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6lowpan The Wireless Embedded Internet Introduction

6LoWPAN

"It is stunningly thorough and takes readers meticulously through the design, configuration and operation of IPv6-based, low-power, potentially mobile radio-based networking." —Vint Cerf, Vice President and Chief Internet Evangelist, Google This book provides a complete overview of IPv6 over Low Power Wireless Area Network (6LoWPAN) technology In this book, the authors provide an overview of the 6LoWPAN family of standards, architecture, and related wireless and Internet technology. Starting with an overview of the IPv6 'Internet of Things', readers are offered an insight into how these technologies fit together into a complete architecture. The 6LoWPAN format and related standards are then covered in detail. In addition, the authors discuss the building and operation of 6LoWPAN networks, including bootstrapping, routing, security, Internet integration, mobility and application protocols. Furthermore, implementation aspects of 6LoWPAN are covered. Key Features: Demonstrates how the 6LoWPAN standard makes the latest Internet protocols available to even the most minimal embedded devices over low-rate wireless networks Provides an overview of the 6LoWPAN standard, architecture and related wireless and Internet technology, and explains the 6LoWPAN protocol format in detail Details operational topics such as bootstrapping, routing, security, Internet integration, mobility and application protocols Written by expert authors with vast experience in the field (industrial and academic) Includes an accompanying website containing tutorial slides, course material and open-source code with examples (6lowpan.net) 6LoWPAN: The Wireless Embedded Internet is an invaluable reference for professionals working in fields such as telecommunications, control, and embedded systems. Advanced students and teachers in electrical engineering, information technology and computer science will also find this book useful.

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"It is stunningly thorough and takes readers meticulously through the design, configuration and operation of IPv6-based, low-power, potentially mobile radio-based networking." Vint Cerf, Vice President and Chief Internet Evangelist, Google This book provides a complete overview of IPv6 over Low Power Wireless Area Network (6LoWPAN) technology In this book, the authors provide an overview of the 6LoWPAN family of standards, architecture, and related wireless and Internet technology. Starting with an overview of the IPv6 'Internet of Things', readers are offered an insight into how these technologies fit together into a complete architecture. The 6LoWPAN format and related standards are then covered in detail. In addition, the authors discuss the building and operation of 6LoWPAN networks, including bootstrapping, routing, security, Internet integration, mobility and application protocols. Furthermore, implementation aspects of 6LoWPAN are covered. Key Features: Demonstrates how the 6LoWPAN standard makes the latest Internet protocols available to even the most minimal embedded devices over low-rate wireless networks Provides an overview of the 6LoWPAN standard, architecture and related wireless and Internet technology, and explains the 6LoWPAN protocol format in detail Details operational topics such as bootstrapping, routing, security, Internet integration, mobility and application protocols Written by expert authors with vast experience in the field (industrial and academic) Includes an accompanying website containing tutorial slides, course material and open-source code with examples (<http://6lowpan.net>) 6LoWPAN: The Wireless Embedded Internet is an

invaluable reference for professionals working in fields such as telecommunications, control, and embedded systems. Advanced students and teachers in electrical engineering, information technology and computer science will also find this book useful.

Congestion Control for 6LoWPAN Wireless Sensor Networks: Toward the Internet of Things

The Internet of Things (IoT) is the next big challenge for the research community. The IPv6 over low power wireless personal area network (6LoWPAN) protocol stack is considered a key part of the IoT. In 6LoWPAN networks, heavy network traffic causes congestion which significantly degrades network performance and impacts on quality of service aspects. This book presents a concrete, solid and logically ordered work on congestion control for 6LoWPAN networks as a step toward successful implementation of the IoT and supporting the IoT application requirements. The book addresses the congestion control issue in 6LoWPAN networks and presents a comprehensive literature review on congestion control for WSNs and 6LoWPAN networks. An extensive congestion analysis and assessment for 6LoWPAN networks is explored through analytical modelling, simulations and real experiments. A number of congestion control mechanisms and algorithms are proposed to mitigate and solve the congestion problem in 6LoWPAN networks by using and utilizing the non-cooperative game theory, multi-attribute decision making and network utility maximization framework. The proposed algorithms are aware of node priorities and application priorities to support the IoT application requirements and improve network performance in terms of throughput, end-to-end delay, energy consumption, number of lost packets and weighted fairness index.

Internet of Things

Advancement in sensor technology, smart instrumentation, wireless sensor networks, miniaturization, RFID and information processing is helping towards the realization of Internet of Things (IoT). IoTs are finding applications in various area applications including environmental monitoring, intelligent buildings, smart grids and so on. This book provides design challenges of IoT, theory, various protocols, implementation issues and a few case study. The book will be very useful for postgraduate students and researchers to know from basics to implementation of IoT.

