Description:
*Design of Digital Phase Shifters for Multipurpose Communication Systems* aims to cover a new emerging need in designing digital phase shifters for modern communication systems.

With the advancement of new generation mobile communication systems, directed beams save a substantial amount of RF-power, and improve the noise immunity. In this regard, beam-forming circuits, namely, digital phase shifters constitute essential parts the antenna arrays. Therefore, this book is devoted to design of digital phase shifters for various communications systems.

In the good old days, phase shifter design requirements used to demand narrow bandwidth with no physical size constraints. Nowadays, they must be compact and suitable for Very Large Scale Integrated Circuits (VLSI) or Microwave Monolithic Integrated Circuit (MMIC) implementation with Wide Phase Range (WPR) and Wide Frequency Band (WFB).

Since the 1980s, the author has been designing digital phase shifters for various applications. He started to work with loaded lines phase shifters, and then employed branch line couplers to achieve wider frequency bands. In order to reduce the physical size, he used a 3 element Symmetric LC ladder based T or PI configurations. In order to achieve broad frequency band with large phase range, usage of LC lattice structures is inevitable. Lately, the author designed phase shifters using both lowpass and highpass LC ladder and lattice based switched-structures, which are suitable for monolithic implementation. In the course of design, MOS transistors were employed as switching elements. This book includes several novel digital phase shifter topologies, which provides wide phase range and wideband operation.

Technical topics discussed in the book include:
- Basic Concept of Antenna Arrays
- Concept of Digital Phase Bit
- Scattering Parameters to analyze the electric performance of phase shifters
- Transmission Lines as circuit elements to construct practical phase shifters
- Loaded Line Digital Phase Shifters (DPS)
- Lowpass Based T/PI Section DPS
- Highpass Based T/PI Section DPS
- 3-Element LC T/PI Section DPS
- Wide Phase Range, Wide Frequency Band Symmetric Lattice Based DPS

For each topology presented, explicit design equations are provided and programs to assess the electric performance of each topology is developed in a MatLab environment. It is expected that the reader will be self-sufficient to design and implement the digital phase shifters topologies presented in this book.
Description:
Security within CONASENSE Paragon describes in particular the cyber security issues in the field of Communication, Navigation, Sensing and Services within the broad platform of CTIF Global Capsule (CGC). This covers future technologies and its enablers, smart cities, crowd computing, reliable and secure communication interface, satellite unmanned air vehicles, wireless sensor networks, data analytics and deep learning, remotely piloted aircraft system and public safety, network neutrality, business ecosystem innovation and so on.
Handbook on ICT in Developing Countries: Next Generation ICT Technologies

Editors:
Knud Erik Skouby, Aalborg University, Denmark
Idongesit Williams, Aalborg University, Denmark
Albert Gyamfi, Aalborg University, Denmark

ISBN: 9788770220989
e-ISBN: 9788770220972
Available From: May 2019
Price: € 90.00

Description:
Handbook on ICT in Developing Countries: Next Generation ICT Technologies is the second volume of the Handbook of ICT in Developing Countries. The first volume was on the potential implementation and service delivery of the forthcoming 5G networks. Here the focus is on the new technologies and services enabled by 5G networks or broadband Internet networks including artificial Intelligence (AI), machine learning, augmented reality, Internet of Things (IoT), autonomous driving, blockchain solutions, cloud solutions etc. Some of these are already globally experiencing growth in the existing networks and all of them are expected to grow substantially in the future.

Examples: currently, 5% of global organizations have fully adopted AI, but the penetration is expected to increase rapidly before 2025. IoT with 20.35 billion devices connected in 2017 is estimated to show 75.44 billion devices connected in 2025. The expected growth is based on delivering of new value to businesses and citizens.

It is, however, not obvious that this growth will also occur in developing countries. Currently, the digital divide between developing countries and developed countries is widening. This is mostly due to the lack of infrastructure and low level of awareness by the businesses and citizens of the value made possible by the new technologies for developing countries.

The book discusses the potentials of the new technologies for developing countries and the need for market interventions that will facilitate the demand and supply side of the market. It is designed for a broad audience including practitioners, researchers, academics, policy makers and industry players and influencers. The language and approach to the handbook is a combination of the academic writing style and professional reviews.
Optimization Methods for User Admissions and Radio Resource Allocation for Multicasting over High Altitude Platforms

Authors:
Ahmed Ibrahim, Memorial University of Newfoundland, Canada
Attahiru Alfa, University of Pretoria, South Africa and University of Manitoba, Canada

ISBN: 9788770220361
e-ISBN: 9788770220354
Available From: February 2019
Price: € 95.00

Description:
This book focuses on the issue of optimizing radio resource allocation (RRA) and user admission control (AC) for multiple multicasting sessions on a single high altitude platform (HAP) with multiple antennas on-board. HAPs are quasi-stationary aerial platforms that carry a wireless communications payload to provide wireless communications and broadband services. They are meant to be located in the stratosphere layer of the atmosphere at altitudes in the range 17-22 km and have the ability to fly on demand to temporarily or permanently serve regions with unavailable telecommunications infrastructure.

An important requirement that the book focusses on is the development of an efficient and effective method for resource allocation and user admissions for HAPs, especially when it comes to multicasting. Power, frequency, space (antennas selection) and time (scheduling) are the resources considered in the problem over an orthogonal frequency division multiple access (OFDMA) HAP system.

Due to the strong dependence of the total number of users that could join different multicast groups, on the possible ways we may allocate resources to these groups, it is of significant importance to consider a joint user to session assignments and RRA across the groups. From the service provider's point of view, it would be in its best interest to be able to admit as many higher priority users as possible, while satisfying their quality of service requirements. High priority users could be users subscribed in and paying higher for a service plan that gives them preference of admittance to receive more multicast transmissions, compared to those paying for a lower service plan. Also, the user who tries to join multiple multicast groups (i.e. receive more than one multicast transmission), would have preferences for which one he would favor to receive if resources are not enough to satisfy the QoS requirements.

Technical topics discussed in the book include:

- Overview on High Altitude Platforms, their different types and the recent works in this area
- Radio Resource Allocation and User Admission Control in HAPs
- Multicasting in a Single HAP System: System Model and Mathematical Formulation
- Optimization schemes that are designed to enhance the performance of a branch and bound technique by taking into account special mathematical structure in the problem formulation
Description:
Precise and accurate localization is one of the fundamental scientific and engineering technologies needed for the applications enabling the emergence of the Smart World and the Internet of Things (IoT). Popularity of localization technology began when the GPS became open for commercial applications in early 1990's. Since most commercial localization applications are for indoors and GPS does not work indoors, the discovery of opportunistic indoor geolocation technologies began in mid-1990's. Because of complexity and diversity of science and technology involved in indoor Geolocation, this area has emerged as its own discipline over the past two decades.

At the time of this writing, received signal strength (RSS) based Wi-Fi localization is dominating the commercial market complementing cell tower localization and GPS technologies using the time of arrival (TOA) technology. Wi-Fi localization technology takes advantage of the random deployment of Wi-Fi devices worldwide to support indoor and urban area localization for hundreds of thousands of applications on smart devices. Public safety and military applications demand more precise localization for first responders and military applications deploy specialized infrastructure for more precise indoor geolocation. To enhance the performance both industries are examining hybrid localization techniques. Hybrid algorithms use a variety of sensors to measure the speed and direction of movement and integrate them with the absolute radio frequency localization.

Indoor Geolocation Science and Technology is a multidisciplinary book that presents the fundamentals of opportunistic localization and navigation science and technology used in different platforms such as: smart devices, unmanned ground and flying vehicles, and existing cars operating as a part of intelligent transportation systems. Material presented in the book are beneficial for the Electrical and Computer Engineering, Computer Science, Robotics Engineering or other disciplines who are interested in integration of navigation into their multi-disciplinary projects. The book provides examples with supporting MATLAB codes and hands-on projects throughout to improve the ability of the readers to understand and implement variety of algorithms. It can be used for both academic education, as a textbook with problem sets and projects, and the industrial training, as a practical reference book for professionals involved in design and performance evaluation.

The author of this book has pioneering research experience and industrial exposure in design and performance evaluation of indoor geolocation based on empirical measurement and modeling of the behavior of the radio propagation in indoor areas and inside the human body. The presentation of the material is based on examples of research and development that his students have performed in his laboratory, his teaching experiences as a professor, and his experiences as a technical consultant to successful startup companies.
Description:
In recent years, a considerable amount of effort has been devoted, both in industry and academia, towards the design, performance analysis and evaluation of modulation schemes to be used in wireless and optical networks, towards the development of the next and future generations of mobile cellular communication systems. Modulation Theory is intended to serve as a complementary textbook for courses dealing with Modulation Theory or Communication Systems, but also as a professional book, for engineers who need to update their knowledge in the communications area.

The modulation aspects presented in the book use modern concepts of stochastic processes, such as autocorrelation and power spectrum density, which are novel for undergraduate texts or professional books, and provides a general approach for the theory, with real life results, applied to professional design.

This text is suitable for the undergraduate as well as the initial graduate levels of Electrical Engineering courses, and is useful for the professional who wants to review or get acquainted with the a modern exposition of the modulation theory.

The books covers signal representations for most known waveforms, Fourier analysis, and presents an introduction to Fourier transform and signal spectrum, including the concepts of convolution, autocorrelation and power spectral density, for deterministic signals. It introduces the concepts of probability, random variables and stochastic processes, including autocorrelation, cross-correlation, power spectral and cross-spectral densities, for random signals, and their applications to the analysis of linear systems. This chapter also includes the response of specific non-linear systems, such as power amplifiers.

The book presents amplitude modulation with random signals, including analog and digital signals, and discusses performance evaluation methods, presents quadrature amplitude modulation using random signals. Several modulation schemes are discussed, including SSB, QAM, ISB, C-QUAM, QPSK and MSK. Their autocorrelation and power spectrum densities are computed. A thorough discussion on angle modulation with random modulating signals, along with frequency and phase modulation, and orthogonal frequency division multiplexing is provided. Their power spectrum densities are computed using the Wiener-Khintchin theorem.
Description:
Over the past few decades, wireless access networks have evolved extensively to support the tremendous growth of consumer traffic. This superlative growth of data consumption has come about due to several reasons, such as evolution of the consumer devices, the types of telephone and smartphone being used, convergence of services, digitisation of economic transactions, tele-education, telemedicine, m-commerce, virtual reality office, social media, e-governance, e-security, to name but a few.

Not only has the society transformed to a digital world, but also the expectations from the services provided have increased many folds. The last mile/meters of delivery of all e-services is now required to be wireless. It has always been known that wireless links are the bottleneck to providing high data rates and high quality of service. Several wireless signalling and performance analysis techniques to overcome the hurdles of wireless channels have been developed over the last decade, and these are fuelling the evolution of 4G towards 5G. Evolution of Air Interface Towards 5G attempts to bring out some of the important developments that are contributing towards such growth.
Description:
Towards Future Technologies for Business Ecosystem Innovation describes CONASENSE within the broad platform of the CTIF Global Capsule (CGC) covering future technologies and its enablers, smart cities, telemedicine, crowd computing, satellite, unmanned air vehicles, cooperative wireless sensor network, remotely piloted aircraft system, network neutrality as well as virtual business model.
Recent Wireless Power Transfer Technologies via Radio Waves

Editor: Naoki Shinohara, Kyoto University, Japan
ISBN: 9788793609242
e-ISBN: 9788793609235
Available From: April 2018
Price: € 85.00

Description:
Wireless Power Transfer (WPT) is considered to be an innovative game changing technology. The same radio wave and electromagnetic field theory and technology for wireless communication and remote sensing is applied for WPT. In conventional wireless communication systems, information is "carried" on a radio wave and is then transmitted over a distance. In WPT however, the energy of the radio wave itself is transmitted over a distance. Wireless communication technology has proven to be extremely useful, however in future it should be even more useful to apply both wireless communication and wireless power technologies together.

