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*This book constitutes the refereed proceedings of the Third International Conference on Internet of Vehicles, IOV 2016, held in Nadi, Fiji, in December 2016. The 22 full papers presented were carefully reviewed and selected from 55 submissions. IOV 2016 is intended to play an important role for researchers and industry practitioners to exchange information regarding advancements in the state of art and practice of IOV architectures, protocols, services, and applications, as well as to identify*

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*emerging research topics and define the future directions of IOV.*

*Within the past decade, technology has grown exponentially, and governments have promoted smart cities. Emerging smart cities have become both crucibles and showrooms for the practical application of the internet of things (IoT), cloud computing, and the integration of big data into everyday life. This complex concoction requires new thinking of the synergistic utilization of deep learning and blockchain methods and data-driven decision making with automation infrastructure, autonomous*

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*transportation, and more. Advances in Deep Learning Applications for Smart Cities provides a global perspective on current and future trends concerning the integration of deep learning and blockchain for smart cities. It provides valuable insights on the best practices and success factors for smart cities. Covering topics such as digital healthcare, object detection methods, and power consumption, this book is an excellent reference for researchers, scientists, libraries, industry experts, government organizations, students and educators of higher education, business professionals,*

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*communication and marketing agencies, entrepreneurs, and academicians.*

*"This book gives detailed analysis of the technology, applications and uses of mobile technologies in the healthcare sector by using case studies to highlight the successes and concerns of mobile health projects"--Provided by publisher.*

*This Handbook offers an unparalleled view of wireless personal area networking technologies and their associated protocols. It lifts the lid on their growing adoption within the consumer electronics, home automation, sports, health and well-being*

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*markets. Bluetooth low energy, ZigBee, EnOcean and ANT+ are comprehensively covered, along with other WPAN technologies including NFC, Wi-Fi, Bluetooth classic and high speed, and WHDI. It also features 802.11ac, the Internet of Things, Wireless USB, WiGig and WirelessHD. The Handbook shows how white space radio, cellular and Femtocells have inadvertently blurred the boundaries between personal and wide area communications, creating disruptive topologies through technology convergence. It explores how pervasive WAN technologies have spawned a new generation of*

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*consumers through the Lawnmower Man Effect and explains how our personal space has become integral to social media streams, including Twitter, Facebook and Pinterest. An essential read for students, software engineers and developers, product planners, technical marketers and analysts.*

*The Handbook of Personal Area Networking  
Technologies and Protocols  
Introduction to Bluetooth and Wifi  
From IoT to AIoT  
Internet of Vehicles – Technologies and Services  
Marketing Wireless Products*

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*Mobile Health Solutions for Biomedical Applications*

**This book gathers selected papers presented at the 7th International Conference on Innovations in Electronics and Communication Engineering, held at Guru Nanak Institutions in Hyderabad, India. It highlights contributions by researchers, technocrats and experts regarding the latest technologies in electronic and communication engineering, and addresses various aspects of communication engineering, including signal processing, VLSI design, embedded systems, wireless communications, and electronics and communications in general. Covering cutting-**

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**edge technologies, the book offers a valuable resource, especially for young researchers. This book provides comprehensive information on Wireless technologies with a deeper focus on Bluetooth and WiFi. The book starts from the ground up but does a quick progression into the technical details. The technology detail is not exhaustive but mostly illustrative to give the reader a ring side view and provide a platform for a more exhaustive exploration. The book is structured as the following: 1. Overview on Wireless Technologies and related taxonomy. 2. Technology architectures of Bluetooth and WiFi**



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**3. Comparative Analysis of Bluetooth and WiFi along with lesser known technologies like HyperLand and HomeRF. 4. Usage scenarios and a market focussed future outlook. 5. [New] Sections on Zigbee and WiMax. "Wireless Technologies: An introduction to Bluetooth and WiFi" is perfect for readers from both technical and non-technical backgrounds getting started on Wireless as it assumes little technical knowhow from its reader. This book is a great pick to use in an introductory class on Wireless Networks and is being used by few universities around the world. It is also a great place to start**

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**for marketing and industry focussed readers as the book goes beyond the technology and elaborates a more consumer centric, usage focused detail of the industry.**

**Having now come of age, telemedicine has the potential of having a greater impact on the future of medicine than any other modality.**

**Telemedicine, in the final analysis, brings reality to the vision of an enhanced accessibility of medical care and a global network of healthcare, which was not even imagined two decades ago.**

**Today, the field of telemedicine has expanded rapidly and is likely to assume greater**

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**importance in healthcare delivery in the coming times. To address the developing trend of telemedicine applications in both urban and rural areas throughout the world, this book has been designed to discuss different technologies which are being applied in the field of telemedicine and their applications including advances in wireless technologies, the use of fibre optics in telecommunication, availability of broadband Internet, digital imaging technologies and compressed video techniques that have eliminated the problems of telemedicine and also reduced the cost. Starting with the basic hospital**