Designing Embedded Systems and the Internet of Things (IoT) with the ARM mbed

A comprehensive and accessible introduction to the development of embedded systems and Internet of Things devices using ARM mbed Designing Embedded Systems and the Internet of Things (IoT) with the ARM mbed offers an accessible guide to the development of ARM mbed and includes a range of topics on the subject from the basic to the advanced. ARM mbed is a platform and operating system based on 32-bit ARM Cortex-M microcontrollers. This important resource puts the focus on ARM mbed NXP LPC1768 and FRDM-K64F evaluation boards. NXP LPC1768 has powerful features such as a fast microcontroller, various digital and analog I/Os, various serial communication interfaces and a very easy to use Web based compiler. It is one of the most popular kits that are used to study and create projects. FRDM-K64F is relatively new and largely compatible with NXP LPC1768 but with even more powerful features. This approachable text is an ideal guide that is divided into four sections; Getting Started with the ARM mbed, Covering the Basics, Advanced Topics and Case Studies. This getting started guide: Offers a clear introduction to the topic Contains a wealth of original and illustrative case studies Includes a practical guide to the development of projects with the ARM mbed platform Presents timely coverage of how to develop IoT applications Designing Embedded Systems and the Internet of Things (IoT) with the ARM mbed offers students and R&D engineers a resource for understanding the ARM mbed NXP LPC1768 evaluation board.

Interconnecting Smart Objects with IP

Interconnecting Smart Objects with IP: The Next Internet explains why the Internet Protocol (IP) has become the protocol of choice for smart object networks. IP has successfully demonstrated the ability to interconnect billions of digital systems on the global Internet and in private IP networks. Once smart objects can be easily interconnected, a whole new class of smart object systems can begin to evolve. The book discusses how IP-based smart object networks are being designed and deployed. The book is organized into three parts. Part 1 demonstrates why the IP architecture is well suited to smart object networks, in contrast to non-IP based sensor network or other proprietary systems that interconnect to IP networks (e.g. the public Internet of private IP networks) via hard-to-manage and expensive multi-protocol translation gateways that scale poorly. Part 2 examines protocols and algorithms, including smart objects and the low power link layers technologies used in these networks. Part 3 describes the following smart object network applications: smart grid, industrial automation, smart cities and urban networks, home automation, building automation, structural health monitoring, and container tracking. - Shows in detail how connecting smart objects impacts our lives with practical implementation examples and case studies - Provides an in depth understanding of the technological and architectural aspects underlying smart objects technology - Offers an in-depth examination of relevant IP protocols to build large scale smart object networks in support of a myriad of new services

Building Next-Generation Converged Networks

Providing a comprehensive introduction to next-generation networks, this book strikes a balance between how and why things work and making them work. It examines Internet architectures and protocols, network management and traffic engineering, embedded systems and sensor networks, web services, cloud technologies, and next-generation wireless networking. Containing the contributions of top industry experts and academics, the book investigates new technologies such as IPv6 over Low Power Wireless Personal Area Networks (6LoWPAN) architectures and standards, mobility, and security.

The Internet of Things

An all-in-one reference to the major Home Area Networking, Building Automation and AMI protocols, including 802.15.4 over radio or PLC, 6LoWPAN/RPL, ZigBee 1.0 and Smart Energy 2.0, Zwave, LON, BACNet, KNX, ModBus, mBus, C.12 and DLMS/COSEM, and the new ETSI M2M system level standard. In-depth coverage of Smart-grid and EV charging use cases. This book describes the Home Area Networking, Building Automation and AMI protocols and their evolution towards open protocols based on IP such as 6LoWPAN and ETSI M2M. The authors discuss the approach taken by service providers to interconnect the protocols and solve the challenge of massive scalability of machine-to-machine communication for mission-critical applications, based on the next generation machine-to-machine ETSI M2M architecture. The authors demonstrate, using the example of the smartgrid use case, how the next generation utilities, by interconnecting and activating our physical environment, will be able to deliver more energy (notably for electric vehicles) with less impact on our natural resources. Key Features: Offers a comprehensive overview of major existing M2M and AMI protocols Covers the system aspects of large scale M2M and smart grid applications Focuses on system level architecture, interworking, and nationwide use cases Explores recent emerging technologies: 6LoWPAN, ZigBee SE 2.0 and ETSI M2M, and for existing technologies covers recent developments related to interworking Relates ZigBee to the issue of smartgrid, in the more general context of carrier grade M2M applications Illustrates the benefits of the smartgrid concept based on real examples, including business cases This book will be a valuable guide for project managers working on smartgrid, M2M, telecommunications and utility projects, system engineers and developers, networking companies, and home automation companies. It will also be of use to senior academic researchers, students, and policy makers and regulators.

Wired/Wireless Internet Communications

This book constitutes the refereed proceedings of the 8th International Conference on Wired/Wireless Internet Communications, WWIC 2010, held in Luleå, Sweden, in June 2010. The 17 revised full papers

were carefully reviewed and selected from 45 submissions. The papers are thematically grouped into 5 technical sessions such as cooperation and multimedia traffic management in WN, advances to IEEE 802.11, routing and performance optimization, security, control and signalling, as well as wireless sensor networks.

Internet of Things

This book constitutes the refereed proceedings of the International Workshop on Internet of Things, IOT 2012, held in Changsha, China, during August 17-19. The 95 revised full papers presented were carefully reviewed and selected from numerous submissions. The papers are organized in topical sections on wireless sensor networks; RFID; sensors and equipments; data processing; security; applications and others.