There are various WPT technologies, e.g. inductive near field WPT, resonance coupling WPT, WPT via radio waves, and laser power transfer. Recent Wireless Power Transfer Technologies via Radio Waves focusses on recent technologies and applications of the WPT via radio waves in far field. The book also covers the history, and future, of WPT via radio waves, as well as safety, EMC and coexistence of radio waves for WPT.

Technical topics discussed in the book include:

- Radio Wave Generation
- Radio Wave Amplification with Solid States Circuit and Microwave Tubes
- Antenna and Beam Forming Technologies
- Radio Wave Conversion/Rectification to Electricity
- Battery-less Sensor Applications toward Internet of Things (IoT)
- Solar Power Satellite Application
- Safety, EMC, Coexistence of Radio Waves for the WPT

WPT is an old technology based on the basic theory of radio waves, however WPT is also a state-of-the-art technology for the latest applications in IoT, sensor networks, wireless chargers for mobile phones, and solar power satellite. The theory behind these technologies, as well as applications, are explained in this book.
Internet of Things (IoT) deals with the interconnection of devices that can communicate with each other over the internet. Currently, several smart systems have evolved with the evolution in IoT. *Cognitive Radio - an enabler for Internet of Things* is a research level subject for all communication engineering students at undergraduate, post graduate and research levels. The contents of the book are designed to cover the prescribed syllabus for one semester course on the subject prescribed by universities. Concepts have been explained thoroughly in simple and lucid language. Mathematical analysis has been used wherever necessary followed by clear and lucid explanation of the findings and their implication.

Key technologies presented include dynamic spectrum access, spectrum sensing techniques, IEEE 802.22 and different radio network architectures. Their role and use in the context of mobile broadband access in general is explained, giving both a high level overview and a detailed step by step explanation.

The book includes a large number of diagrams, MATLAB examples, thereby enabling the readers to have a sound grasp of the concepts presented and their applications. This book is a must have resource for engineers and other professionals in the telecommunication industry working with cellular or wireless broadband technologies, helping comprehension of the process of utilization of the updated technology to enable being ahead competition.
The desire for precise knowledge about the location of a moving object at any time instant has motivated a great deal of scientific research recently. This is owing to a steady expansion of the range of enabling devices and technologies, as well as the need for seamless solutions for location-based services. Besides localization accuracy, a common requirement for emerging solutions is that they are cost-abstemious, both in terms of the financial and computational cost. Hence, development of localization strategies from already deployed technologies, e.g., from different terrestrial radio frequency sources is of great practical interest. Amongst other, these include localization strategies based on received signal strength (RSS), time of arrival, angle of arrival (AoA) or a combination of them.

**RSS-AoA-based Target Localization and Tracking in Wireless Sensor Networks** presents recent advances in developing algorithms for target localization and tracking, reflecting the state-of-the-art algorithms and research achievements in target localization and tracking based on hybrid (RSS-AoA) measurements.

Technical topics discussed in the book include:

- Centralized RSS-AoA-based Target Localization
- Distributed RSS-AoA-based Target Localization
- RSS-AoA-based Target Tracking via Maximum A Posteriori Estimator
- RSS-AoA-based Target Tracking via Kalman Filter
- RSS-AoA-based via Sensor Navigation

This book is of interest for personnel in telecommunications and surveillance industries, military, smart systems, as well as academic staff and postgraduate/research students in telecommunications, signal processing, and non-smooth and convex optimization.
Description: 

*Breakthroughs in Smart City Implementation* provides answers on a wide variety of present social, political and technological problems. Green and long-lasting solutions for improving air quality, quality of life of residents in cities, traffic congestions and many more topics are needed in the coming 10 years and beyond.

Society on Communication, Navigation, Sensing and Services (CONASENSE) is a new scientific society with the vision on Communication, Navigation, Sensing and Services (CNSS), 20 to 50 years from now.

Two CONASENSE branches, established in China and in India, report in six book chapters on initiatives needed to overcome the obvious shortcomings at present. Three more chapters complete this fifth CONASENSE book: an introductory chapter concerning the Smart City from CONASENSE perspective, a chapter showing that it is not technology but the people in the cities that are most important and a chapter on recent results and prospects of “Human in the Loop” in smart vehicular systems.
Description:
The mobile communications market in developing countries is growing at a rapid rate. This is evident in the rapid spread of mobile broadband cellular networks such as 3G. 4G is also being deployed in developing countries around the world. As the global communications market proceeds towards 5G, it is evident that developing countries will not be left behind. However, there are challenges and barriers on the road ahead specific to developing countries. To aid policy makers, researchers and members of the academia make informed decision that will help the advancement of 5G, this handbook provides an insight into the impact of existing mobile cellular networks in some developing countries.

Topics discussed in this handbook include:

- Digital divide
- Policy outlook
- 5G and rural areas
- 5G readiness
- Telco Business models
- Telecom tower pricing
- Mobile application adoption
Cybersecurity and Privacy - Bridging the Gap

Editors:
Samant Khajuria, CMI/Aalborg University, Denmark
Lene Sørensen, CMI/Aalborg University, Denmark
Knud Erik Skouby, CMI/Aalborg University, Denmark

ISBN: 9788793519664
e-ISBN: 9788793519657
Available From: March 2017
Price: € 75.00

Description:
The huge potential in future connected services has as a precondition that privacy and security needs are dealt with in order for new services to be accepted. This issue is increasingly on the agenda both at company and at individual level.

_Cybersecurity and Privacy - bridging the gap_ addresses two very complex fields of the digital world, i.e., Cybersecurity and Privacy. These multifaceted, multidisciplinary and complex issues are usually understood and valued differently by different individuals, data holders and legal bodies. But a change in one field immediately affects the others. Policies, frameworks, strategies, laws, tools, techniques, and technologies - all of these are tightly interwoven when it comes to security and privacy.

This book is another attempt to bridge the gap between the industry and academia. The book addresses the views from academia and industry on the subject. Technical topics discussed in the book include:

- Cybersecurity
- Encryption
- Privacy policy
- Trust
- Security and Internet of Things
- Botnets
- Data risks
- Cloud-based Services
- Visualization
Description:
Recent developments in computer communications and networks have enabled the deployment of exciting new areas such as Internet of Things and collaborative big data analysis. The design and implementation of energy efficient future generation communication and networking technologies also require the clever research and development of mobile, pervasive, and large-scale computing technologies.

Advances in Computer Communications and Networks: from Green, Mobile, Pervasive Networking to Big Data Computing studies and presents recent advances in communication and networking technologies reflecting the state-of-the-art research achievements in novel communication technology and network optimization.

Technical topics discussed in the book include:

- Data Center Networks
- Mobile Ad Hoc Networks
- Multimedia Networks
- Internet of Things
- Wireless Spectrum
- Network Optimization.

This book is ideal for personnel in computer communication and networking industries as well as academic staff and collegial, master, Ph.D. students in computer science, computer engineering, electrical engineering and telecommunication systems.
Description:
Future communication networks aim to build an intelligent and efficient living environment by connecting a variety of heterogeneous networks to fulfill complicated tasks. These communication networks bring significant challenges in building secure and reliable communication networks to address the numerous threat and privacy concerns. New research technologies are essential to preserve privacy, prevent attacks, and achieve the requisite reliability.

Security, Privacy and Reliability in Computer Communications and Networks studies and presents recent advances reflecting the state-of-the-art research achievements in novel cryptographic algorithm design, intrusion detection, privacy preserving techniques and reliable routing protocols.

Technical topics discussed in the book include:

- Vulnerabilities and Intrusion Detection
- Cryptographic Algorithms and Evaluation
- Privacy
- Reliable Routing Protocols

This book is ideal for personnel in computer communication and networking industries as well as academic staff and collegial, master, Ph.D. students in computer science, computer engineering, cyber security, information insurance and telecommunication systems.
Description:
Over the recent years, few books have been published covering all the subjects needed to understand the very fundamental concepts of cell planning. Most books which deal with this topic are destined to very specific audiences, and the vast majority introduce the subject at a very basic, or technical, level, or are destined to an academic audience.

*Cellular Network Planning* begins with an introduction to the subject, covering conventional and contemporary wireless systems. Spectral allocation and the frequency plan are discussed, along with the essential characteristics of wireless systems. The design of mobile cellular systems includes cell planning, traffic and channel problems.

The book presents a review of existing models, considering both green field dimensioning and network expansion strategies, and discusses multi-objective optimization and base station deployment based on artificial immune systems. It also discusses a cost-effective base station deployment approach based on artificial immune systems, and introduces the modified MO-AIS algorithm.

Technical topics discussed in the book include:

- Mobile Cellular Network Basics
- Evolution of Mobile Cellular System
- The Mobile Communications Channel
- Propagation Models
- Cell Planning
- Green Field Dimensioning
- Network Expansion
- Cost-effective Planning Strategies
**Compressive Sensing for Wireless Communication:** Challenges and Opportunities

**Authors:**
Radha Sankararajan, SSN College of Engineering, India
Hemalatha Rajendran, SSN College of Engineering, India
Aasha Nandhini Sukumaran, SSN College of Engineering, India

**ISBN:** 9788793379855
**e-ISBN:** 9788793379862
**Available From:** September 2016
**Price:** € 85.00

**Description:**
Compressed Sensing (CS) is a promising method that recovers the sparse and compressible signals from severely under-sampled measurements. CS can be applied to wireless communication to enhance its capabilities. As this technology is proliferating, it is possible to explore its need and benefits for emerging applications.

Compressive Sensing for Wireless Communication provides:

- A clear insight into the basics of compressed sensing
- A thorough exploration of applying CS to audio, image and computer vision
- Different dimensions of applying CS in Cognitive radio networks
- CS in wireless sensor network for spatial compression and projection
- Real world problems/projects that can be implemented and tested
- Efficient methods to sample and reconstruct the images in resource constrained WMSN environment

This book provides the details of CS and its associated applications in a thorough manner. It lays a direction for students and new engineers and prepares them for developing new tasks within the field of CS. It is an indispensable companion for practicing engineers who wish to learn about the emerging areas of interest.
Role of ICT for Multi-Disciplinary Applications in 2030

Editors:
Leo P. Ligthart, CONASENSE, The Netherlands
Ramjee Prasad, GISFI, Denmark

ISBN: 9788793379480
e-ISBN: 9788793379473
Available From: April 2016
Price: € 80.00

Description:
The theme of this book is “Role of ICT for multi-disciplinary applications in 2030”, which is absolutely appropriate to explore with regard to the CONASENSE vision of looking at services utilizing the Communications, Navigation, Sensing and Services (CONASENSE) paradigm in a period of 20-50 years from now. The vision of CONASENSE society is to bring about active integration of the three worlds of communications, navigation and local/remote sensing – that have been apart for years require a multidisciplinary approach. This 4th Communication, Navigation, Sensing and Services (CONASENSE) book brings together in contributions from another society, namely, Global ICT Standardization Forum for India (GISFI).

