandable by a wide audience Includes both beginner and advanced examples at the end of each section Features sections on major open research challenges 5G Networks Fundamental Requirements Enabling Technologies and Operations Management is an excellent book for graduate students academic researchers and industry professionals involved in 5G technology *Security and Privacy in Smart Grids* Yang Xiao,2016-04-19 Presenting the work of prominent researchers working on smart grids and related fields around the world Security and Privacy in Smart Grids identifies state of the art approaches and novel technologies for smart grid communication and security It investigates the fundamental aspects and applications of smart grid security and privacy and reports on the latest advances in the range of related areas making it an ideal reference for students researchers and engineers in these fields The book explains grid security development and deployment and introduces novel approaches for securing today s smart grids Supplying an overview of recommendations for a technical smart grid infrastructure the book describes how to minimize power consumption and utility expenditure in data centers It also Details the challenges of cybersecurity for smart grid communication infrastructures Covers the regulations and standards relevant to smart grid security Explains how to conduct vulnerability assessments for substation automation systems Considers smart grid automation SCADA system security and smart grid security in the last mile The book s chapters work together to provide you with a framework for implementing effective security through this growing system Numerous figures illustrations graphs and charts are included to aid in comprehension With coverage that includes direct attacks smart meters and attacks via networks this versatile reference presentsactionable suggestions you can put to use immediately to prevent such attacks

Next Generation Mobile Broadcasting David Gomez-Barquero,2013-03-26 This book provides an overview of the past present and future in mobile multimedia broadcasting The first part of the book supplies an overview of the new generation mobile broadcasting technologies currently available The second part describes the cutting edge mobile broadcast

technology known as DVB NGH Digital Video Broadcasting Next Generation Handheld which is expected to significantly outperform existing technologies in both capacity and coverage The book is edited by a member of the DVB NGH standardization group and contains contributions from the different standardization groups worldwide   Building Next-Generation Converged Networks Al-Sakib Khan Pathan,Muhammad Mostafa Monowar,Zubair Md. Fadlullah,2013-01-29 Providing a comprehensive introduction to next generation networks this book strikes a balance between how and why things work and making them work It examines Internet architectures and protocols network management and traffic engineering embedded systems and sensor networks web services cloud technologies and next generation wireless networking Containing the contributions of top industry experts and academics the book investigates new technologies such as IPv6 over Low Power Wireless Personal Area Networks 6LoWPAN architectures and standards mobility and security   Sustainable Wireless Communications Jianping An,Kai Yang,Xiaozheng Gao,Neng Ye,2022-06-06 This book discusses the architecture of future wireless networks reliable communications between different nodes and energy efficient resource allocations for achieving sustainable wireless communications To meet the increasing demands of wireless communication networks and achieve sustainable wireless communications various promising technologies in this book have been investigated and developed This book is to present cutting edge research results on achieving sustainable wireless communications In particular the sustainable ultra dense heterogeneous networks and the sustainability issues of non orthogonal multiple access are investigated the performances of cooperative networks with space time network coding under different scenarios are evaluated the dynamic estimation for a unified laser telemetry tracking and command system is discussed and the energy efficient resource allocation schemes are developed for future wireless communication networks We believe that the results in this book can provide useful insights for the design of future wireless communication networks and achieving sustainable wireless communications Graduate students researchers and engineers in the field of wireless communications can benefit from the book   New Technologies, Development and Application III Isak Karabegović,2020-05-04 This proceedings book features papers presented at the International Conference on New Technologies Development and Application held at the Academy of Sciences and Arts of Bosnia and Herzegovina in Sarajevo on 25th 27th June 2020 It covers a wide range of future technologies and technical disciplines including complex systems such as Industry 4 0 patents in Industry 4 0 robotics mechatronics systems automation manufacturing cyber physical and autonomous systems sensors networks control energy and renewable energy sources automotive and biological systems vehicular networking and connected vehicles effectiveness and logistics systems smart grids nonlinear systems power social and economic systems education and IoT The book focuses on the Fourth Industrial Revolution Industry 4 0 in which implementation will improve many aspects of human life in all segments and lead to changes in business paradigms and production models Further new business methods are emerging transforming production systems transport delivery and consumption which need to be monitored and implemented by every

company involved in the global market   **Cognitive Radio Techniques** Kandeepan Sithamparanathan,Andrea Giorgetti,2012 Providing an in depth treatment of the core enablers of cognitive radio technology this unique book places emphasis on critical areas that have not been sufficiently covered in existing literature You find expert guidance in the key enablers with respect to communications and signal processing The book presents fundamentals basic solutions detailed discussions of important enabler issues and advanced algorithms to save you time with your projects in the field For the first time in any book you find an adequately detailed treatment of spectrum sensing that covers nearly every aspect of the subject Moreover this valuable resource provides you with thorough working knowledge of localization and interference mitigation as enablers of cognitive radio technology The book includes all the necessary mathematics statistical and probabilistic treatments and performance analysis to give you a comprehensive understanding of the material

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