Personal Networks

Written by experts in the field, this book describes the Personal Network architecture and its various components. This book focuses on networking and security aspects of Personal Networks (PNs). Given a single user, the authors propose an architecture for PNs in which devices are divided into one of two types of nodes: personal nodes and foreign nodes. Furthermore, the authors demonstrate the ways in which PNs can be formed in a self-organized and secure way, how they can be interconnected using infrastructure networks, how multiple PNs can be connected, and how their services and resources can be shared. In addition, the book shows how security and ease-of-use can be achieved through automatic configuration and how mobility can be supported through adaptability and self-organization. The motivations for the PN concept, the PN architecture, its functionalities and features, as well as future challenges are covered in depth. Finally, the authors consider the potential applications for PNs and briefly discuss additional support systems for PN applications. The latter includes service discovery and context information management among others. Key Features: Describes the PN network architecture and its various components in-depth. Written by experts who developed this concept. Discusses the newer topic of federations of PNs. Considers potential PN applications, and demonstrates how applications support systems, such as service discovery and context management, can assist the applications. Provides an insight into the challenges of future personal networking, architectures for PNs, potential and important solutions, and their implications. This book will serve as an invaluable reference for researchers, developers, and standardization experts in mobile and wireless communication systems and services. It will also be of interest to postgraduate students in the field of telecommunications.

Fog, Edge, and Pervasive Computing in Intelligent IoT Driven Applications

A practical guide to the design, implementation, evaluation, and deployment of emerging technologies for intelligent IoT applications. With the rapid development in artificially intelligent and hybrid technologies, IoT, edge, fog-driven, and pervasive computing techniques are becoming important parts of our daily lives. This book focuses on recent advances, roles, and benefits of these technologies, describing the latest intelligent systems from a practical point of view. Fog, Edge, and Pervasive Computing in Intelligent IoT Driven Applications is also valuable for engineers and professionals trying to solve practical, economic, or technical problems. With a uniquely practical approach spanning multiple fields of interest, contributors cover theory, applications, and design methodologies for intelligent systems. These technologies are rapidly transforming engineering, industry, and agriculture by enabling real-time processing of data via computational, resource-oriented metaheuristics and machine learning algorithms. As edge/fog computing and associated technologies are implemented far and wide, we are now able to solve previously intractable problems. With chapters contributed by experts in the field, this book: Describes Machine Learning frameworks and algorithms for edge, fog, and pervasive computing. Considers probabilistic storage systems and proven optimization techniques for intelligent IoT. Covers 5G edge network slicing and virtual network systems that utilize new networking capacity. Explores resource provisioning and bandwidth allocation for edge, fog, and pervasive mobile applications. Presents emerging applications of intelligent IoT, including smart farming, factory automation, marketing automation, medical diagnosis, and more. Researchers, graduate students, and practitioners working in the intelligent systems domain will appreciate this book's

practical orientation and comprehensive coverage. Intelligent IoT is revolutionizing every industry and field today, and Fog, Edge, and Pervasive Computing in Intelligent IoT Driven Applications provides the background, orientation, and inspiration needed to begin.

Internet of Things and Sensors Networks in 5G Wireless Communications

The Internet of Things (IoT) has attracted much attention from society, industry and academia as a promising technology that can enhance day to day activities, and the creation of new business models, products and services, and serve as a broad source of research topics and ideas. A future digital society is envisioned, composed of numerous wireless connected sensors and devices. Driven by huge demand, the massive IoT (mIoT) or massive machine type communication (mMTC) has been identified as one of the three main communication scenarios for 5G. In addition to connectivity, computing and storage and data management are also long-standing issues for low-cost devices and sensors. The book is a collection of outstanding technical research and industrial papers covering new research results, with a wide range of features within the 5G-and-beyond framework. It provides a range of discussions of the major research challenges and achievements within this topic.

Cellular Authentication for Mobile and Internet Services

An invaluable reference discussing the Generic Authentication Architecture (GAA), its infrastructure, usage and integration into existing networks Cellular Authentication for Mobile and Internet Services introduces the reader into the field of secure communication for mobile applications, including secure web browsing with a phone or PC, Single Sign-On (SSO), mobile broadcast content protection, secure location services, etc. The book discusses the Generic Authentication Architecture (GAA) of the mobile standardization body 3rd Generation Partnership Project (3GPP) and its American counterpart 3GPP2 in full detail and with all variants. It explains the usage of GAA by various standardization bodies and standardized applications, and also looks at a number of non-standardized ones, such as secure remote login to enterprise environment and card personalization. Cellular Authentication for Mobile and Internet Services: Describes the usage of the generic authentication architecture (GAA) by various standardization bodies and standardized applications, covering mobile broadcast / multicast service security, Single Sign-On, HTTPS (i.e. secure web browsing), secure data access, secure location services, etc Provides guidance on how to integrate the generic authentication into existing and future terminals, networks and applications Explains the functionality of the application security in general as well as on application developer level Describes various business scenarios and related security solutions, and covers secure application implementation and integration Brings together essential information (currently scattered across different standardization bodies) on standards in one comprehensive volume This excellent all-in-one reference will provide system and protocol designers, application developers, senior software project managers, telecommunication managers and ISP managers with a sound introduction into the field of secure communication for mobile applications. System integrators, advanced students, Ph.D. candidates, and professors of computer science or telecommunications will also find this text very useful.