Technical topics discussed in the book include:

- Wireless Sensor Networks
- Advanced IoT and M2M
- Future Space Communications Infrastructure
- ICT Networks for CONASENSE in 2030
- International ICT Research
- Secure Vehicular Ad-Hoc Networks
- Heterodox Networks
- CONASENSE Innovation Era
- CONASENSE at Nanoscale

Thus the book provides a rich and interesting coverage of diverse aspects concerning multi-disciplinary applications.
Introduction to Analog and Digital Communication

Authors:
M. A. Bhagyaveni, Anna University, Dept. of ECE, College of Engineering, Guindy, Chennai, India
R. Kalidoss, Dept. of ECE, SSN College of Engineering, Chennai, India
K. S. Vishvaksenan, Dept. of ECE, SSN College of Engineering, Chennai, India

ISBN: 9788793379336
e-ISBN: 9788793379329
Available From: March 2016
Price: € 85.00

Description:

This book primarily focuses on the design of analog and digital communication systems; and has been structured to cater to the second year engineering undergraduate students of Computer Science, Information Technology, Electrical Engineering and Electronics and Communication departments. For better understanding, the basics of analog communication systems are outlined before the digital communication systems section. The content of this book is also suitable for the students with little knowledge in communication systems. The book is divided into five modules for efficient presentation, and it provides numerous examples and illustrations for the detailed understanding of the subject, in a thorough manner.

Technical topics discussed in the book include:

- Analog modulation techniques-AM, FM and PM
- Digital modulation techniques-ASK, PSK, FSK, QPSK, MSK and M-ary modulation
- Pulse modulation techniques and Data communication
- Source coding techniques-Shannon Fano and Huffman coding; channel coding techniques-Linear block codes and convolutional codes
- Advanced communication techniques topics includes-Cellular communication, Satellite communication and multiple access schemes.
Wireless Power Transfer, 2nd edition

Author: Johnson I. Agbinya, Melbourne Institute of Technology, Australia
ISBN: 9788793237629
Available From: December 2015
Price: € 90.00

Description:
Wireless Power Transfer is the second edition of a well received first book, which published in 2012. It represents the state-of-the-art at the time of writing, and addresses a unique subject of great international interest in terms of research. Most of the chapters are contributed by the main author, though as in the first edition several chapters are contributed by other authors. The authors of the various chapters are experts in their own right on the specific topics within wireless energy transfer. Compared to the first edition, this new edition is more comprehensive in terms of the concepts discussed, and the range of current industrial applications which are presented, such as those of magnetic induction. From the eleven chapters of the first edition, this second edition has expanded to twenty chapters. More chapters on the theoretical foundations and applications have been included. This new edition also contains chapters which deal with techniques for reducing power losses in wireless power transfer systems. In this regard, specific chapters discuss impedance matching methods, frequency splitting and how to deploy systems based on frequency splitting. A new chapter on multi-dimensional wireless power transfer has also been added. The design of wireless power transfer systems based on bandpass filtering approach has been included, in addition to the two techniques using couple mode theory and electronic circuits.

The book has retained chapters on how to increase efficiency of power conversion and induction, and also how to control the power systems. Furthermore, detailed techniques for power relay, including applications, which were also discussed in the first edition, have been updated and kept. The book is written in a progressive manner, with a knowledge of the first chapters making it easier to understand the later chapters. Most of the underlying theories covered in the book are clearly relevant to inductive near field communications, robotic control, robotic propulsion techniques, induction heating and cooking and a range of mechatronic systems.
Description:
In recent years, a considerable amount of effort has been devoted, both in industry and academia, towards the efficient utilization of the available spectrum under the various propagation models which lead towards the design and dimensioning of the future network Internet of Things (IoT).

This book focuses on Television White Space (TVWS) opportunities and regulatory aspects for cognitive radio applications, and includes case studies for the exploitation of TVWS depending on user's mobility, and the geo-location between user and the Base Station. The book presents recent advances in spectrum sensing, reflecting state of the art technology and research achievements in this area as well as a new insights in spectrum sensing of performance modeling, analysis and worldwide applications.

Technical topics discussed include:

- Novel Application of TV White Space
- Spectrum Sensing in Cognitive Radio
- Cooperative Spectrum Sensing
- DoA Estimation Algorithms
Description:

In most IT system development processes, the identification or elicitation of user requirements is recognized as a key building block. In practice, the identification of user needs and wants is a challenge and inadequate or faulty identifications in this step of an IT system development can cause huge problems with the final product. The elicitation of user requirements as such changes according to age groups, to gender, to cultural settings, and into time; and experience in the use of the system/software. User requirements, therefore, cannot be used between projects, IT systems, and different software. That makes the elicitation of user requirements an inherent part of any software development project and a resourceful activity as well.

This book provides insights to the process of identifying user requirements and to different types by describing varying case studies in which technologies or software has been developed. A variety of user requirements are provided illustrating the effect of changing the targeted user group with respect to age, to gender, to cultural settings, and into time; and experience in the use of the system/software. User requirements, therefore, cannot be used between projects, IT systems, and different software. That makes the elicitation of user requirements an inherent part of any software development project and a resourceful activity as well.

Cases and user requirement elements discussed in the book include:

- User requirements elicitation processes for children, construction workers, and farmers
- User requirements for personalized services of a broadcast company
- Variations in user involvement
- Practical elements of user involvement and requirements elicitation
- Usable security requirements for design of privacy
Wireless communication is one of the fastest growing fields in the engineering world today. Rapid growth in the domain of wireless communication systems, services and application has drastically changed the way we live, work and communicate. Wireless communication offers a broad and dynamic technological field, which has stimulated incredible excitments and technological advancements over last few decades. The expectations from wireless communication technology are increasing every day. This is placing enormous challenges to wireless system designers. Moreover, this has created an ever increasing demand for conceptually strong and well versed communication engineers who understand the wireless technology and its future possibilities. In recent years, significant progress in wireless communication system design has taken place, which will continue in future. Especially for last two decades, the research contributions in wireless communication system design have resulted in several new concepts and inventions at remarkable speed.

A text book is indeed required to offer familiarity with such developments and underlying concepts, to be taught in the classroom to future engineers. This is one of the motivations for writing this book. Practically no book can be up to date in this field, due to the fast ongoing research and developments. The new developments are announced almost every day. Teaching directly from the research papers in the classroom cannot build the necessary foundation. Therefore need for a textbook is unavoidable, which is integral to learning, and is an essential source to build the concept. The prime goal of this book is to cooperate in the learning process. This book is based on current research as well as classical text books in the field, and aims to provide in depth understanding on fundamental concepts, which form the basis of wireless communication and build the platform, on which current developments can be understood and future contributions can be made.

This book is written in self-explanatory manner to facilitate critical thinking and to support self study. Special emphasis has been given in this book to systematically organize and present the wide domain of wireless communication technology. Extra care has been taken to present the contents and the concepts in user friendly way to enable an easy understanding. Therefore the language of this book is made to make one feel, listening to a classroom lecture. This makes learning straightforward. Sometimes, the explanation could seem to be oversimplified, this is in order to support wide spectrum of readers as well as to clarify the hazy picture.

A book of this kind, which addresses a fast developing technology, the frequent use of acronyms and abbreviations is almost inevitable. A care has been taken to spell the acronyms and abbreviations as frequently as practically suitable in the text. Besides, a list of acronyms and abbreviations has also been provided.
River Publishers Series in Communications

**Neuro-Rehabilitation with Brain Interface**

**Editors:**
- Leo P. Ligthart, Chairman CONASENSE, The Netherlands
- Ramjee Prasad, Aalborg University, Denmark
- and Silvano Pupolin, University of Padova, Italy

**ISBN:** 9788793237438
**Available From:** March 2015
**Price:** € 80.00

**Description:**
In recent years, major results were reported on Brain-Computer Interface / Brain-Machine Interface (BCI/BMI) applied to rehabilitation in scientific reports and papers. This subject received much attention within the Society on Communication, Navigation, Sensing and Services (CONASENSE) during the period 2013-2015. Describing the state of the art on various BCI/BMI activities related to neuro-rehabilitation is the central theme of this book.

The latest insights coming from neurophysiologists, neuropsychologists, ICT experts specialized in clinical data management and from representatives of patient organizations are elucidated and new ways for “BCI/BMI applied to rehabilitation” using advanced ICT are introduced. The book describes the latest progress in and is an appeal for an approach leading to more cost-saving multi-disciplinary neuro-rehabilitation.

This book covers the following topics:

- Overview on BCI/BMI applied to rehabilitation
- ICT for neuro-rehabilitation
- ICT for new generation prostheses
- Gaze tracking, facial orientation determination, face and emotion recognition in 3D space for neuro-rehabilitation applications
- Integrated perspective for future widespread integration of motor neuro-rehabilitation
- Ethical issues in the use of Information and Communication Technologies in the health care of patients with neurological disorders
Resource Management in Future Internet

Editors:
Vladimir Poulkov, Technical University of Sofia, Bulgaria
Ramjee Prasad, University of Aalborg, Denmark

ISBN: 9788793102446
Available From: January 2015
Price: € 90.00

Description:
Future Internet and Internet of Things set out a new vision for connectivity, real-time applications and services. Data procured from the use of a large number of heterogeneous physical and virtual devices must be real-time processed and analyzed for the goal of effective resource management and control while maintaining the required performance and quality of service. In addition, the development of the communication networks towards heterogeneous and new generation broadband connectivity brings up new requirements towards the way of managing and controlling of the available resources. Thus for the effective resource management in future internet novel approaches must be proposed and developed. It could be seen that recently a considerable amount of effort has been devoted on behalf of industry and academia, towards the research and design of methods for effective management of resources in internet and multimedia communications.

The book reviews some specific topics in the field of future internet and internet technologies that are closely related to the issue of finding effective solutions for the management of resources and performance.

Technical topics discussed in the book include:

- Future Internet Technologies;
- Internet of things;
- Multimedia Networks;
- Wireless Access Networks;
- Software Communications;
- Positioning and Localization in Communications;
- Resource Management.

Resource Management in future Internet is recommended for specialists working in the field of information and communication industries as well as academic staff and researchers working in the field of multimedia communications and telecommunication networks.
The Internet of Things is a wide-reaching network of devices, and these devices can intercommunicate and collaborate with each other to produce variety of services at any time, any place, and in any way. Maintaining access control, authentication and managing the identity of devices while they interact with other devices, services and people is an important challenge for identity management. The identity management presents significant challenges in the current Internet communication. These challenges are exacerbated in the internet of things by the unbound number of devices and expected limitations in constrained resources. Current identity management solutions are mainly concerned with identities that are used by end users, and services to identify themselves in the networked world. However, these identity management solutions are designed by considering that significant resources are available and applicability of these identity management solutions to the resource constrained internet of things needs a thorough analysis.

Technical topics discussed in the book include:

- Internet of Things;
- Identity Management;
- Identity models in Internet of Things;
- Identity management and trust in the Internet of Things context;
- Authentication and access control;

Identity management for Internet of Things contributes to the area of identity management for ubiquitous devices in the Internet of Things. It initially presents the motivational factors together with the identity management problems in the context of Internet of Things and proposes an identity management framework. Following this, it refers to the major challenges for Identity management and presents different identity management models. This book also presents relationship between identity and trust, different approaches for trust management, authentication and access control. Key milestones identified for Identity management are clustering with hierarchical addressing, trust management, mutual authentication and access control.