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**based telemedicine system and leading to mHealth, teleHealth and eHealth, the book covers as to how various physiological signals are acquired from the body, processed and used for monitoring the patients anywhere anytime. The book is primarily intended for undergraduate and postgraduate students of Biomedical Engineering, Biomedical Instrumentation, Computer Science and Information Technology and Hospital Management and Nursing. KEY FEATURES • Covers all aspects of telemedicine technology, including medical devices, telecommunications, networking and interfacing**

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**techniques • Provides step-by-step coverage on how to set up a telemedicine centre • Includes broad application areas of telemedicine • Covers essentials of telemedicine including mHealth, eHealth and teleHealth • Provides abbreviations/acronyms and glossary of commonly used terms in telemedicine**

**RF/MICROWAVE ENGINEERING AND APPLICATIONS IN ENERGY SYSTEMS** An essential text with a unique focus on RF and microwave engineering theory and its applications In **RF/Microwave Engineering and Applications in Energy Systems**, accomplished researcher

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**Abdullah Eroglu delivers a detailed treatment of key theoretical aspects of radio-frequency and microwave engineering concepts along with parallel presentations of their practical applications. The text includes coverage of recent advances in the subject, including energy harvesting methods, RFID antenna designs, HVAC system controls, and smart grids. The distinguished author provides step-by-step solutions to common engineering problems by way of numerous examples and offers end-of-chapter problems and solutions on each topic. These practical applications of theoretical**

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**subjects aid the reader with retention and recall and demonstrate a solid connection between theory and practice. The author also applies common simulation tools in several chapters, illustrating the use and implementation of time domain circuit simulators in conjunction with electromagnetic simulators, as well as Matlab for design, simulation, and implementation at the component and system levels. Readers will also benefit from: A thorough introduction to the foundations of electromagnetics, including line, surface, and volume integrals, vector operation and theorems, and Maxwell's equations**

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**Comprehensive explorations of passive and active components in RF and microwave engineering, including resistors, capacitors, inductors, and semiconductor materials and active devices Practical discussions of transmission lines, including transmission line analysis, Smith charts, microstrip lines, and striplines In-depth examinations of network parameters, including impedance parameters, ABCD parameters, h-Hybrid parameters, and network connections Perfect for senior-level undergraduates and graduate students studying RF or Microwave engineering, RF/Microwave**



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**Engineering and Applications in Energy Systems is also an indispensable resource for professionals whose work touches on radio-frequency and microwave technologies.**

**Third International Conference, IOV 2016, Nadi, Fiji, December 7-10, 2016, Proceedings**

**Principles of Wireless Access and Localization**

**Understanding Communications Networks for**

**Emerging Cybernetics Applications**

**Internet of Things (IoT) in 5G Mobile**

**Technologies**

**Electronics for You, June 2015**

**Wi-fi, Bluetooth, ZigBee, WirelessHART and ISA**

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### **SP100, and Their Effectiveness in Industrial Automation**

*This book reports on the latest advances in the modeling, analysis and efficient management of information in Internet of Things (IoT) applications in the context of 5G access technologies. It presents cutting-edge applications made possible by the implementation of femtocell networks and millimeter wave communications solutions, examining them from the perspective of the universally and constantly connected IoT.*

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***Moreover, it describes novel architectural approaches to the IoT and presents the new framework possibilities offered by 5G mobile networks, including middleware requirements, node-centrality and the location of extensive functionalities at the edge. By providing researchers and professionals with a timely snapshot of emerging mobile communication systems, and highlighting the main pitfalls and potential solutions, the book fills an important gap in the literature and will foster***

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***the further developments of 5G hosting IoT devices.***

***The latest wireless security solutions Protect your wireless systems from crippling attacks using the detailed security information in this comprehensive volume. Thoroughly updated to cover today's established and emerging wireless technologies, Hacking Exposed Wireless, second edition reveals how attackers use readily available and custom tools to target, infiltrate, and hijack vulnerable systems. This book discusses the***

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***latest developments in Wi-Fi, Bluetooth, ZigBee, and DECT hacking, and explains how to perform penetration tests, reinforce WPA protection schemes, mitigate packet injection risk, and lock down Bluetooth and RF devices. Cutting-edge techniques for exploiting Wi-Fi clients, WPA2, cordless phones, Bluetooth pairing, and ZigBee encryption are also covered in this fully revised guide. Build and configure your Wi-Fi attack arsenal with the best hardware and software tools Explore common weaknesses in WPA2 networks***