Wireless Networking and Mobile Data Management

This book examines two main topics, namely, Wireless Networking and Mobile Data Management. It is designed around a course the author began teaching to senior undergraduate and master's students at the Department of Computer Science & Engineering of the Indian Institute of Technology Kanpur. The first part of the book, consisting of eight chapters, including the introduction, focuses exclusively on wireless networking aspects. It begins with cellular communication systems, which provided the foundation of wireless networking principles. Three subsequent chapters are devoted to the Global System for Mobile communication (GSM), Wireless Local Area Network (WLAN), Bluetooth, infrared (IR), ZigBee and 6LoWPAN protocols. There is also a chapter on routings in ad hoc networks, an area that is currently being intensively researched due to its potential applications in areas of vehicular network, traffic management,

tactical and military systems. Furthermore, the book discusses mobile operating systems and wireless network application level protocols such as Wireless Application Protocols (WAP), Mobile IP and Mosh. The second part highlights mobile data management. It addresses the issues like location management, the importance of replication and caching in mobile environments, the concept of broadcast disk and indexing in air, storage systems for sharing data in mobile environments, and building smart environments. Given that the design of algorithms is the key to applications in data management; this part begins with a chapter on the type of paradigm shift that has been introduced in the design of algorithms, especially due to asymmetry in mobile environments. Lastly, the closing chapter of the book explores smart environments, showing the readers how wireless technology and mobile data management can be combined to provide optimum comfort for human life. Though the book has been structured as a monograph, it can be used both as a textbook and as a reference material for researchers and developers working in the area.

Security Engineering for Embedded and Cyber-Physical Systems

Digital transformation, also known as Industry 4.0, Smart Industry, and Smart Manufacturing, is at the top of leaders' agendas. Such a transformation stimulates innovation in new products and services, the digital transformation of processes, and the creation of new business models and ecosystems. In the world of manufacturing, Industry 4.0 is based on various technological advances, among which we can mainly cite CPS (cyber-physical systems), IoT (Internet of Things), and IoS (internet of services). While engaging, this fourth wave also brings significant challenges for manufacturers. Business operations and the supply chain are becoming more vulnerable to cyber threats. Security Engineering for Embedded and Cyber-Physical Systems is an invaluable resource to discover cybersecurity and privacy techniques for embedded and cyber-physical systems. This book presents the latest studies and research results on all aspects of security engineering for embedded and cyber-physical systems. It also provides a premier interdisciplinary reference for researchers, practitioners, and educators to discover the most recent innovations, trends, concerns, and practical challenges encountered and solutions adopted in security engineering for embedded and cyber-physical systems. The book offers comprehensive coverage of the essential topics, including the following:

- Embedded and cyber-physical systems threats and vulnerabilities
- Security engineering techniques for embedded and cyber-physical systems
- Security engineering for embedded and cyber-physical systems and potential future-use cases
- Artificial intelligence techniques for cybersecurity and privacy
- Security engineering for Internet of Things
- Blockchain for cybersecurity in embedded and cyber-physical systems

This book comprises a number of state-of-the-art contributions from both scientists and practitioners working in security engineering for embedded and cyber-physical systems. It aspires to provide a relevant reference for students, researchers, engineers, and professionals working in this area or those interested in grasping its diverse facets and exploring the latest advances and future trends related to security engineering for embedded and cyber-physical systems.

Building the Hyperconnected Society

This book aims to provide a broad overview of various topics of Internet of Things (IoT), ranging from research, innovation and development priorities to enabling technologies, nanoelectronics, cyber-physical systems, architecture, interoperability and industrial applications. All this is happening in a global context, building towards intelligent, interconnected decision making as an essential driver for new growth and co-competition across a wider set of markets. 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 research to technological innovation, validation and deployment. The book builds on the ideas put forward by the European Research Cluster on the Internet of Things Strategic Research and Innovation Agenda, and presents global views and state of the art results on the challenges facing the research, innovation, development and deployment of IoT in future years. The concept of IoT could disrupt consumer and industrial product markets generating new revenues and serving as a growth driver for semiconductor, networking equipment, and service provider end-markets globally. This will create new application and product end-markets, change the value chain of companies that creates the IoT technology and deploy it in various end sectors, while

impacting the business models of semiconductor, software, device, communication and service provider stakeholders. The proliferation of intelligent devices at the edge of the network with the introduction of embedded software and app-driven hardware into manufactured devices, and the ability, through embedded software/hardware developments, to monetize those device functions and features by offering novel solutions, could generate completely new types of revenue streams. Intelligent and IoT devices leverage software, software licensing, entitlement management, and Internet connectivity in ways that address many of the societal challenges that we will face in the next decade.