Identity management for Internet of Things is ideal for personnel in computer/communication industries as well as academic staff and master/research students in wireless communication, computer science, operational research, electrical engineering and telecommunication systems Internet, and cloud computing.
The field of electronics has seen an unparalleled growth in the last 60 years, from the invention of the transistor to the making of the processor. In this ever evolving field, the modern day student has been observed to jump to complex circuit designing without having a firm understanding of the internal circuit elements and the tools that are used to analyze them. This book is an attempt to redress these shortcomings by providing an apt and concise description of basic electronic components and apparatus and how to work with them practically. Theoretical description is followed by specifying the practical considerations so as to cement the student’s understanding of the component/apparatus. This edition contains a more detailed component description with focus on real life usability. We have included many pictures showing the different shapes and forms of each component that are available. A set of questions has been included after each practical so as to challenge the students understanding of the component discussed. Tasks have been changed so they relate more to everyday situations and build up student intuition. A section on working with components has been included which introduces the student to basic circuit elements that can be made using various components. Discussion is also done on noting and analyzing various phenomenon?s that occur during circuit operation such as phase difference etc.

The Practical Book on Electronic Workshop imparts technical knowledge on following five main topics:

Laboratory Apparatus:

Passive Electronic Components:

Active Electronic Components:

Circuit Assembly:

Circuit Simulation:

It is envisaged that before students use any of the lab equipment for conducting any practical work, they must become familiar with their use and functions. Similar is the case with the passive and active electronic components. The students mostly perform their practical work in the senior semester over specialized trainers, and never get acquainted with practicality of the circuit components. Hence they face severe problems while working over their own projects. Similarly, knowing how to build circuits is as important as knowing how to design circuits and how to use the components. Therefore, techniques of Circuit Assembling are also covered in this Practical Book.

Though this book adopts practical approach, it first gives a thorough and sound theoretical background of each and every apparatus and component covered in the book, and then it reinforces the theoretical concepts by discussing their practical considerations. We feel that this Practical Book on Electronic Workshop is first of its kind, and will find usefulness for the students of all engineering disciplines in general, and Electrical, Electronics, Telecommunication in particular.

We believe that this Practical Book will be valuable and insightful in getting basic knowledge and skills of Exciting and Important field of Electronics.
Description:
The subject is “Virtual Roaming for data services” and “Seamless Technology change” also called “Number Continuity”.

“Virtual Roaming for voice and SMS” was covered in one of the author's previous book. “Virtual Roaming” means that it allows a subscriber to visit a network which his home network does not have an agreement with. The “Seamless Technology change” allows a user to keep all his services including reception of calls and SMS sent to his usual number when he switches his GSM to a Satellite phone or to WiFi. The implementation of Seamless Technology change uses the SS7 Roaming Hub and GTP Hubs technology explained in the first part of the book.

The book also contains chapters explaining in detail the steering and anti-steering of roaming, LTE Serving Mobile Location Centers, and Advanced Policy and Charging implementations in LTE and 3G.

This is to be used as an easy reference book. All the relevant references to the standards are included chapter by chapter.

This is the first book on the two main subjects of Virtual Data Roaming and Seamless Technology change.

Keywords:
Virtual Roaming, Number Continuity, Seamless technology change, Policy Charging and Control, LTE LBS, Steering of Roaming, GTP Hub, MMS Hub, RADIUS Hub, DIAMETER Hub
The African Mobile Story

Authors:
Knud Erik Skouby & Idongesit Williams, Aalborg University, Denmark

ISBN: 9788793102637
Available From: March 2014
Price: € 90.00

Description:
Africa and especially Sub-Saharan Africa has during the past decade witnessed one of the fastest growing markets in mobile communication. This growth is recognized to have played a pivotal role in Africa’s socio-economic development. It has had a huge impact on residential living patterns; on business networks and models; and on government services and income sources. The mobile industry has contributed more to economic growth than in any other comparable region globally introducing innovative, broadly used applications. Technical topics discussed in the book include:

• Mobile Development in Sub-Saharan Africa;
• Telecom Liberalization in Africa;
• Role of Mobile in Socio-economic Development;
• Mobile Applications in specific sectors;
• Security in African Mobile;
• Role of Prepaid in Africa
Activities on integrated communications, navigation, sensing and services are urgently needed in a wide range of human-centered and/or device-centered system applications. They require a multi-disciplinary approach. It is foreseen that the economic scale of these activities are comparable with the present scale of wireless communications. The area in which systems operate can vary from personal area network to global network.

This book covers the following topics:

- CONASENSE Architecture
- Performance Analyses of Integrated Communication Systems
- Cognitive Radio Networks
- Brain Computer Interfacing
- Quality Improvement of Generic Services
- Machine to Machine communications
- Chip to Chip Communications

Thus, the multi-disciplinary approach get attention in the book.
Femtocells: Secure Communication and Networking

Author: Marcus Wong, Huawei Technologies, USA
ISBN: 9788792982858
Available From: January 2014
Price: € 90.00

Description:

With Femtocell popularities and deployments on the rise, a number of Femtocell security breach has been reported as a result of pre-standards versions of Femtocells that did not conform to published standards or implemented as a result of lack of understanding of basic security principles. A considerable amount of effort has been devoted, both in industry forums and standards developing organizations, towards creating technical specifications for the architecture, operational, and security of the Femtocells. Security remains on the minds of operators as the traditionally closed operator core network opens up with the Femtocells extending into the homes of users and potential hackers with more and more powerful tools.

Technical topics discussed in the book include:

- UMTS/LTE Femtocell security and threat analysis;
- CDMA Femtocell security;
- WiMAX Femtocell security;
- LIPA and SIPTO security;
- Small Cells;

Femtocells: Secure Communication and Networking provides an in-depth analysis and research results on the security design of Femtocells based on UMTS, LTE, CDMA and WiMAX access technologies. Threat analysis, security requirements as well as security mechanisms used to counter the threats and potential attacks are provided in details covering every aspect of Femtocell security.

Femtocells: Secure Communication and Networking is ideal for personnel in communication, networking and security industries as well as academic staff and master/research students in network security, computer science, operational research, electrical engineering and telecommunication systems and the Internet.

Content:

Description:
The combination of bio-telemetry, sensor networks, communication networks and computing has opened up new areas in the medical field and provided the means for improved health care delivery. Over the past decade therefore reliance on information technology has become very prominent as doing so makes it a lot easier for health practitioners to offer much more efficient health services. This book is a compendium of emerging smart techniques using artificial intelligence for diagnosis, bio-informatics data analysis and biomedical systems. It details innovative applications of neural networks, computer vision, panoramic image processing, electroencephalography, electromyography and specialized information delivery based on smart sensors and communication to support the deaf, control of prosthetic limb, fall detection, cancer detection and fatigue detection. These tools and methods are presented for application in secure transportation, home-based health care and in medical establishments. The state-of-the art coverage provide also practical foundations for further research in biomedical informatics and engineering.

Technical topics discussed in the book include:

- Active detection of driver drowsiness;
- Myoelectric Control of Limb Prostheses;
- Electromyography;
- Electroencephalography;
- Bio-Signal Telemetry Sensor Networks;
- Computer Vision in health care delivery;
- Applications of wireless communication devices in health care delivery

Description:
The revolution in wireless communication technology was initiated in the nineties leading to the development of new mobile communication systems including GSM, GPRS, EDGE, WCDMA, WLAN, HSDPA, WiMAX and recently LTE-Advanced. These technologies have revolutionized the way and manner modern communication is undertaken. The revolution is not only in network design but also in new devices, handsets and Internet enabled devices. It is impossible for these technologies to be created without the support of other fields such as advanced signal processing techniques including OFDM, MIMO, coding, voice, image and video compression. These developments have also created the migration in focus from fixed telephony to IP telephony with complimentary consequences in the use of social networking and online retail and sales. As welcome as the new developments are, the overwhelming depth of technical expertise required to understand and follow the progress in technology advancement makes it harder and harder for the telecommunication engineer to follow without a logical and detailed compendium of the major concepts leading to these advancements.

This book is a detailed compendium of these major advancements focusing exclusively on the emerging broadband wireless communication technologies which support broadband wireless data rate transmissions. Several applications of the wireless communication networks including health care, underground communication, biomedical and bio-telemetry systems are detailed in the book.

Technical topics:

● Cellular communication concepts
● CDMA, WCDMA, WiMAX, LTE-Advanced and Zigbee
● Fading, diffraction and propagation models
● Block and error control coding in modern communication networks including msequences, OVSF, Gold and Golay codes
● OFDM and MIMO
● Multi-carrier and cooperative communication techniques
● Applications of wireless communication networks
● Optical networks
● Electromagnetic interference
Description:

The modern society is rapidly becoming a fully digital society. This has many benefits, but unfortunately it also means that personal privacy is threatened. The threat does not so much come from a 1984 style Big Brother, but rather from a set of smaller big brothers. The small big brothers are companies that we interact with; they are public services and institutions. Many of these little big brothers are indeed also being invited to our private data by ourselves.

Privacy as a subject can be problematic. At the extreme it is personal freedom against safety and security. We shall not take a political stand on personal privacy and what level of personal freedom and privacy is the correct one.

Aspects of Personal Privacy in Communications is mostly about understanding what privacy is and some of the technologies may help us to regain a bit of privacy. We discuss what privacy is about, what the different aspects of privacy may be and why privacy needs to be there by default.

There are boundaries between personal privacy and societal requirements, and inevitably society will set limits to our privacy (Lawful Interception, etc.). There are technologies that are specifically designed to help us regain some digital privacy. These are commonly known as Privacy Enhancing Technologies (PETs). We investigate some these PETs including MIX networks, Onion Routing and various privacy-preserving methods. Other aspects include identity and location privacy in cellular systems, privacy in RFID, Internet-of-Things (IoT) and sensor networks amongst others. Some aspects of cloud systems are also covered.

Content:

1. Getting a Grip on Privacy
2. The Legal Context of Privacy
3. Anonymous Communications
4. Secure Multi-party Computations and Privacy
5. Privacy and Data Mining in Telecommunications
6. Requirements for Cellular System Subscriber Privacy
7. The 3GPP Systems and Subscriber Privacy
8. Future Cellular Systems and Enhanced Subscriber Privacy
9. Sensor Networks
10. Radio Frequency Identification
11. Privacy and Trust for the Internet-of-Things
12. Privacy in the Cloud
13. Summary and Concluding Remarks
Description:

The book aims to provide a broad overview of various topics of the Internet of Things (IoT) from the research and development priorities to enabling technologies, architecture, security, privacy, interoperability and industrial applications. It is intended to be a standalone book in a series that covers the Internet of Things activities of the IERC - Internet of Things European Research Cluster from technology to international cooperation and the global “state of play”. The book builds on the ideas put forward by the European research Cluster on the Internet of Things Strategic Research Agenda and presents global views and state of the art results on the challenges facing the research, development and deployment of IoT at the global level.