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***through the eyes of an attacker Leverage post-compromise remote client attacks on Windows 7 and Mac OS X Master attack tools to exploit wireless systems, including Aircrack-ng, coWPAtty, Pyrit, IPPON, FreeRADIUS-WPE, and the all new KillerBee Evaluate your threat to software update impersonation attacks on public networks Assess your threat to eavesdropping attacks on Wi-Fi, Bluetooth, ZigBee, and DECT networks using commercial and custom tools Develop advanced skills leveraging Software Defined Radio and other***

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***flexible frameworks Apply comprehensive defenses to protect your wireless devices and infrastructure***

***This book presents the latest innovative research findings, methods, and development techniques related to intelligent social networks and collaborative systems, intelligent networking systems, mobile collaborative systems, and secure intelligent cloud systems. Offering both theoretical and practical perspectives, it also reveals synergies among various paradigms in the***

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***multi-disciplinary field of intelligent collaborative systems. With the rapid development of the Internet, we are experiencing a shift from the traditional sharing of information and applications as the main purpose of the Web to an emergent paradigm that places people at the very centre of networks, making full use of their connections, relations, and collaboration. Social networks also play a major role in the dynamics and structure of intelligent Web-based networking and collaborative systems.***



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***Virtual campuses, communities and organizations strongly leverage intelligent networking and collaborative systems through a wide variety of formal and informal electronic relations, such as business-to-business, peer-to-peer, and many types of online collaborative learning interactions, including the emerging e-learning systems. This has resulted in entangled systems that need to be managed efficiently and autonomously. In addition, while the latest powerful technologies based on grid and***

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***wireless infrastructures as well as cloud computing are currently greatly enhancing collaborative and networking applications, they are also facing new challenges. The principal purpose of the research and development community is to stimulate research that will lead to the creation of responsive environments for networking and, in the long term, the development of adaptive, secure, mobile, and intuitive intelligent systems for collaborative work and learning. Information networking has emerged as a***

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***multidisciplinary diversified area of research over the past few decades. From traditional wired telephony to cellular voice telephony and from wired access to wireless access to the Internet, information networks have profoundly impacted our lifestyles as they have undergone enormous growth. To understand this technology, students need to learn several disciplines and develop an intuitive feeling of how they interact with one another. To achieve this goal, the book describes important networking standards,***

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***classifying their underlying technologies in a logical manner and gives detailed examples of successful applications. The emergence of wireless access and dominance of the Ethernet in LAN technologies has shifted the innovations in networking towards the physical layer and characteristics of the medium. This book pays attention to the physical layer while we provide fundamentals of information networking technologies which are used in wired and wireless networks designed for local and wide area operations.***

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***The book provides a comprehensive treatment of the wired IEEE802.3 Ethernet, and Internet as well as ITU cellular 2G-6G wireless networks, IEEE 802.11 for Wi-Fi, and IEEE 802.15 for Bluetooth, ZigBee and ultra-wideband (UWB) technologies. The novelty of the book is that it places emphasis on physical communications issues related to formation and transmission of packets and characteristics of the medium for transmission in a variety of networks. Material presented in the book will be***

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***beneficial for students of Electrical and Computer Engineering, Computer Science, Robotics Engineering, Biomedical 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 a variety of algorithms.***

***Wi-Fi™, Bluetooth™, Zigbee™ and***

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**WiMax™**

**Mobile Internet Security**

**From Theory to Implementation**

**Smart Grid Communication Infrastructures**

**Comparison Among Short Range Wireless  
Networks**

**Hacking Exposed Wireless, Second Edition**

*Wireless Network Coexistence deals with the integration and practical applications of the entire gamut of wireless services, including Wi-Fi, Wi-Media, ZigBee, and Bluetooth. It discusses what each of the services has to offer, what can be accomplished with each,*

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*and how each fits into an integrated wireless solution. \* Covers all "flavors" of 802.11: a, b, and g \* Explores 802.15 and its applications in home automation \* Includes cutting-edge information on Wi-Media, still in the draft stage of becoming a standard*

*Contents: Introduction \* Indoor RF Propagation and Diversity Techniques \* Basic Modulation and Coding \* Advanced Modulation and Coding \* Radio Performance \* Medium Access Control \* Passive Coexistence \* Active Coexistence \* Coexistence with Other Services*  
*This book constitutes the proceedings of the 24th RoboCup International Symposium which*



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*was held online during June 22 - June 28, 2021. The 19 full papers included in these proceedings were carefully reviewed and selected from 42 submissions; the volume also includes 10 RoboCup Champions Papers. In addition to presenting the proceedings of the RoboCup 2021 Symposium, the book highlights the approaches of champion teams from the competitions. Due to the complex research challenges set by the RoboCup initiative, the RoboCup International Symposium offers a unique perspective for exploring scientific and engineering principles underlying advanced robotic and AI systems.*