IoT Fundamentals

Today, billions of devices are Internet-connected, IoT standards and protocols are stabilizing, and technical professionals must increasingly solve real problems with IoT technologies. Now, five leading Cisco IoT experts present the first comprehensive, practical reference for making IoT work. IoT Fundamentals brings together knowledge previously available only in white papers, standards documents, and other hard-to-find sources—or nowhere at all. The authors begin with a high-level overview of IoT and introduce key concepts needed to successfully design IoT solutions. Next, they walk through each key technology, protocol, and technical building block that combine into complete IoT solutions. Building on these essentials, they present several detailed use cases, including manufacturing, energy, utilities, smart+connected cities, transportation, mining, and public safety. Whatever your role or existing infrastructure, you'll gain deep insight what IoT applications can do, and what it takes to deliver them. Fully covers the principles and components of next-generation wireless networks built with Cisco IOT solutions such as IEEE 802.11 (Wi-Fi), IEEE 802.15.4-2015 (Mesh), and LoRaWAN Brings together real-world tips, insights, and best practices for designing and implementing next-generation wireless networks Presents start-to-finish configuration examples for common deployment scenarios Reflects the extensive first-hand experience of Cisco experts

Wireless Networks

In recent years, wireless networks communication has become the fundamental basis of our work, leisure, and communication life from the early GSM mobile phones to the Internet of Things and Internet of Everything communications. All wireless communications technologies such as Bluetooth, NFC, wireless sensors, wireless LANs, ZigBee, GSM, and others have their own challenges and security threats. This book addresses some of these challenges focusing on the implication, impact, and mitigations of the stated issues. The book provides a comprehensive coverage of not only the technical and ethical issues presented by the use of wireless networks but also the adversarial application of wireless networks and its associated implications. The authors recommend a number of novel approaches to assist in better detecting, thwarting, and addressing wireless challenges and threats. The book also looks ahead and forecasts what attacks can be carried out in the future through the malicious use of the wireless networks if sufficient defenses are not implemented. The research contained in the book fits well into the larger body of work on various aspects of wireless networks and cyber-security. The book provides a valuable reference for cyber-security experts, practitioners, and network security professionals, particularly those interested in the security of the various wireless networks. It is also aimed at researchers seeking to obtain a more profound knowledge in various types of wireless networks in the context of cyber-security, wireless networks, and cybercrime. Furthermore, the book is an exceptional advanced text for Ph.D. and master's degree programs in cyber-security, network security, cyber-terrorism, and computer science who are investigating or evaluating a security of a specific wireless network. Each chapter is written by an internationally-renowned expert who has extensive experience in law enforcement, industry, or academia. Furthermore, this book blends advanced research findings with practice-based methods to provide the reader with advanced understanding and relevant skills.

Handbook of Research on Wireless Sensor Network Trends, Technologies, and Applications

Wireless sensor networks have become an intricate and necessary addition to daily life by providing an

energy efficient way to collect and monitor data while rerouting the information to a centralized location. As the application of these networks becomes more common, it becomes imperative to evaluate their effectiveness, as well as other opportunities for possible implementation in the future. The Handbook of Research on Wireless Sensor Network Trends, Technologies, and Applications provides inclusive coverage on the processing and applications of wireless communication, sensor networks, and mobile computing. Investigating emergent research and theoretical concepts in the area of wireless sensors and their applications to daily life, this handbook of research is a critical reference source for students, researchers, engineers, scientists, and working professionals.

IoT Architectures, Models, and Platforms for Smart City Applications

Developing countries are persistently looking for efficient and cost-effective methods for transforming their communities into smart cities. Unfortunately, energy crises have increased in these regions due to a lack of awareness and proper utilization of technological methods. These communities must explore and implement innovative solutions in order to enhance citizen enrollment, quality of government, and city intelligence. IoT Architectures, Models, and Platforms for Smart City Applications provides emerging research exploring the theoretical and practical aspects of transforming cities into intelligent systems using IoT-based design models and sustainable development projects. This publication looks at how cities can be built as smart cities within limited resources and existing advanced technologies. Featuring coverage on a broad range of topics such as cloud computing, human machine interface, and ad hoc networks, this book is ideally designed for urban planners, engineers, IT specialists, computer engineering students, research scientists, academicians, technology developers, policymakers, researchers, and designers seeking current research on smart applications within urban development.

Internet of Things and Smart Environments

This book is focused on the Internet of Things (IoT) services and smart environments that can be of assistance to the elderly and individuals living with dementia or some sensory impairment. The book outlines the requirements of the systems that aim to furnish some digital sensory or cognitive assistance to the individuals and their caregivers. Internet of Things and Smart Environments: Assistive Technologies for Disability, Dementia, and Aging covers the important evolutions of the IoT, the sensors, actuators, wireless communication and pervasive computing systems, and other enabling technologies that power up this megatrend infrastructure. The use of the IoT-based systems in improving the conventional assistive technologies and provisions of ambient assisted living are also covered. The book takes an impartial, and yet holistic, view to providing research insights and inspirations for more development works in the areas related to assistive IoT. It will show the potentials of using normally available interactive devices, like smartphones or smart TVs, which can be supplemented with low-cost gadgets or apps to provide assistive capabilities. It aims to accentuate the need for taking a comprehensive and combinatory view of the comprising topics and approaches that are based on the visions and ideas from all stakeholders. The book will examine these points and considerations to conclude with recommendations for future development works and research directions. This book can be of value to a diverse array of audience. The researchers and developers in healthcare and medicine, aged care and disability services, as well as those working in the IoT-related fields, may find many parts of this book useful and stimulating. It can be of great value to postgraduate and research students working in these areas. It can also be adapted for use in upper-level classroom courses relevant to communication and smart technologies, IoT applications, and assistive technologies. Many parts of the book can be of interest to the elderly and individuals living with a disability, as well as their families and caregivers. From an industry perspective, it can be of interest to software, hardware, and particularly app developers working on the IoT applications, smart homes and environments, and assistive technologies for the elderly and people living with disability or dementia.