Today we see the integration of Industrial, Business and Consumer Internet which is bringing together the Internet of People, Internet of Things, Internet of Energy, Internet of Vehicles, Internet of Media, Services and Enterprises in forming the backbone of the digital economy, the digital society and the foundation for the future knowledge and innovation based economy in supporting solutions for the emerging challenges of public health, aging population, environmental protection and climate change, the conservation of energy and scarce materials, enhancements to safety and security and the continuation and growth of economic prosperity.

Penetration of smartphones and advances in machine to machine and wireless communication technology will be the main drivers for IoT development. The IoT contribution is in the increased value of information created by the number of interconnections among things and the transformation of the processed information into knowledge shared into the Internet of Everything. The connected devices are part of ecosystems connecting people, processes, data, and things which are communicating in the cloud using the increased storage and computing power and pushing for standardization of communication and metadata. In this context the next generation of the Cloud technologies will need to be flexible enough to scale autonomously, adaptive enough to handle constantly changing connections and resilient enough to stand up to the huge flows in data that will occur.

For 2025 analysts forecast that there will be six devices per human on the planet, which means 50 billion more connected devices over the next 12 years. The Internet of Things market is connected to this devices growth from industrial machine to machine (M2M) systems, smart meters and wireless sensors.

Enabling technologies such as nanoelectronics, MEMS, embedded systems, intelligent device management, smart phones, telematics, smart network infrastructure, cloud computing and software technologies will create new products, new services, new interfaces by creating smart environments and smart spaces with applications ranging from Smart Cities, smart transport, buildings, energy, grid, to smart health and life.

Technical topics discussed in the book include:

- Introduction
- Internet of Things in a wider context: Time for convergence.
● Internet of Things Strategic Research Agenda
● Interconnection and Integration of the Physical World into the Digital World
● Scalable Architectures for IoT Applications
● IoT standardisation requirements and initiatives. Standardisation and Innovation.
● Service Openness and Interoperability
● Software define and virtualization of network resources
● Mobile devices enable IoT evolution from industrial applications to mass consumer applications
● Innovation through Interoperability and Standardisation when everything is connected anytime at anyplace
● Security, privacy, trust, safety, dependability: new challenges for IoT
● Internet of Things Industrial Applications
Description:
During the last decade there was a shift from wireless and mobile communications technology, networks and applications towards integration of radio with other disciplines. Integration of navigation, sensing and services allow for entering new areas in which many requirements from individuals and organizations are satisfied.

Potential applications are manifold. Developments for realizing these new application areas will cause a boost on new systems demonstrating the potentials of this integration approach.

In this first book the fundamentals of this new approach on integrated communication, navigation, sensing and services (Conasense) will be elucidated. Furthermore, several applications illustrate some of the aims of Conasense. Two major areas have been selected

1. Quality of life
2. Intelligent Conasense architectures

Topics in the book on ‘quality of life’ include:

- Visionary plans on health, security, neurophysics, indoor and outdoor safeguarding: in all these areas new Conasense technology and systems are essential.

Topics in the book on intelligent Conasense architectures concern:

- a framework describing novelties in Conasense technology needed to realize the aimed improve in ‘quality of life’.
- Breakthroughts on full integration of space-based and terrestrial communication and navigation systems with advanced high resolution sensing of the local environment supplemented with geographical information at regionals, national and international scales.
Description:
Green communication has emerged as one of the most important research topics for radio systems. This leads us to develop an energy-efficient mechanism which adjusts transmission power according to the traffic load and reduces the energy per bit usage. For the vision of Europe 2020 as a smart, sustainable and inclusive economy to become reality, the EU have set forth the 20:20:20 targets by which greenhouse gas emissions and energy reduction of primary use should be reduced by 20% while 20% of energy consumption should come from renewable resources.

In fact, in today's energy-conscious society, Information and Communication Technology (ICT) accounts for 2% of the global CO₂ emissions. A medium-sized cellular network uses as much energy as 170,000 homes, while the cost of powering the existing BSs accounts for a staggering 50% of a service provider's overall expenses. Therefore, new solutions are required whereby operators can accommodate additional traffic volume whilst reducing their investment in new infrastructure and beyond that significantly reduces their energy bill. Moreover, the EU political agenda, in unison with expected growth in mobile data, has identified cost and energy per bit reduction as a stringent design requirement for mobile networks of the future.

Green Communication for 4G Wireless Systems mainly covers energy efficient techniques in physical, MAC and network layers. Cross-layer energy efficiency optimization in time and frequency has been also discussed with two fundamental tradeoffs, energy efficiency and spectral efficiency.

This technical introduction to Green Communication in 4G wireless systems, explaining the rather complex standards (3GPP Releases R10 and R11), is a must-read for engineers, decision-makers and students interested in Green Communication, as well as other researchers and scientists from this evolving field.
Description:
A Practical Approach to Corporate Networks Engineering is dedicated to corporate network design and engineering, covering the different levels of network design and deployment. The main theoretical concepts are explained and the different functioning mechanisms are illustrated with practical experiments. Using an open source network simulator that is able to emulate real network equipment and run concrete network scenarios (Graphical Network Simulator), the authors present several realistic network scenarios that illustrate the different network protocols and mechanisms and can be easily replicated by readers at home. Readers will be able to configure the different network equipments, run the scenarios and capture traffic at the different network links on their own, ordinary PC, acquiring a deep knowledge of the underlying network protocols and mechanisms.

This interactive and practical teaching approach is very motivating and effective, since students can easily follow the explanations that are given throughout the book, making this work a valuable addition to the existing literature.
Description:
Emerging technologies have been successfully employed within different disciplines improving the quality of life globally in India. These have been employed to address the multifarious issues in a limited manner to improve the way of life for individuals with different disabilities. Indian Institute of Information Technology, Allahabad, therefore, organized International and National Seminars since 2008 to deliberate on the application of information communication technologies [ICT] in the rehabilitation of people with disabilities.

Domain experts have recognized that management of differently abled individuals requires participation of multidisciplinary experts. We also require an enormous bank of skilled, qualified trained manpower with support to keep themselves in tune with latest technology and developments. We also face the problems of having to deal with individuals located countrywide; inadequate ICT-based infrastructure to assist with accessing services of experts that are based in urban areas. This is one of the major constraints for a sustained and effective therapeutic program.

This is the fifth publication under the IIIT-A Series on e-Governance. It is a collection of 20 articles based on the presentations made in the Seminars. This book will of interest to all stakeholders in the disability rehabilitation management as the population of people with disabilities in growing.

Contents:
The chapters cover the following four areas on disability rehabilitation management:

- Rehabilitation of Differently Abled Persons: Overview and Issues
- Infrastructure and potentials for use of ICT in Disability Rehabilitation
- ICT Initiatives for Rehabilitation of Differently Abled Persons
- Assistive Technology for Differently Abled Persons — the road ahead
Green Energy

Editor: M. D. Tiwari & Anurika Vaish, IIIT-Allahabad, India
ISBN: 9788792329417
Available From: September 2012
Price: € 85.00

Description:
Green Energy is increasingly becoming an important component for all individuals and governments of the world. According to Brundtland Commission Report (Our Common Future, 1987) of United Nations states: sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Green Energy is widely considered as Sustainable Energy/ Renewable Energy which meets the needs of the present without compromising the ability of future generation to meet their own needs. In the global movement of Green Energy Sustainable Renewable Energy, most of the countries decided to be a part of this movement of saving our planet and our future generation. This effort is supported by eleven international authors who are experts in their respective fields. The output is this book Green Energy. This book is comprises of six chapters.

The first chapter discusses how global temperature can be controlled with the help of technology. Second chapter explains about green buildings. It explains about costs and benefits of green houses. Third chapter discusses about biofuels. Fourth chapter discusses about technical feasibility of Renewable Electricity Generation in Nunavut. Fifth chapter presents a summary of 15 years of grass root project experience in Partnership with impoverished, remote high altitude communities in the Nepal Himalayas. Sixth chapter argues that, contrary to popular belief, sustainable sources, in particular solar power, are capable of providing all the energy the Europe needs at reasonable cost.

Contents:
Preface:
1. Carbon Capture and Storage Need and Prospects;
2. The Economics of Sustainability: The Business Case that Makes Itself;
3. Bioenergy in Developing Countries: Lessons Learned in Brazil and Perspectives in Other Countries;
4. Technical Feasibility of Renewable Electricity Generation in Nunavut;
5. The Role of Renewable Energy Technology in Holistic-Community Development;
6. Europe Sunny Future
Description:
Nikola Tesla's dream in the early 20th century of a "World Wireless System" led him to build the Wardenclyffe Tower, a prototype base station serving as an emitter for his "World Wireless System". The base station was to supply wireless electrical energy to a distant receiver. This book builds upon that dream and is a result of intensive research interest in powerline, machine to machine communications and wireless power transfer globally. Wireless energy transfer or Witricity (Wireless elecTRICITY) transfers electricity instead of data. The technology is useful in cases where instantaneous or continuous energy is needed but interconnecting wires are inconvenient, hazardous, or impossible. The transfer is made through inductive coupling and electromagnetic radiation. Inductive coupling provides optimum power delivery to a receiver load if both the emitter and the receiver achieve magnetic resonance concurrently. Energy transfer systems mostly use antennas operating in their near field regions. As fossil energy sources are being depleted rapidly worldwide and oil prices soar, solar energy enhanced with wireless power transfer (WPT) have become reasonable alternatives for renewable energy and power harvesting. They are finding use in transportation, electric and hybrid vehicles, very fast trains and the emerging field of Internet of Things. This book is written by the leading experts on wireless energy transfer technology and its applications. It introduces and explains the technology in great details and provides the theory and practice of WPT through the two approaches of coupled mode theory and circuit theory. Both approaches are dependent on resonance techniques. The level of presentation is suitable for design and training. In depth coverage is provided on near field concepts; coupled-mode theory and models; circuit models of inductive antennas; radiative and inductive wireless power transfer, wireless power relay concepts, optimization techniques for wireless power transfer systems, control of wireless power transfer systems, wireless charging concepts; wireless energy transfer applications in electric vehicles, embedded medical systems and propagation in human tissues. Each chapter is written by experts on a selected aspect of wireless energy transfer. The authors have gone to great lengths to provide worked examples to assist the reader in working through some of the difficult concepts and to allow more understanding. The book is an excellent foundation for applying wireless energy transfer technologies in most fields including transportation, communication, home automation, biomedical systems and home appliances. The book is recommended to practitioners and engineers in the power industry, students in universities and research institutes. Honours and post graduate students in Physics, electrical/electronic engineering and computer science will find the book easy to read and apply because of the mode of presentation.

Description:
Relay systems have become a subject of intensive research interest over the recent years, as it is recognized that they can improve performances and extend the coverage area of wireless communication systems. Special attention has been dedicated to them since the proposal appeared for their implementation in mobile cellular systems. Numerous researches conducted after that proposal have enabled incorporation of OFDM based relay systems in both accepted standards for IMT-Advanced systems. Nowadays, researches are ongoing with the aim to define new solutions for performance improvement of the standardized OFDM relay systems for cellular networks and one of the interesting solutions is implementation of subcarrier permutation (SCP) at the relay (R) station.
The book "OFDM based relay systems for future wireless communications" presents a comprehensive research results in analyzing behavior and performance of the OFDM based relay systems with SCP. Dual-hop relay scenario with three communication terminals, and no direct link between the source (S) and the destination (D) has been analyzed, as it is compliant with the accepted solutions for IMT-Advanced systems. The book includes performance analysis and performance comparison of OFDM based:

- amplify-and-forward (AF) relay systems with fixed gain (FG),
- amplify-and-forward (AF) relay systems with variable gain (VG),
- decode-and-forward (DF) relay systems,

each including two SCP schemes, known to maximize the system capacity and/or improve the bit error rate (BER) performances. Performance comparisons have enabled definition of optimal solutions for the future wireless communication systems in a given conditions, and for the given optimality criteria. OFDM based relay systems for future wireless communications contains recent research results in this area and is ideal for the academic staff and master/research students in area of mobile communication systems, as well as for the personnel in communication industry.