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*For engineers, product designers, and technical marketers who need to design a cost-effective, easy-to-use, short-range wireless product that works, this practical guide is a must-have. It explains and compares the major wireless standards - Bluetooth, Wi-Fi, 802.11abgn, ZigBee, and 802.15.4 - enabling you to choose the best standard for your product. Packed with practical insights based on the author's 10 years of design experience, and highlighting pitfalls and trade-offs in performance and cost, this book will ensure you get the most out of your chosen standard by teaching you how to tailor*

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*it for your specific implementation. With information on intellectual property rights and licensing, production test, and regulatory approvals, as well as analysis of the market for wireless products, this resource truly provides everything you need to design and implement a successful short-range wireless product.*

*Compared with other wireless communication technologies, such as Bluetooth, WiFi, and UWB, ZigBee is a far more reliable, affordable, and energy-efficient option. It is also the only global wireless communication standard for easily deployed,*

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*low-power consumption products. ZigBee Network Protocols and Applications provides detailed descriptions of*

*Introduction to Wireless Communications and Networks*

*Bluetooth, Zigbee, Wi-fi*

*The 11th International Conference on Intelligent Networking and Collaborative Systems (INCoS-2019)*

*Comparative Study of Wireless Protocols*

*Zigbee Wireless Networking*

*Wireless Networking*

**ZigBee is a standard based on the IEEE 802.15.4 standard for wireless personal networks. This standard**

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allows for the creation of very low cost and low power networks - these applications run for years rather than months. These networks are created from sensors and actuators and can wireless control many electrical products such as remote controls, medical, industrial, and security sensors. Hundreds of companies are creating applications including Mitsubishi, Motorola, Freescale, and Siemens. This book is written for engineers who plan to develop ZigBee applications and networks, to understand how they work, and to evaluate this technology to see if it is appropriate to a particular project. This book does not simply state facts but explains what ZigBee can do through detailed code

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examples. \*Details how to plan and develop applications and networks \*Zigbee sensors have many applications including industrial automation, medical sensing, remote controls, and security \*Hot topic for today's electrical engineer because it is low cost and low power

This book constitutes the refereed proceedings of the First International Symposium on Mobile Internet Security, MobiSec 2016, held in Taichung, Taiwan, in July 2016. The 15 revised full papers presented were carefully reviewed and selected from 44 submissions. They are closely related to various theories and practical applications in mobility management to highlight the state-of-the-art research.

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A comprehensive, encompassing and accessible text examining a wide range of key Wireless Networking and Localization technologies. This book provides a unified treatment of issues related to all wireless access and wireless localization techniques. The book reflects principles of design and deployment of infrastructure for wireless access and localization for wide, local, and personal networking. Description of wireless access methods includes design and deployment of traditional TDMA and CDMA technologies and emerging Long Term Evolution (LTE) techniques for wide area cellular networks, the IEEE 802.11/WiFi wireless local area networks as well as IEEE 802.15 Bluetooth, ZigBee,

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UltraWideband (UWB), RF Microwave and body area networks used for sensor and ad hoc networks. The principles of wireless localization techniques using time-of-arrival and received-signal-strength of the wireless signal used in military and commercial applications in smart devices operating in urban, indoor and inside the human body localization are explained and compared. Questions, problem sets and hands-on projects enhances the learning experience for students to understand and appreciate the subject. These include analytical and practical examples with software projects to challenge students in practically important simulation problems, and problem sets that use MatLab. Key



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features: Provides a broad coverage of main wireless technologies including emerging technical developments such as body area networking and cyber physical systems Written in a tutorial form that can be used by students and researchers in the field Includes practical examples and software projects to challenge students in practically important simulation problems

Provides a detailed analysis of the standards and technologies enabling applications for the wireless Internet of Things The Wireless Internet of Things: A Guide to the Lower Layers presents a practitioner's perspective toward the Internet of Things (IoT) focusing on over-the-air interfaces used by applications such as

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home automation, sensor networks, smart grid, and healthcare. The author—a noted expert in the field—examines IoT as a protocol-stack detailing the physical layer of the wireless links, as both a radio and a modem, and the media access control (MAC) that enables communication in congested bands. Focusing on low-power wireless personal area networks (WPANs) the text outlines the physical and MAC layer standards used by ZigBee, Bluetooth LE, Z-Wave, and Thread. The text deconstructs these standards and provides background including relevant communication theory, modulation schemes, and access methods. The author includes a discussion on Wi-Fi and gateways, and

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explores their role in IoT. He introduces radio topologies used in software-defined radio implementations for the WPANs. The book also discusses channel modelling and link budget analysis for WPANs in IoT. This important text: Introduces IEEE 802.15.4, ITU-T G.9959, and Bluetooth LE as physical layer technology standards enabling wireless IoT Takes a layered approach in order to cultivate an appreciation for the various standards that enable interoperability Provides clarity on wireless standards with particular focus on actual implementation Written for IoT application and platform developers as well as digital signal processing, network, and wireless communication engineers; The Wireless Internet of

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Things: A Guide to the Lower Layers offers an inclusive overview of the complex field of wireless IoT, exploring its beneficial applications that are proliferating in a variety of industries.