Smart Cities and Smart Spaces: Concepts, Methodologies, Tools, and Applications

As populations have continued to grow and expand, many people have made their homes in cities around the globe. With this increase in city living, it is becoming vital to create intelligent urban environments that efficiently support this growth and simultaneously provide friendly and progressive environments to both businesses and citizens alike. *Smart Cities and Smart Spaces: Concepts, Methodologies, Tools, and Applications* is an innovative reference source that discusses social, economic, and environmental issues surrounding the evolution of smart cities. Highlighting a range of topics such as smart destinations, urban planning, and intelligent communities, this multi-volume book is designed for engineers, architects, facility managers, policymakers, academicians, and researchers interested in expanding their knowledge on the emerging trends and topics involving smart cities.

Security and Privacy in Smart Sensor Networks

Security and privacy protection within computer networks can be a challenge. By examining the current problems and challenges this domain is facing, more efficient strategies can be established to safeguard personal information against invasive pressures. *Security and Privacy in Smart Sensor Networks* is a critical scholarly resource that examines recent developments and emerging trends in smart sensor security and privacy by providing new models, practical solutions, and technological advances related to security. Featuring coverage on a broad range of topics such as cloud security, encryption, and intrusion detection systems, this book is geared towards academicians, engineers, IT specialists, researchers, and students seeking current research on authentication and intrusion detection.

Examining Cloud Computing Technologies Through the Internet of Things

The progressive combination of cloud computing and Internet of Things (IoT) will enable new monitoring services, create powerful processing of sensory data streams, and provide a new method for intelligent perception and connection. *Examining Cloud Computing Technologies Through the Internet of Things* is a pivotal reference source for scholarly research on the latest and innovative facets of cloud-based Internet of Things systems including technical evaluations and comparisons of existing concepts. Featuring coverage on a broad range of topics such as fog computing, network programming, and data security, this book is geared towards advanced-level students, researchers, and professionals interested in exploring and implementing the IoT and related technologies.

A Deeper Perspective on the Fundamentals of Digital Communication, Security, and Privacy Protocols

This book, divided into three parts, describes the detailed concepts of Digital Communication, Security, and Privacy protocols. In Part One, the first chapter provides a deeper perspective on communications, while Chapters 2 and 3 focus on analog and digital communication networks. Part Two then delves into various Digital Communication protocols. Beginning first in Chapter 4 with the major Telephony protocols, Chapter 5 then focuses on important Data Communication protocols, leading onto the discussion of Wireless and Cellular Communication protocols in Chapter 6 and Fiber Optic Data Transmission protocols in Chapter 7. Part Three covers Digital Security and Privacy protocols including Network Security protocols (Chapter 8), Wireless Security protocols (Chapter 9), and Server Level Security systems (Chapter 10), while the final chapter covers various aspects of privacy related to communication protocols and associated issues. This book will offer great benefits to graduate and undergraduate students, researchers, and practitioners. It could be used as a textbook as well as reference material for these topics. All the authors are well-qualified in this domain. The authors have an approved textbook that is used in some US, Saudi, and Bangladeshi universities since Fall 2020 semester – although used in online lectures/classes due to COVID-19 pandemic.

Communication, Signal Processing & Information Technology

The book elaborates selected, extended and peer reviewed papers on Communication and Signal Processing. As Vol. 8 of the series on "Advances on Signals, Systems and Devices" it presents main topics such as: content based video retrieval, wireless communication systems, biometry and medical imaging, adaptive and smart antennae.

Mobility Models for Next Generation Wireless Networks

Mobility Models for Next Generation Wireless Networks: Ad Hoc, Vehicular and Mesh Networks provides the reader with an overview of mobility modelling, encompassing both theoretical and practical aspects related to the challenging mobility modelling task. It also: Provides up-to-date coverage of mobility models for next generation wireless networks Offers an in-depth discussion of the most representative mobility models for major next generation wireless network application scenarios, including WLAN/mesh networks, vehicular networks, wireless sensor networks, and opportunistic networks Demonstrates the practices for designing effective protocol/applications for next generation wireless networks Includes case studies showcasing the importance of properly understanding fundamental mobility model properties in wireless network performance evaluation

14th International Conference on Computational Intelligence in Security for Information Systems and 12th International Conference on European Transnational Educational (CISIS 2021 and ICEUTE 2021)