Contents:
1. Introduction; 2. General overview of relay techniques; 3. OFDM relay systems; 4. Relay stations in wireless cellular networks; 5. Performance of OFDM AF FG relay systems with subcarrier permutation; 6. Performance of OFDM AF VG relay systems with subcarrier permutation; 7. Performance of OFDM DF relay systems with subcarrier permutation; List of Abbreviations
Description:

Future broadband wireless communication systems are expected to be able to offer new and powerful services enabling fast transmission rates of several tens of Mbit/s. This is an ambitious challenge especially for mobile communication systems since these systems should be able to cope with severely time dispersive channels, associated to the signal multipath propagation. Moreover, these systems should have high spectral and power efficiencies, as well as high capacity and flexibility. Spread spectrum techniques, particularly coded division multiple access (CDMA) techniques allow high capacity and flexibility, continuous transmission requiring low-peak power requirements for the amplifiers, as well as some robustness against fading and time-dispersion effects associated with the multipath propagation. When employed in prefix assisted (PA) block transmission schemes combined with frequency-domain receiver implementations they become especially interesting for broadband wireless systems.

In Frequency-Domain Multiuser Detection for CDMA Systems the use of PA block transmission is considered in the context of both DS (Direct Sequence) and MC (Multicarrier) CDMA schemes. The main goal is the study of frequency-domain multiuser detection techniques with iterative signal detection/decoding techniques, also in combination with estimation and cancelation of nonlinear distortion effects. The receiver structures are suitable to scenarios with high interference levels and strongly time-dispersive channels.
Description:
Near field communication devices and the emerging field of Internet of things require efficient short range communication techniques. Classical telecommunication theory however has so far focused on radiating electromagnetic signals which is more suited to terrestrial communication systems. Over the last decade however considerable research and applications of inductive methods have emerged as innovative approaches for secure short range communications by changing the paradigm of an established model of electromagnetic communications. We have witnessed the emergence of embedded inductive medical devices, magneto-inductive waveguides, inductive pots and cooking devices, magneto-inductive sensors, wireless power transfer, inductive hearing aids and the emerging inductive point-to-point communication specifically termed near-field communication (NFC) as used in mobile phones and payment cards to name a few. While there exist a large set of distributed methods and algorithms detailing the design and performances of such applications, a significant gap is observed as a lack of detailed collection of the methods in one place which could be easily understood and used quickly by someone seeking to apply the methods.

In this book this missing gap is filled with the required details and the theory of near field communication systems including both the radiating and reactive (energy coupling) near-field systems in addition to the well known far field radiation techniques. The book details the fundamental expressions and design methods which facilitate the creation of near field devices and equipment including embedded biomedical implants. The book contains recent advances in inductive communications, performance, limitations and a collection of applications. It also lays a strong foundation for the application of inductive methods for creating Internet of Things systems.

- The topics discussed in the book in great details include:
  - Near field and far field methods
  - Circuit models of inductive antennas;
  - Inductive methods in embedded medical devices
  - Range and capacity extension methods including multiple-input and multiple-output inductive systems;
  - Coding and modulation techniques;
  - Narrowband and broadband methods;
  - Magnetic link budgets;
  - Crosstalk
  - Magnetic induction waveguide devices and a Near field Simulator in Matlab

The book is a compendium and design methods for inductive near field technologies and is ideal for design personnel in the wireless communication industries as well as academic staff and master/research students in computer science, wireless sensors, telecommunications systems research, electrical engineering and Internet of things. It is a useful guide for undergraduate student to appreciate the role of inductive circuits and magnetism in telecommunications and electronic devices.
Future Internet Services and Service Architectures presents state-of-the-art results in services and service architectures based on designs for the future Internet and related emerging networks. The discussions include technology issues, key services, business models, and security. The work describes important trends and directions. Future Internet Services and Service Architectures is intended to provide readers with a comprehensive reference for the most current developments in the field. It offers broad coverage of important topics with twenty chapters covering both technology and applications written by international experts. The 20 chapters of Future Internet Services and Service Architectures are organized into the following five sections:

- **Future Internet Services** -- This section contains four chapters which present recent proposals for a new architecture for the Internet, with service delivery in the Future Internet as the key focus.
- **Peer-to-Peer Services** -- Using the P2P network overlay as a service platform, five chapters explore the P2P architecture and its use for streaming services, communication services, and service discovery.
- **Virtualization** -- Virtualization and its benefits for resource management, supporting heterogeneity, and isolation are the basis for five chapters which describe virtualization at the endpoint, in the cloud, and in the network.
- **Event-Distribution** -- Publish/Subscribe mechanisms are important for applications which require time-sensitive delivery of notifications. The two chapters in this section present recent developments in publish/subscribe load balancing and in sensor networks.
- **VANETs - Vehicular Ad Hoc Networks (VANETs)** are a network technology which are designed for vehicle-to-vehicle and vehicle-to-infrastructure connectivity for moving vehicles. The four chapters in this section provide an introduction to VANETs, routing, services and system architecture.

Future Internet Services and Service Architectures is complemented by a separate volume, Advances in Next Generation Services and Service Architectures, which covers emerging services and service architectures, IPTV, context awareness, and security.

**Keywords:** Services, Service Architectures, Future Internet, Peer-to-Peer, VIRutalization, Event Distribution, VANET
Description:
The book aim is to define the Internet of Things (IoT) in a global view, present the research agenda for Internet of Things technologies by addressing the new technological developments and providing a global balanced coverage of the challenges and the technical and industrial trends.

Energy consumption by the data, communication and networking devices and global CO2 emission is increasing exponentially. ICT has a dual role in this process: it accounts for about two percent of global CO2 emissions and at the same the ICT including IoT technologies and applications have a direct effect on lowering CO2 emissions, increasing energy efficiency, reducing power consumption, and achieving efficient waste recycling.

The book builds on the ideas put forward by the European research Cluster on the Internet of Things Strategic Research Agenda and presents global views and state of the art results on the challenges facing the research, development and deployment of IoT at the global level.

IoT together with the other emerging Internet developments such as Internet of Energy, Media, People, Services, Business/Enterprises are the backbone of the digital economy, the digital society and the foundation for the future knowledge based economy and innovation society. IoT developments show that we will have 16 billion connected devices by the year 2020, which will average out to six devices per person on earth and to many more per person in digital societies.

Devices like smart phones and machine to machine or thing to thing communication will be the main drivers for further IoT development. The first direct consequence of the IoT is the generation of huge quantities of data, where every physical or virtual object may have a digital twin in the cloud, which could be generating regular updates. The IoT contribution is in the increased value of information created by the number of interconnections among things and the transformation of the processed information into knowledge for the benefit of mankind and society. The Internet of Things market is connected to industrial machine to machine (M2M) systems, smart meters and enabling technologies such as nanoelectronics, communications, sensors, smart phones, embedded systems, cloud computing and software technologies that will create new products, new services, new interfaces by creating smart environments and smart spaces with applications ranging from smart transport, cities, buildings, energy, grid, to smart health and life.

Technical topics discussed in the book include:

- The Internet of Things: The Way Ahead
- Internet of Things Strategic Research Agenda
- Challenges of a Sustainable Roadmap for the Internet of Things
- Technologies behind Internet of Things: From Nanoelectronics and Embedded Systems to Cloud Computing and Cognitive Systems
- Machine to machine (M2M) communication and the emerging Internet of Things applications
- The "Internet of Things" based on IPv6. Paving the way to Smart IPv6 Buildings
- "Internet of Things - from Ubiquitous Computing to Ubiquitous Intelligence Applications"
- Virtualization of network resources and Physical devices in Internet of Things applications
- Validation and Interoperability challenges for IoT
Mobile devices enable IoT evolution from industrial applications to mass consumer applications.

Interoperability, Standardisation and Governance in the era of Internet of Things (IoT)

Technologies, Applications, and Governance in the Internet of Things

Opportunities, Challenges for Internet of Things Technologies
Description:
Advances in Next Generation Services and Service Architectures presents state-of-the-art results in services and service architectures, identifies challenges including business models, technology issues, service management, and security, and describes important trends and directions. The book is intended to provide readers with a comprehensive reference for the most current developments in the field. It offers broad coverage of important topics with eighteen chapters covering both technology and applications written by international experts.

The chapters are organized into the following four parts:-

- **Part 1: Emerging Services and Service Architectures** - This part provides eight chapters which survey many of the important emerging categories of services, and provides details about architectures, service models, and sample applications.
- **Part 2: IPTV and Video Services** - Video content delivery to a variety of endpoints with varying capacities and network connectivity is a fundamental service. In this part, four chapters address enabling technologies including semantic support, context-awareness, QoE optimization, and support for mobile devices.
- **Part 3: Context Awareness** - User sensitive application delivery has long been viewed as an important capability to increase the value of services to users. Context awareness focuses on representing and using the immediate situation and surroundings of the user in the delivery of the service. In this part, four chapters cover recent progress in context awareness and illustrate its use in next generation networks and IPTV.
- **Part 4: Security** - New types of services and service architectures require new security techniques. This part contains two chapters, one on security challenges and the other on the user of reputation in service management.

Advances in Next Generation Services and Service Architectures is complemented by a separate volume, Future Internet Services and Service Architectures, which covers future Internet architectures, peer-to-peer service models, event based processing, and VANETs.

**Keywords** Services, Service Architectures, IPTV, context awareness, smart grids, web 2.0, IMS, security, next-generation networks.
Description:

Imagination depicts earthquakes as a mysterious and magic matter. However, as scientists and technical, we do have to consider them also form a different perspective: they are natural phenomena that evolve with time and depend on a number of variables.

Their modeling can help us to reply to the simplest and at the same time the most complex question: are earthquakes predictable?

In case the answer is affirmative, what could be the role of the extremely mature Information and Communication Technology (ICT) in setting up an effective prediction process? How artificial Intelligence Algorithms can contribute to the picture?

The book presents our vision about the above matter. The book is organized in three parts. Part 1 frames the possible use of ICT and Artificial Intelligence in dealing with earthquake-related Disaster Ahead management (DAM). Part 2 presents modeling tools for the earthquake issue and proposes possible ICT tools for supporting the earthquake DAM. Part 3 presents and experimental network for earthquake DAM based on communications and navigation (GNSS) tools.
Description:
Disasters occur in short time periods and are usually unexpected, leaving in their wake large numbers of casualties and severe infrastructure damages. These disasters can be due to natural causes (earthquakes, fires, floods, hurricanes, epidemics or combinations of thereof) or manmade (industrial accidents, terrorism and war). Essential communications breakdown is one of the common characteristics of all disasters. The partial or complete failure of telecommunications infrastructure leads to preventable loss of life and damage to property, by causing delays and errors in emergency response and disaster relief efforts. Despite the increasing reliability and resiliency of modern telecommunications networks to physical damage, the risk associated with communications failures still remains serious because of growing dependence upon these tools in emergency operations.