Advances in Intelligent Networking and Collaborative Systems

Wireless Home Networking For Dummies

ZigBee Wireless Sensor and Control Network

Proceedings of the 7th ICIECE 2018

A Guide to the Lower Layers

Document from the year 2019 in the subject Computer

Science - Internet, New Technologies, , course: Wireless

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Sensor Networks, Home Area Networks, language: English, abstract: The objectives of this research are: To propose a scheme to estimate the future interference and enable efficient channel switching mechanism to avoid interference for Wireless Sensor Network (WSN) as per the latency requirements specified by Smart Grid (SG). To propose an algorithm for efficient data recovery mechanism so that ZigBee devices can quickly familiarize with the encoding according to the highly dynamic WiFi traffic. To propose an efficient frequency shifting mechanism for different frame sizes of data under interference conditions to guarantee the reliable data transmission within the delay requirements of the

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SG. To propose an effective mechanism to guarantee the ZigBee communications within the maximum tolerable delay under the coexistence of WiFi for carrying out effective smart home solutions. To propose an algorithm based on effective transmission power control to increase WSN life time under coexistence scenarios for efficient monitoring and controlling purposes at smart homes. With the introduction of Information and Data-Communication Technology (ICT) to the present electrical power systems, the traditional electrical-grid system is becoming more intelligent and adaptive. The ICT successfully establishes bi-directional communication between Utility companies and the

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consumer for improving the generation and utilization of power. Wireless Sensor Network (WSN) is efficiently utilized by wide-ranging Smart Grid (SG) applications. Despite many advantages, WSN faces a challenge of avoiding interference experiencing from other coexisting wireless technologies working in the 2.4GHz unlicensed frequency band. Providing support for WSN in terms of avoiding interference is a very challenging issue due to the dynamic wireless communication environment and extremely limited resources. In the present thesis, the problem of interference experienced by WSN in 2.4GHz has been investigated. The challenges, limitations and requirements for avoiding the interference for WSN

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working in the vicinity of other technologies like WiFi and Bluetooth have been identified. As a result of the literature survey carried out, it was identified that proper channel selection and channel prioritization for WSNs working in the coexisting environment had not been adequately developed till then. Hence, there was a requirement for addressing these issues. The proposed schemes in this thesis are based on simulation results obtained.

Wi-Fi™, Bluetooth™, Zigbee™ and WiMax™ Springer Science & Business Media  
Readers learn about the most popular wireless data communications technologies in use today as GUIDE TO



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WIRELESS COMMUNICATIONS, 4Ed examines Bluetooth, ZigBee, Wi-Fi, cellular and satellite communications while providing a broad industry perspective. Readers develop a solid base of knowledge in Wireless Personal Area Networks (WPANs), Wireless Local Area Networks (WLANs), Wireless Metropolitan Area Networks (WMANs), and Wireless Wide Area Networks (WWANs) to better understand the most popular wireless communications available today. This book's comprehensive approach to wireless communication technology provides the solid background readers need to prepare for a future career in today's information and communications technology

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field. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

Bringing to you the special issue on wearables with Electronics For You, June 2015. It will help you guide the golden rules related to design wearable devices, identify how flexible electronics is helping in the promotion of wearables and a buyer's guide for selecting the right wearable device. This is not all, this issue will also help you select the right wireless modules and...

ZigBee Network Protocols and Applications

Hacking Exposed Wireless, Second Edition, 2nd Edition

Wireless Security Secrets and Solutions

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Advances in Deep Learning Applications for Smart Cities  
Wireless Network Coexistence

ZigBee Wireless Networks and Transceivers

*Indoor Wireless Communications: From Theory to Implementation provides an in-depth reference for design engineers, system planners and post graduate students interested in the vastly popular field of indoor wireless communications. It contains wireless applications and services for in-building scenarios and knowledge of key elements in the design and implementation of these systems. Technologies such as Wireless Local Area Networks, Bluetooth, ZigBee, Indoor Optical Communications, WiMAX, UMTS and*

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*GSM for indoor environments are fully explained and illustrated with examples. Antennas and propagation issues for in-building scenarios are also discussed, emphasizing models and antenna types specifically developed for indoor communications. An exhaustive survey on indoor wireless communication equipment is also presented, covering all available technologies including antennas, distribution systems, transceivers and base stations.*