This book of Advances in Intelligent and Soft Computing contains accepted papers presented at CISIS 2021 and ICEUTE 2021, all conferences held in the beautiful and historic city of Bilbao (Spain), in September 2021. The aim of the 14th CISIS 2021 conference is to offer a meeting opportunity for academic and industry-related researchers belonging to the various, vast communities of computational intelligence, information security, and data mining. The need for intelligent, flexible behavior by large, complex systems, especially in mission-critical domains, is intended to be the catalyst and the aggregation stimulus for the overall event. After a thorough peer-review process, the CISIS 2021 International Program Committee selected 23 papers which are published in these conference proceedings achieving an acceptance rate of 40%. In this relevant edition, a special emphasis was put on the organization of special sessions. One special session is organized related to relevant topics as follows: building trust in ecosystems and ecosystem components. In the case of 12th ICEUTE 2021, the International Program Committee selected 17 papers, which are published in these conference proceedings. One special session is organized related to relevant topics as follows: sustainable personal goals: engaging students in their learning process. The selection of papers is extremely rigorous in order to maintain the high quality of the conference, and we would like to thank the members of the program committees for their hard work in the reviewing process. This is a crucial process to the creation of a high standard conference, and the CISIS and ICEUTE conferences would not exist without their help.

Introduction to Wireless Sensor Networks

This book mainly focuses on Undergraduate students to understand the basic concept of Wireless Sensor Networks (WSN). "Introduction to Wireless Sensor Network" Book Explain various concepts and terminologies used in WSN. Describe importance and use of radio communication and link management in WSN. Explain various wireless standards and protocols associated with WSN. Recognize importance of localization and routing techniques used in WSN. Understand techniques of data aggregation and importance of security in WSN. Examine the issues involved in design and deployment of WSN.

Sensing Technology: Current Status and Future Trends III

This book contains a collection of selected works stemming from the 2013 International Conference on

Sensing Technology (ICST), which was held in Wellington, New Zealand. The purpose of the book is to distill the highlights of the conference, and therefore track the latest developments in sensing technologies. The book contents are broad, since sensors can be applied in many different areas. Therefore the book gives a broad overview of the latest developments, in addition to discussing the process through which researchers go through in order to develop sensors, or related systems, which will become more widespread in the future. The book is written for academic and industry professionals working in the field of sensing, instrumentation and related fields, and is positioned to give a snapshot of the current state of the art in sensing technology, particularly from the applied perspective.

Interoperability, Safety and Security in IoT

This book constitutes the refereed post-conference proceedings of the International Conference on Safety and Security in Internet of Things , SaSeIoT 2016, which was collocated with InterIoT and took place in Paris, France, in October 2016. The 14 revised full papers were carefully reviewed and selected from 22 submissions and cover all aspects of the latest research findings in the area of Internet of Things (IoT).

Ambient Assisted Living

This book constitutes the refereed proceedings of the Third International Workshop on Ambient Assisted Living, IWAAL 2011, held in Torremolinos-Málaga, Spain, in June 2011 as a satellite event of IWANN 2011, the International Work-Conference on Artificial and Natural Neural Networks.. The 30 papers presented were carefully reviewed and selected from numerous submissions. They are organized in topical sections on mobile proposals for AAL, applications for cognitive impairments, e-health, smart and wireless sensors, applied technologies, frameworks and platforms, and methodologies and brain interfaces.

Applications and Techniques in Information Security

This book constitutes the refereed proceedings of the International Conference on Applications and Techniques in Information Security, ATIS 2014, held in Melbourne, Australia, in November 2014. The 16 revised full papers and 8 short papers presented were carefully reviewed and selected from 56 submissions. The papers are organized in topical sections on applications; curbing cyber crimes; data privacy; digital forensics; security implementations.

Technologies and Protocols for the Future of Internet Design: Reinventing the Web

The Internet has changed significantly from its beginnings as a simple network used to pass data from one computer to another. Containing essential tools for everyday information processing, the Internet is used by small and large organizations alike and continues to evolve with the changing information technology landscape. Technologies and Protocols for the Future of Internet Design: Reinventing the Web aims to provide relevant methods and theories in the area of the Internet design. It is written for the research community and professionals who wish to improve their understanding of future Internet technologies and gain knowledge of new tools and techniques in future Internet design.

Recent Advances in Systems Safety and Security

This book represents a timely overview of advances in systems safety and security, based on selected, revised and extended contributions from the 2nd and 3rd editions of the International Workshop on Systems Safety and Security – IWSSS, held in 2014 and 2015, respectively, in Bucharest, Romania. It includes 14 chapters, co-authored by 34 researchers from 7 countries. The book provides an useful reference from both theoretical and applied perspectives in what concerns recent progress in this area of critical interest. Contributions, broadly grouped by core topic, address challenges related to information theoretic methods for assuring

systems safety and security, cloud-based solutions, image processing approaches, distributed sensor networks and legal or risk analysis viewpoints. These are mostly accompanied by associated case studies providing additional practical value and underlying the broad relevance and impact of the field.