Coordinated relief to the affected areas needs to be given as soon as possible, so to minimize further nefarious effects. In such scenarios it is vital that communications between interested parties, i.e. relief and security groups, are established as quickly and as easily as possible, ideally in a plug & play or zero configuration fashion. The acknowledgment that infrastructure-based networks in such deployment areas may be destroyed raises the need for new alternatives and communication paradigms, ideally infrastructure-less, and for decentralized wireless technologies.

Technical topics discussed in the book include, within the domain of Telecommunications in Disaster Areas:-

- System Engineering, Power and Communication Infrastructure;
- Self-Organizing, Cognitive and Location-aware Networks;
- Public Safety Scenarios Modelling;
- Inter-Network Interoperability;
- Networks of Mobile Robots.

Content

- Introduction;
- Systems Engineering Methodology for the Development of Disaster Tolerant Networks;
- Power Supply and Communications Infrastructure Issues in Disaster Areas;
- Self-Organizing Cognitive Disaster Relief Networks;
- Modeling Public Safety Scenarios for Emergency Communication Systems;
- Inter-Network Operability/Multi-System Resource Sharing Method for Disaster Relief;
- Location-Aware Cognitive Communication Systems for Public Safety;
- Networks of Mobile Robots for Rescue Operations; Bibliography.
Description:

In the last two decades, the wireless arena has witnessed the emergence of an astonishing number of technologies which play a part in the definition of new wireless systems. Driven by the pressing capacity demand, the research community has developed several technological enablers. Fundamental technological building blocks that will be part of wireless systems in the near-future definitely include: Orthogonal Frequency Division Multiplexing (OFDM) modulation at the physical (PHY) layer, Multiple Input Multiple Output (MIMO) systems, and a cross-layer (CL) stack design. While the benefits of OFDM have been recognized for several years, the real capacity improvement of MIMO antennae is still being debated today. As to the last point, even if opportunities for CL have been pointed out for a long time, the impact on the actual legacy systems has not been noticeable, as investors are hesitant to implement the inherent design paradigm shift.

Single and Cross-Layer MIMO Techniques for IMT-Advanced will present some advanced MIMO techniques where adaptivity, cross-layer approach, and MIMO antennae are analyzed together to show a deep impact on the sum-capacity achievable over the wireless link.

The introduction presents the functional requirements for IMT-A candidate systems and the relation between IEEE802.16 and LTE wireless access networks. Then, in the first part, adaptive strategies are analyzed separately at the PHY and Medium Access Control (MAC) layers. The second part presents an evolution of the previous approach, providing a cross-layer MIMO-ARQ protocol, where adaptive MIMO schemes, namely Spatial Multiplexing (SM) and STBC Alamouti, are used with ARQ protocol. A Multiple User (MU) network is served in DownLink (DL) with a Round Robin (RR) scheduler; the design is ready to include more advanced schedulers. The ARQ state machine at the MAC layer is aware of per-antenna ARQ. The interaction between the ARQ and the PHY layer, with a per-antenna ACK, allows resource exploitation to increase with per-antenna ACKs, shifting from MIMO Signal Processing Gain to MIMO Protocol Gain with no need for Channel State Information (CSI) feedback. The absence of CSI feedback at the PHY layer is an important characteristic of the proposed MIMO-ARQ cross-layer designs since MIMO CSI feedback (when feasible) drastically reduces the network efficiency.

The added degrees of freedom offered by MIMO transmissions can make the difference if correctly exploited both at the physical and medium access layers, in particular for overcoming the problem of low MIMO channel ranks.

The advantages of the paradigm shift from signal processing gain to protocol gain - together with the modifications to be applied at the classical protocol stack - are discussed in the final chapter.
Multihop Mobile Wireless Networks

Author: Kannan Govindan, Deepthi Chander, Bhushan Jagyasi, Shabbir N. Merchant, Uday B. Desai, University of California Davis, IIT Bombay, TCS, IIT Bombay, IIT Hyderabad
ISBN: 9788792329448
Available From: October 2010
Price: € 95.00

Description:
Multihop Cellular Networks, Multihop Sensor Networks and Multihop Cellular Sensor Networks are fast-emerging, utilitarian multihop mobile networking paradigms that promise increased transmission rates and network capacity. Multihop Mobile Wireless Networks discusses issues pertaining to each of these networks and proposes novel and innovative algorithms on Scheduling, Routing and Data aggregation that are viable solutions for multihop mobile networks. Moreover, the book provides the preliminaries and an excellent review on existing approaches in wireless communications. Multihop Mobile Wireless Networks is suitable for academic and industrial research, and can be used for advanced courses in Senior Undergraduate and Graduate programs.

The key findings of the book are:-

- Multihop Cellular Networks (MCN): These networks, as compared to the existing single-hop cellular networks, provide higher throughput and capacity at lower transmission power requirements by effective spectral re-use. A novel route discovery and resilience protocol, as well as a probability of error based link Scheduling algorithm have been proposed in this book.
- Multihop Sensor Networks (MSN): Wireless Sensor Networks are inherently multihop in nature, due to the limited transmission range of resource-constrained sensor nodes. This book presents a novel multibit distributed data aggregation scheme, which minimizes in-network communication, for an event detection application.
- Multihop Cellular Sensor Networks (MCSN): Cell phones empowered with sensing capabilities have resulted in the emergence of Cellular Sensor Networks which can impact urban sensing applications in a profound sense. This book advocates multihopping in Cellular Sensor Networks and demonstrates its utility in a moving event localization application. Novel data aggregation and routing protocols which take into consideration the underlying mobility model and time-varying connectivity in MCSN have been proposed.

Contents
Preface
- Introduction
- Mobile Multihop Networks: Preliminaries I Multihop Cellular Networks
- Cellular Networks: Past, Present and Future
- Route Discovery and Route Resilience for MCN
- PoE based Spatial Link Scheduling for SCDMA MCN II Multihop Sensor Networks
- Distributed Detection in Wireless Sensor Networks: Preliminaries
- Multibit Aggregation in Multihop Wireless Sensor Networks III Multihop Cellular Sensor Networks
- Cellular Sensor Networks
- Moving Event Localization using MCSN
- Conclusions of the Monograph Bibliography
Description:

The next generation mobile communication networks (4G) have the challenging target of providing a peak data rate of 1 Gigabit per second local area and 100 Megabit per second wide area. The ability to offer such high data rates in 100MHz bandwidth requires overall a very high spectral efficiency, and hence the need for multi-antenna techniques (MIMO) with spatial multiplexing, fast dynamic link adaptation and packet scheduling, wideband access techniques, and most likely non-contention based spectrum sharing among multiple operators. Many of these required technology components and techniques are well researched and established. Adaptive PHY-MAC Design for Broadband Wireless Systems explains how one can integrate and optimise their use in providing the target cell data rates with high availability. The authors address the ability to cope with interference and enhanced physical layer processing, and simultaneously, the multifaceted system level design. Focus is also on the selection of technology components and techniques, which leads to the highest spectral efficiency and peak data rate availability with reasonable Quality of Service (QoS) support, such as improved outage scenario, reduced delay, guaranteed bit rate, etc.

In short, this book will answer questions such as, how individual techniques relate to each other, how can we benefit the gains by suitable combinations of different technologies and how to choose different technological solutions in different scenarios, etc.
use in providing the target cell data rates with high availability. The authors address the ability to cope with interference and enhanced physical layer processing, and simultaneously, the multifaceted system level design. Focus is also on the selection of technology components and techniques, which leads to the highest spectral efficiency and peak data rate availability with reasonable Quality of Service (QoS) support, such as improved outage scenario, reduced delay, guaranteed bit rate, etc. In short, this book will answer questions such as, how individual techniques relate to each other, how can we benefit the gains by suitable combinations of different technologies and how to choose different technological solutions in different scenarios, etc.
Description:
ICT is playing an increasingly important role in both business and individual's private life. It has increased international interconnectedness and speed up the process of globalization. But on the other side the total energy consumption by the communication and networking devices and the relevant global CO emission is increasing exponentially. ICT has, in many ways, a vital role to play. It accounts for about two percent of global CO emissions. Telecommunications applications can have a direct, tangible impact on lowering greenhouse gas emissions, power consumption, and achieve efficient recycling of equipment waste.

This book is the outcome of the special session on Green Communications at 'The 12th International Symposium on Wireless Personal Multimedia Communications' (WPMC) held in September '09 in Sendai, Japan. To the best of the editors' knowledge this is the first book on the Green Information and Communication Technologies (ICT) and can be considered a milestone and a key-tool aimed at driving the industrial, scientific and academic efforts of the international community to guarantee a greener future to the whole planet.

Section I of the book Towards Green ICT provides the necessary background and technical content to understand the vision and the role of green communication packed with details of the technologies like Zigbee and RFID in turning the planet earth greener. Section II covers a number of paradigm-shifting technical approaches including energy-efficient deployment through optimizations in the planning of ICT networks, energy-efficient wireless transmission techniques, reduced transmission power & reduced radiation, cross-layer optimization methods, and opportunistic spectrum sharing without causing harmful interference pollution. Section III covers the application of Intelligent WiMAX (I-WiMAX), a green radio technique able to support new maritime communication services and ICT based Business models.

The coverage of new and upcoming issues on Green ICT makes it a good choice for educators, industry practitioners, regulators, researchers and students.
Planning and Optimisation of 3G and 4G Wireless Networks

Author: J.I. Agbinya, University of Technology, Sydney, Australia and FÀ§Á¿Â½SATIE
ISBN: 9788792329240
Available From: January 2010
Price: € 80.00

Description:
An overwhelming development has taken place in voice and data communication over the last twenty years as the industry evolved from fixed to mobile and wireless communication. This development is supported with new technologies and evolving networks from the first generation (1G), 2G, 3G and the fourth generation (4G) mobile wireless communications. During this evolution and revolution in telecommunications, the industry also changed from circuit switched networks to packet switched networks in 3G and 3G. Hence the planning of telecommunication networks has equally changed significantly. By providing the necessary background and technical content to understand stay abreast of how to plan the new network types, Planning and Optimisation of 3G and 4G Wireless Networks explores the idiosyncrasies of how to plan the various types of wireless networks. Packed with details of the technologies that support each network type, this cutting-edge reference leads the reader step by step on how to plan and optimize various types of wireless networks. It examines current and emerging network planning and enhancement techniques through examples in HSPA, B3G, WiMAX, mesh networks, personal area networks and wireless sensor networks. It clearly provides the different architectures of these networks along with their support design methods. It includes coverage of the latest wireless network types, planning and optimization methods in the form of:-

- 3G
- HSPA and Beyond 3G
- WiMAX (fixed and mobile) and LTE
- OFDM
- Wireless mesh networks
- Personal area networks
- Propagation models and link budgets
- Cognitive radio and spectrum sensing
- Planning of wireless sensor networks
- Synchronisation of CDMA systems
- Interference suppression
- Cross-layer optimisation
- Topology control
- Resource management

The illustrative planning and optimization methods provide the reader with a clear foot path into future networks. This book provides educators, industry practitioners, regulators, researchers and subscribers with the ideal foundation for developing the understanding required to design, deploy, train, and use wireless networks of various types.