*A decade ago, wireless technology was unimaginable in its application in industrial automation as wireless had poor reliability and security in the form of time delays and frame losses. Also, lack of interoperability and standards has been a barrier for wireless*

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*applications in control system. But with recent advancements in wireless technology, and with the underlying advantages of wireless like low infrastructural costs, scalability, mobility, and ability to operate in extreme and remote environments, many are seriously considering wireless for industrial automation solutions. For wireless implementation in industries, it is important to understand its characteristics - security, update rates, data types, protocols, and latency time. Protocol being an important characteristic of any communication, is to be chosen intelligently for maximum efficiency. Because of the complexity of creating a communication protocol, existing information*

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*technology (IT) protocols such as Wi-Fi, Bluetooth, and ZigBee were used in industries. But as applications widened, and interoperability became an important factor to be considered, it was required to standardize the protocols used. ISA SP100 and WirelessHART are results of this standardizing process. For the last few years, there has been a huge discussion on which of these protocols are robust and work better, and none has emerged as clear winners. The aim of this thesis is to explore the capabilities and limitations of each of these protocols for various industrial applications. This thesis considers all these protocols and helps choose the best fit for industrial applications and includes study of security, reliability,*

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*and efficiency of these protocols.*

*The book provides a complete and detailed description of the recent wireless technologies including Wi-Fi, Bluetooth, ZigBee and WiMAX. These technologies are considered to be important topics in the telecommunication industry in the next decade. Some critical subjects are particularly developed such as security, quality of service, roaming and power conservation. The book also includes some chapters on practical aspects.*

*ZigBee is a short-range wireless networking standard backed by such industry leaders as Motorola, Texas Instruments, Philips, Samsung, Siemens, Freescale, etc. It supports mesh networking, each node can*

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*transmit and receive data, offers high security and robustness, and is being rapidly adopted in industrial, control/monitoring, and medical applications. This book will explain the ZigBee protocol, discuss the design of ZigBee hardware, and describe how to design and implement ZigBee networks. The book has a dedicated website for the latest technical updates, ZigBee networking calculators, and additional materials. Dr. Farahani is a ZigBee system engineer for Freescale semiconductors Inc. The book comes with a dedicated website that contains additional resources and calculators:*

*<http://www.learnZigBee.com> Provides a comprehensive overview of ZigBee technology and*



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*networking, from RF/physical layer considerations to application layer development Discusses ZigBee security features such as encryption Describes how ZigBee can be used in location detection applications Explores techniques for ZigBee co-existence with other wireless technologies such as 802.11 and Bluetooth The book comes with a dedicated website that contains additional resources and calculators:*

*<http://www.learnZigBee.com>*

*Big Data, Cloud Computing, and Security*

*Coexisting problems for wireless sensor networks*

*working in 2.4 GHz frequency band*

*Essentials of Short-Range Wireless*

*Indoor Wireless Communications*

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*TELEMEDICINE TECHNOLOGY AND APPLICATIONS  
(MHEALTH, TELEHEALTH AND EHEALTH)*

*First International Symposium, MobiSec 2016,  
Taichung, Taiwan, July 14-15, 2016, Revised Selected  
Papers*

The latest wireless security solutions Protect your wireless systems from crippling attacks using the detailed security information in this comprehensive volume. Thoroughly updated to cover today's established and emerging wireless technologies, Hacking Exposed Wireless, second edition reveals how attackers use readily available and custom tools

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to target, infiltrate, and hijack vulnerable systems. This book discusses the latest developments in Wi-Fi, Bluetooth, ZigBee, and DECT hacking, and explains how to perform penetration tests, reinforce WPA protection schemes, mitigate packet injection risk, and lock down Bluetooth and RF devices. Cutting-edge techniques for exploiting Wi-Fi clients, WPA2, cordless phones, Bluetooth pairing, and ZigBee encryption are also covered in this fully revised guide. Build and configure your Wi-Fi attack arsenal with the best hardware and software tools Explore common weaknesses in WPA2 networks

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through the eyes of an attacker Leverage post-compromise remote client attacks on Windows 7 and Mac OS X Master attack tools to exploit wireless systems, including Aircrack-ng, coWPAtty, Pyrit, IPPON, FreeRADIUS-WPE, and the all new KillerBee Evaluate your threat to software update impersonation attacks on public networks Assess your threat to eavesdropping attacks on Wi-Fi, Bluetooth, ZigBee, and DECT networks using commercial and custom tools Develop advanced skills leveraging Software Defined Radio and other flexible frameworks Apply comprehensive defenses