IoT Benefits and Growth Opportunities for the Telecom Industry

This critical and forward-looking book features: An assessment of the impact of Internet of Things (IoT) on the telecom industry's revenue streams IoT-based business models in the telecom industry A PESTLE (political, economic, socio-cultural, technological, legal, and environmental) analysis of the industry in relation to IoT Key technological drivers. It also features a case study of Bell Canada Enterprises (BCE) Inc., which highlights IoT-based business models in the industry. The study reveals that telecom operators have started implementing IoT projects, however, true revenue streams are yet to materialize. Ten IoT-based business models have been identified at BCE Inc. The book points out that operators do leverage existing infrastructure in terms of broadband fiber and mobile connectivity in part and resort to partnerships and acquisitions to acquire much-needed knowledge, technology, and smart devices. Concerning the effect of IoT on the telecoms' revenue streams, it was revealed that new entrants, who are not necessarily in the telecom industry, have impacted the old players' revenue streams. OTT services like YouTube, WhatsApp, IPTV, Netflix, are the biggest culprits. Seven key technological drivers for IoT have been identified and include widespread wireless connectivity, the availability and affordability of microcontrollers, sensors and actuators, the decreasing cost of bandwidth, the recent implementation of IPv6, and the ongoing development of 5G network, as well as the use of cloud computing and analytics. Finally, the PESTLE analysis of the industry shows that the lack of a comprehensive political and regulatory framework still slows down IoT deployment. Interoperability, security, and privacy concerns are other constraints. Conversely, general economic conditions in most developed and developing economies are favorable to the advancement of IoT technology. Governments are willing to subsidize R&D and have partnered with the private sector to speed up the roll-out process.

New Results in Dependability and Computer Systems

DepCoS – RELCOMEX is an annual series of conferences organized by the Institute of Computer Engineering, Control and Robotics (CECR), Wrocław University of Technology, since 2006. Its idea came from the heritage of the other two cycles of events: RELCOMEX Conferences (1977 – 89) and Microcomputer Schools (1985 – 95) which were then organized by the Institute of Engineering Cybernetics, the previous name of CECR. In contrast to those preceding meetings focused on the conventional reliability analysis, the DepCoS mission is to develop a more comprehensive approach to computer system performability, which is now commonly called dependability. Contemporary technical systems are integrated unities of technical, information, organization, software and human resources. Diversity of the processes being realized in the system, their concurrency and their reliance on in-system intelligence significantly impedes construction of strict mathematical models and calls for application of intelligent and soft computing methods. The submissions included in this volume illustrate variety of problems that need to be explored in the dependability analysis: methodologies and practical tools for modeling, design and simulation of the systems, security and confidentiality in information processing, specific issues of heterogeneous, today often wireless, computer networks, or management of transportation networks.

Evolving Networking Technologies

EVOLVING NETWORKING TECHNOLOGIES This book discusses in a practical manner some of the critical security challenges facing the ever-evolving networking technologies of today. In an age of explosive worldwide growth of electronic data storage and communications, effective protection of information has become a critical requirement, especially when used in coordination with other tools for information security and cryptography in all of its applications, including data confidentiality, data integrity, and user authentication. While the importance of cryptographic technique, i.e., encryption, in protecting sensitive and

critical information and resources cannot be overemphasized, an examination of the technical evolution within several industries reveals an approaching precipice of scientific change. The glacially paced but inevitable convergence of quantum mechanics, nanotechnology, computer science, and applied mathematics will revolutionize modern technology. The implications of such changes will be far-reaching, with one of its greatest impacts affecting information security and, more specifically, modern cryptography. The book takes the reader through these issues. As the security systems design becomes more and more complex to meet these challenges, a mistake that is committed most often by security specialists is not making a comprehensive analysis of the system to be secured before choosing which security mechanism to deploy. Often, the security mechanism chosen turns out to be either incompatible with, or inadequate for, handling the complexities of the system. In addition, the book also discusses three main points: Configuration management is a critical issue, and as networks are increasing in size, their configuration needs to be managed. Devices may conflict with each other in terms of configuration. Therefore, it becomes challenging for firewalls to be up-to-date according to network policies. Scalability of the network is another big challenge, it would be easier to address if the network stays the same, but the network is ever expanding with a constant increase in the number of devices devoted to the network. Vendor lock-in: Business decisions that are taken today are revolving around the assumptions and capabilities of the current vendor and environment scenario. Buying the best solutions from today's vendors involves how to interoperate, integrate, and support multiple solutions. It may involve tearing out all of the longstanding kits without tearing down the entire network at the same time. Audience This book specifically appeals to industry practitioners, IT researchers, and students regarding network technological management.

Intelligent Data Analytics for Power and Energy Systems

This book brings together state-of-the-art advances in intelligent data analytics as driver of the future evolution of PaE systems. In the modern power and energy (PaE) domain, the increasing penetration of renewable energy sources (RES) and the consequent empowerment of consumers as a central and active solution to deal with the generation and development variability are driving the PaE system towards a historic paradigm shift. The small-scale, diversity, and especially the number of new players involved in the PaE system potentiate a significant growth of generated data. Moreover, advances in communication (between IoT devices and M2M: machine to machine, man to machine, etc.) and digitalization hugely increased the volume of data that results from PaE components, installations, and systems operation. This data is becoming more and more important for PaE systems operation, maintenance, planning, and scheduling with relevant impact on all involved entities, from producers, consumer,s and aggregators to market and system operators. However, although the PaE community is fully aware of the intrinsic value of those data, the methods to deal with it still necessitate substantial enhancements, development and research. Intelligent data analytics is thereby playing a fundamental role in this domain, by enabling stakeholders to expand their decision-making method and achieve the awareness on the PaE environment. The editors also included demonstrated codes for presented problems for better understanding for beginners.

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