Contact River Publishers
Phone: +13-176899634, +31-(0)-6-46573673
Email: customercare@riverpublishers.com
www.riverpublishers.com

The Netherlands Office
Lange Geer 44,
2611 PW Delft
The Netherlands

Denmark Office
Alsbjergvej 10
9260 Gistrup
Denmark
Link Adaptation for Relay-Based Cellular Networks

Author: Dr. Basak Can, Intel Corp., USA
ISBN: 9788792329301
Available From: November 2009
Price: € 85.00

Description:

Link Adaptation for Relay-Based Cellular Networks focuses on the implementation of various link adaptation methods in OFDM(A) (Orthogonal Frequency Division Multiplexing/Multiple Access)?Time Division Duplex (TDD) based two-hop cellular networks. The analysis and design consider infrastructure based relays. New link adaptive transmission methods which dynamically select the channel coding, modulation, forwarding, relaying mechanisms and the packet size have been designed and evaluated for such networks. The selection among various schemes is based on maximizing the end-to-end throughput. This book provides a channel adaptive scheduler which considers the multiplexing loss caused by the two-phase nature of wireless relaying. The scheduler dynamically schedules the users on the frequency-time radio resources with efficient Modulation and Coding Schemes (MCS)s selected by Adaptive Modulation and Coding (AMC). Relaying is used only if it can provide throughput enhancement. The guidelines for efficient deployment of infrastructure based relay terminals are given. For the two-hop cellular communication systems, the system level performance of various cooperative diversity schemes has been investigated with the scheduler developed and the relays efficiently deployed in the cell. This investigation for low mobility scenarios shows that, a simple cooperative diversity scheme that dynamically chooses the best scheme among direct transmission and two-hop conventional relaying is a promising choice when compared to various more complex cooperative diversity schemes.

In this book, a hop adaptive Medium Access Control (MAC)-Protocol Data Unit (PDU) size optimization is proposed for wireless relay networks. With this proposal, the MAC-PDU size in different hops can be different and it is optimized based on the channel condition of each hop. Such optimization improves the end-to-end goodput via MAC-PDU size optimization. The proposal further reduces the total overhead transmitted in the end-to-end path via transmitting longer length packets in the potentially robust Base Station (BS)?to?Relay Station (RS) links.

The time and carrier frequency offset issues and the hardware complexity of various cooperative diversity scheme implementations are investigated for the MS. The investigations show a significant complexity increase with the cooperative diversity schemes which require coherent signal combining at the MS. Hence, coherent signal combining at the MS should be used if there is a throughput gain.

Content

● Introduction
● Background on Cooperative Communications and the Systems Considered
● Link Adaptation and Selection Method for OFDM Based Wireless Relay Networks
● Cooperative Diversity Schemes and User Scheduling with Fixed Relays for IEEE 802.16j
● Hop Adaptive MAC-PDU Size Optimization for Infrastructure Based Wireless Relay Networks
● Implementation Issues for OFDM(A) Based Wireless Relay Networks
● Conclusions and Future Work
Principles of Communications provides an introduction to the fundamental principles of communications. Basic mathematical background for system and signals, analog communication systems and modern digital communication systems are systematically introduced. Principles of Communications theory is been explained in an easy-to-understand way. Advanced topics in modern digital communications, especially related to wireless communications, have been conceptually explained, including forward error correcting codes, fading channels, OFDM, and CDMA. This book serves as the basis of communication system design, and as a way to quickly understand the principles of communication systems for those who do not major in communications. Its readership includes undergraduate and graduate level students in the field of Communications and research engineers at Communications companies.

Contents

- Preface
- History and Milestones of Communication Technology
- Filtering of Random Processes and Signals
- Analog Communications
- Pulse Modulations and Digital Coding
- Optimal Receiver of Digital Communication Systems
- Passband Digital Transmission
- Error Correcting Codes
- Communications over Wireless in Fading Channels
- Orthogonal Frequency Division Multiplexing
- Spread Spectrum Communications and Code Division Multiple Access
- References; Index
Description:

The main focus of "Single- and Multi-Carrier MIMO Transmission for Broadband Wireless Systems" is to provide the basic understanding of the underlying techniques related to PHY-MAC design of future wireless systems. It includes basic concepts related to single- and multi-carrier transmissions together with MIMO techniques. Discussions related to different recent standards that use single- and multi-carrier transmissions are also explained.

"Single- and Multi-Carrier MIMO Transmission for Broadband Wireless Systems" provides a comprehensive and holistic approach to the variety of technical solutions. Future system design would require these different technologies to work together, and not independently. Therefore, it is very important to analyze the effects and gains when they are put together in a unified platform. This is the prime focus of this book. Moreover, the authors include recent research results which are not yet published in another form. The book is intended to be used for lectures in graduate level courses at universities. PhD level students should also find it useful as this book will outline the fundamental concepts and design methods for PHY and MAC layers of future wireless systems. This book can also be used as a reference by engineers and developers in the industry as well as by researchers in academia. For professionals, system architects and managers who play a key role in the selection of a baseline system concept for future wireless standards, such as IMT-Advanced type architecture, the authors will include discussions, analysis and guidelines to highlight overall system level perspective.

Contents

Preface,

- Introduction: Background and motivation,
- Wireless Channel Modeling,
- Basic Multi-Carrier Multiple Access Schemes,
- Multi-carrier Fundamentals,
- Multi-carrier based access techniques,
- Single-carrier transmissions with Cyclic Prefix,
- Synchronization - Time and frequency,
- Channel estimation and equalization,
- Effect of High Power Amplifier,
- Multi-antenna gains ? background,
- Transmit Diversity Vs Beamforming,
- Exploiting Cyclic Delay Diversity in OFDM System,
- Joint Diversity and Multiplexing Schemes for MIMO-OFDM Systems,
- MIMO design in SC-FDE/Sc-FDMA systems,
- Conclusions and perspectives
Description: Ultra Wideband Demystified: Technologies, Applications, and System Design Considerations is a comprehensive text for emerging high speed short range wireless technology of Ultra Wideband. It provides background concepts and information on evolving standards and their development efforts, radio technology, practical system design/implementation and real life applications. The book also deliberates on the regulatory frameworks, security aspects and power management techniques essential to Ultra Wideband usage in consumer devices like portable handheld mobile devices. Important topics as UWB common radio usage for adapting to different existing/new applications and upper layer protocols like Wireless USB are also discussed.

Contents
Abstract :

- Introduction to Short Range Wireless;
- Introduction to Ultra Wideband;
- Evolution of UWB Standards;
- Physical Layer;
- Medium Access Layer;
- Advanced MAC Features;
- UWB System Design;
- Adaptation to Multiple Applications;
- Wireless USB;
- Converging Marketplace; References

Foreword
"This book is very timely, unique and fresh in its approach, coming from engineers who have been involved in system design and standard development stages. In particular, the book stands out amongst other literature available because it highlights system designer’s viewpoints and because of it covering the whole gamut of technology from practitioner’s viewpoints ... I would strongly recommend this book to System Designers, Practicing Engineers, Researchers in Academia and Industry, Product Marketing and Technical strategists for a comprehensive reading on the emerging UWB technologies. I commend Sunil Jogi and Manoj Choudhary for a very timely contribution."

Bart Vertenten Chief Architect Connectivity, NXP Semiconductors
Aerospace Technologies and Applications for Dual Use
(Subtitle: A New World of Defense and Commercial in 21st Century Security)

Editor: General Pietro Finocchio, Ramjee Prasad, Marina Ruggieri, AFCEA, CTIF (Aalborg University), University of Tor Vergata

ISBN: 9788792329042
e-ISBN: 9788792329059
Available From: October 2008
Price: € 90.00

Description:
The events occurred in the last years have shown how the threat related to both intentional and natural disasters could bring the civil and the military worlds closer in the conception and deployment of countermeasures as well as in the identification of effective strategies for enhancing the Planet safety and security. In this frame, the concept of dual use - the set of technologies and applications that can be exploited for both civil and military purposes - becomes a key-topic. In addition, the aerospace is a strategic building block in the deployment of a network centric environment that aims at the global protection of the mankind. Aerospace is also a natural environment for dual use: many of the related enabling technologies have been first developed for the military world and then applied to civil - including commercial - purposes.

On September 12-14, 2007 an International Symposium has been held in Roma, Italy, joining the dual use approach with the aerospace technology: the international community has been gathered around the key-topic: aerospace technologies and applications for dual use. The event has called experts and operators from the military and civil community, belonging to industry, scientific and governmental institutions. The common aim was an effective convergence between the available and perspected technologies for the civil and military worlds as well as the conceivment of applications that can take the maximum benefit from the dual approach, optimizing the available economic resources. The Symposium has included invited-only contributions and an industrial panel. The main results of the Symposium, derived from key-note speeches, invited lectures, panel discussions and conclusions have created the starting material to develop this Edited Book. The book - the first on the topic - can be considered a milestone and a key-tool aimed at driving the industrial, scientific and institutional efforts of the international community to guarantee a pleasant and safe future to the whole Planet.
Description:
Mobile and wireless communications are moving towards a new era that will be characterized by the seamless collaboration of heterogeneous systems, the need for high speed communications while on the move and for advanced services with quality guarantees. Recent market research studies show that most of the traffic in the future wireless networks will be produced by mobile multimedia services which are expected to proliferate by the year 2010. On the other hand mobile and wireless communications technology is becoming more and more important in developing countries where people demand fast deployment and low cost for broadband wireless internet services.

The objective of this volume is to gather research and development on topics shaping the fourth generation (4G) in mobile and wireless communications and reveal the key trends and enabling technologies for 4G. We envisage 4G wireless communication systems as IP based solution providing integrated services (voice, data, multimedia) regardless of time and end-users' location. 4G technologies will manifest the benefits of the wireless and wired technologies convergence, through enabling a wide range of innovative (both indoor and outdoor) applications. 4G applications will feature premium quality, high security and an affordable cost. The vision, though fantastic, is associated with a host of technical and technological challenges.

A great deal of the latter are discussed in the articles of this volume, which aims at providing insights on the research issues and solutions that are directly associated with leading edge 4G technologies and services.

Taking into account recent developments in the world of wireless communications we have given emphasis to cover all these technologies and aspects that are considered as cornerstones for achieving the goals set for 4G and that will further boost research and development of next-generation mobile communications.
Description:
Broadband communications has become the major focus for industry for offering rich multimedia IP services in next generation networks. This book deals with the state-of-the-art and the underlying principles of key technologies which facilitate broadband telecommunications including millimetre wave gigabit Ethernet, terahertz communication, multiple input multiple output (MIMO) technology, orthogonal frequency division multiplex (OFDM), ultra wideband (UWB) and the fourth generation (4G) network technologies. The book illustrates the use of these technologies, including high resolution three-dimensional millimetre wave radar imaging and terahertz imaging techniques. Within the next few years advances in graphic rendering and the application of millimetre wave radar technology will enable high resolution radar surveillance and operators of industrial processes to control their machines and to navigate remotely even in poor visibility environments. The principles and performance of terahertz imaging are also demonstrated in this important book. The performance and success of emerging all-IP networks depend largely on the efficiency of broadband technologies and this book provides the basis for 4G networks and explores key performance measures such as quality of service and handover between distributed networks (mobile and fixed). The book also demonstrates the medical and biomedical applications of broadband wireless communications.