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to protect your wireless devices and infrastructure. Learn to design, implement and secure your IoT infrastructure Key Features Build a complete IoT system that is the best fit for your organization Learn about different concepts, technologies, and tradeoffs in the IoT architectural stack Understand the theory, concepts, and implementation of each element that comprises IoT design—from sensors to the cloud Implement best practices to ensure the reliability, scalability, robust communication systems, security, and data analysis in your IoT infrastructure Book Description The Internet of Things (IoT) is the fastest

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growing technology market. Industries are embracing IoT technologies to improve operational expenses, product life, and people's well-being. An architectural guide is necessary if you want to traverse the spectrum of technologies needed to build a successful IoT system, whether that's a single device or millions of devices. This book encompasses the entire spectrum of IoT solutions, from sensors to the cloud. We start by examining modern sensor systems and focus on their power and functionality. After that, we dive deep into communication theory, paying close attention to near-

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range PAN, including the new Bluetooth® 5.0 specification and mesh networks. Then, we explore IP-based communication in LAN and WAN, including 802.11ah, 5G LTE cellular, SigFox, and LoRaWAN. Next, we cover edge routing and gateways and their role in fog computing, as well as the messaging protocols of MQTT and CoAP. With the data now in internet form, you'll get an understanding of cloud and fog architectures, including the OpenFog standards. We wrap up the analytics portion of the book with the application of statistical analysis, complex event processing, and deep learning

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models. Finally, we conclude by providing a holistic view of the IoT security stack and the anatomical details of IoT exploits while countering them with software defined perimeters and blockchains. What you will learn Understand the role and scope of architecting a successful IoT deployment, from sensors to the cloud Scan the landscape of IoT technologies that span everything from sensors to the cloud and everything in between See the trade-offs in choices of protocols and communications in IoT deployments Build a repertoire of skills and the vernacular necessary to work in the IoT space



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Broaden your skills in multiple engineering domains necessary for the IoT architect Who this book is for This book is for architects, system designers, technologists, and technology managers who want to understand the IoT ecosphere, various technologies, and tradeoffs and develop a 50,000-foot view of IoT architecture.

This book is where your adventures with Bluetooth LE begin. You'll start your journey by getting familiar with your hardware options: Arduino, BLE modules, computers (including Raspberry Pi!), and mobile phones. From there, you'll write code and wire

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circuits to connect off-the-shelf sensors, and even go all the way to writing your own Bluetooth Services. Along the way you'll look at lightbulbs, locks, and Apple's iBeacon technology, as well as get an understanding of Bluetooth security-- both how to beat other people's security, and how to make your hardware secure.

A comprehensive resource that covers all the key areas of smart grid communication infrastructures Smart grid is a transformational upgrade to the traditional power grid that adds communication capabilities, intelligence and modern control. Smart

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Grid Communication Infrastructures is a comprehensive guide that addresses communication infrastructures, related applications and other issues related to the smart grid. The text shows how smart grid departs from the traditional power grid technology. Fundamentally, smart grid has advanced communication infrastructures to achieve two-way information exchange between service providers and customers. Grid operations in smart grid have proven to be more efficient and more secure because of the communication infrastructures and modern control. Smart Grid Communication

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Infrastructures examines and summarizes the recent advances in smart grid communications, big data analytics and network security. The authors – noted experts in the field – review the technologies, applications and issues in smart grid communication infrastructure. This important resource: Offers a comprehensive review of all areas of smart grid communication infrastructures Includes an ICT framework for smart grid Contains a review of self-sustaining wireless neighborhood that are network designed Presents design and analysis of a wireless monitoring network for transmission lines in smart

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grid Written for graduate students, professors, researchers, scientists, practitioners and engineers, Smart Grid Communication Infrastructures is the comprehensive resource that explores all aspects of the topic.

Bluetooth LE Projects with Arduino, Raspberry Pi, and Smartphones

Getting Started with Bluetooth Low Energy

The Wireless Internet of Things

Architecting IoT solutions by implementing sensors, communication infrastructure, edge computing, analytics, and security

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## 5G-Enabled Internet of Things

### A Practical Perspective

Marketing Wireless Products provides a comprehensive insight into the world of wireless technology marketing by addressing the many issues faced in effectively presenting this new technology to the end user/consumer. The book is based upon the rationale that technology marketing, and in particular wireless technology marketing, has always proved somewhat paradoxical to those working within the industry. By drawing upon the knowledge of industry

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leaders within the wireless world, the reader significantly benefits from the personal experiences of those who are primarily responsible for communicating a product's message to the consumer. To those entering the world of technology marketing for the first time, Marketing Wireless Products provides a valuable tutorial, opening up the reader to the thoughts and experiences of industry figureheads, whilst encouraging the birth of fresh perspectives. To existing technology marketers, the book provides a valuable reference, allowing the reader to consider his/her particular approach to marketing

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alongside the successes and failures of peers. The book is accompanied by a regularly updated web site to keep up with advances in the field as this is such a fast-moving area and technology is continuing to change rapidly.

With Bluetooth Low Energy (BLE), smart devices are about to become even smarter. This practical guide demonstrates how this exciting wireless technology helps developers build mobile apps that share data with external hardware, and how hardware engineers can gain easy and reliable access to mobile operating systems. This book provides a solid, high-level overview of how



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devices use BLE to communicate with each other. You'll learn useful low-cost tools for developing and testing BLE-enabled mobile apps and embedded firmware and get examples using various development platforms—including iOS and Android for app developers and embedded platforms for product designers and hardware engineers. Understand how data is organized and transferred by BLE devices Explore BLE's concepts, key limitations, and network topology Dig into the protocol stack to grasp how and why BLE operates Learn how BLE devices discover each other and establish secure connections Set

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up the tools and infrastructure for BLE application development Get examples for connecting BLE to iPhones, iPads, Android devices, and sensors Develop code for a simple device that transmits heart rate data to a mobile device

Perception of human beings has evolved from natural biosensor to powerful sensors and sensor networks. In sensor networks, trillions of devices are interconnected and sense a broad spectrum of contexts for human beings, laying the foundation of Internet of Things (IoT). However, sensor technologies have several limitations relating to deployment cost and usability, which

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render them unacceptable for practical use. Consequently, the pursuit of convenience in human perception necessitates a wireless, sensorless and contactless sensing paradigm. Recent decades have witnessed rapid developments in wireless sensing technologies, in which sensors detect wireless signals (such as acoustic, light, and radio frequency) originally designed for data transmission or lighting. By analyzing the signal measurements on the receiver end, channel characteristics can be obtained to convey the sensing results. Currently, significant effort is being devoted to employing

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the ambient Wi-Fi, RFID, Bluetooth, ZigBee, and television signals for smart wireless sensing, eliminating the need for dedicated sensors and promoting the prospect of the Artificial Intelligence of Things (AIoT). This book provides a comprehensive and in-depth discussion of wireless sensing technologies. Specifically, with a particular focus on Wi-Fi-based sensing for understanding human behavior, it adopts a top-down approach to introduce three key topics: human detection, localization, and activity recognition. Presenting the latest advances in smart wireless sensing based on an extensive

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review of state-of-the-art research, it promotes the further development of this area and also contributes to interdisciplinary research.

How the enabling technologies in 5G as an integral or as a part can seamlessly fuel the IoT revolution is still very challenging. This book presents the state-of-the-art solutions to the theoretical and practical challenges stemming from the integration of 5G enabling technologies into IoTs in support of a smart 5G-enabled IoT paradigm, in terms of network design, operation, management, optimization, privacy and security, and applications. In particular, the technical focus

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covers a comprehensive understanding of 5G-enabled IoT architectures, converged access networks, privacy and security, and emerging applications of 5G-enabled IoT.

Tools and Techniques for Low-Power Networking

RoboCup 2021

Innovations in Electronics and Communication Engineering

Smart Wireless Sensing

Internet of Things for Architects

RF/Microwave Engineering and Applications in Energy Systems

The First Practical Guide to Advanced Wireless

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Development with ZigBee Technologies Supported by more than a hundred companies, the new ZigBee standard enables powerful new wireless applications for safety, security, and control, ranging from smart energy to home automation and medical care to advanced remote control. ZigBee Wireless Sensor and Control Network brings together all the knowledge professionals need to start building effective ZigBee solutions. The only simple, concise guide to ZigBee architecture, concepts, networking, and applications, this book thoroughly explains the entire ZigBee protocol stack and covers issues ranging from routing

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to security. It also presents detailed, practical coverage of ZigBee features for home automation, smart energy networking, and consumer electronics. Topics include

- Fundamental wireless concepts: OSI Model, error detection, the ISM Band, modulation, WLAN, FHSS, DSSS, Wireless MANs, Bluetooth, and more
- ZigBee essentials: applications, characteristics, device types, topologies, protocol architecture, and expanded ZigBee PRO features
- Physical layer: includes frequency bands, data rate, channels, data/management services, transmitter power, and receiver sensitivity
- MAC layer: data/management



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services, MAC layer information base, access methods, and frames • Network layer: data entities, NIB, device configuration, starting network, addressing, discovery, channel scanning, and more • Application support sublayer and application layer: includes profiles, cluster format, attributes, device discovery, and binding • ZigBee network security: includes encryption, trust center, security modes, and security management primitives • Address assignment and routing techniques • Alternative technologies: 6lowpan, WirelessHART, and Z-wave

Make: Bluetooth

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Guide to Wireless Communications