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Getting Started with Bluetooth Low Energy Intro to Bluetooth Low Energy Bluetooth Low Energy Inside Bluetooth Low Energy Building Bluetooth Low Energy Systems IoT Projects with Bluetooth Low Energy IoT Projects with Bluetooth Low Energy Inside Bluetooth Low Energy Bluetooth Tutorial Analytics for the Internet of Things (IoT) Getting Started with Bluetooth Low Energy Bluetooth Low Energy in Arduino 101 Bluetooth Low Energy in iOS Swift 13th EAI International Conference on Body Area Networks Unraveling Bluetooth LE Audio Make: Bluetooth Guide to Bluetooth Security Inside Bluetooth Low Energy, Second Edition Beacon Technologies Protocols and Applications for the Industrial Internet of Things ESSCIRC 2019 - IEEE 45th European Solid State Circuits Conference (ESSCIRC) IoT Development for ESP32 and ESP8266 with JavaScript Hybrid ADCs, Smart Sensors for the IoT, and Sub-1V & Advanced Node Analog Circuit Design Bluetooth Essentials for Programmers Bluetooth Low Energy in Android Java Computational Intelligence, Communications, and Business Analytics Essentials of Short-Range Wireless Ultra Low Power Transceiver for Wireless Body Area Networks Ultra-Low-Power Short-Range Radios Trends and Advances in Information Systems and Technologies Radio Link Quality Estimation in Low-Power Wireless Networks Building Applications with IBeacon Big Data, Cloud Computing, Data Science &

Engineering Precision Positioning with Commercial Smartphones in Urban Environments Advances in Cyber Security Advances in Electrical and Computer Technologies Ultra-Low Energy Wireless Sensor Networks in Practice ZigBee Wireless Networks and Transceivers Ultra-Low Power FM-UWB Transceivers for IoT Playstation 3

Bluetooth Low Energy Nov 03 2022 The First Complete Guide to Bluetooth Low Energy: How It Works, What It Can Do, and How to Apply It A radical departure from conventional Bluetooth technology, Bluetooth low energy (BLE) enables breakthrough wireless applications in industries ranging from healthcare to transportation. Running on a coin-sized battery, BLE can operate reliably for years, connecting and extending everything from personal area network devices to next-generation sensors. Now, one of the standard's leading developers has written the first comprehensive, accessible introduction to BLE for every system developer, designer, and engineer. Robin Heydon, a member of the Bluetooth SIG Hall of Fame, has brought together essential information previously scattered through multiple standards documents, sharing the context and expert insights needed to implement high-performance working systems. He first reviews BLE's design goals, explaining how they drove key architectural decisions, and introduces BLE's innovative usage models. Next, he thoroughly covers how the two main parts of BLE, the controller and host, work together, and then addresses key issues from security and profiles through testing and qualification. This knowledge has enabled the creation of

Bluetooth Smart and Bluetooth Smart Ready devices. This guide is an indispensable companion to the official BLE standards documents and is for every technical professional and decision-maker considering BLE, planning BLE products, or transforming plans into working systems. Topics Include BLE device types, design goals, terminology, and core concepts Architecture: controller, host, applications, and stack splits Usage models: presence detection, data broadcasting, connectionless models, and gateways Physical Layer: modulation, frequency band, radio channels, power, tolerance, and range Direct Test Mode: transceiver testing, hardware interfaces, and HCI Link Layer: state machine, packets, channels, broadcasting, encryption, and optimization HCI: physical/logical interfaces, controller setup, and connection management L2CAP: channels and packet structure, and LE signaling channels Attributes: grouping, services, characteristics, and protocols Security: pairing, bonding, and data signing Generic Access Profiles: roles, modes, procedures, security modes, data advertising, and services Applications, devices, services, profiles, and peripherals Testing/qualification: starting projects, selecting features, planning, testing, compliance, and more

Make: Bluetooth Sep 20 2021 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 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.

Inside Bluetooth Low Energy Oct 02 2022 Bluetooth Low Energy (LE) is one of the latest enhancement to Bluetooth technology and, as the name suggests, it is aimed at ultra low power devices, such as heart rate monitors, thermometers, and laboratory sensors. Due to very low power consumption, devices compliant with this standard can operate for months or even years on coin cell batteries without the need for recharging. This cutting-edge book helps you understand the whats, whys, and hows of Bluetooth LE. It includes a broad view of the technology, identifies the various building blocks and explains how they come together. The book explains the architecture of Bluetooth LE stack and the functionality provided by each of the layers. You find expert guidance in setting up your own system in a quick and efficient manner with inexpensive, easily available hardware and just a couple of PCs running Linux. Additionally, this practical volume features exercises and sample programs to help you get a first-hand feel for how the technology works.

Analytics for the Internet of Things (IoT) Mar 27 2022 Break through the hype and learn how to extract actionable intelligence from the flood of IoT data About This Book Make better business decisions and acquire greater control of your IoT infrastructure Learn techniques to solve unique problems associated with IoT and examine and analyze data from your IoT devices Uncover the business potential generated by data from IoT devices and bring down business costs Who This Book

Is For This book targets developers, IoT professionals, and those in the field of data science who are trying to solve business problems through IoT devices and would like to analyze IoT data. IoT enthusiasts, managers, and entrepreneurs who would like to make the most of IoT will find this equally useful. A prior knowledge of IoT would be helpful but is not necessary. Some prior programming experience would be useful What You Will Learn Overcome the challenges IoT data brings to analytics Understand the variety of transmission protocols for IoT along with their strengths and weaknesses Learn how data flows from the IoT device to the final data set Develop techniques to wring value from IoT data Apply geospatial analytics to IoT data Use machine learning as a predictive method on IoT data Implement best strategies to get the most from IoT analytics Master the economics of IoT analytics in order to optimize business value In Detail We start with the perplexing task of extracting value from huge amounts of barely intelligible data. The data takes a convoluted route just to be on the servers for analysis, but insights can emerge through visualization and statistical modeling techniques. You will learn to extract value from IoT big data using multiple analytic techniques. Next we review how IoT devices generate data and how the information travels over networks. You'll get to know strategies to collect and store the data to optimize the potential for analytics, and strategies to handle data quality concerns. Cloud resources are a great match for IoT analytics, so Amazon Web Services, Microsoft Azure, and PTC ThingWorx are reviewed in detail next. Geospatial analytics is then introduced as a way to leverage location

information. Combining IoT data with environmental data is also discussed as a way to enhance predictive capability. We'll also review the economics of IoT analytics and you'll discover ways to optimize business value. By the end of the book, you'll know how to handle scale for both data storage and analytics, how Apache Spark can be leveraged to handle scalability, and how R and Python can be used for analytic modeling. Style and approach This book follows a step-by-step, practical approach to combine the power of analytics and IoT and help you get results quickly

ESSCIRC 2019 - IEEE 45th European Solid State Circuits Conference (ESSCIRC) Apr 15 2021

Bluetooth Tutorial Apr 27 2022 'Bluetooth Tutorial: Design, Protocol and Specifications for BLE - Bluetooth Low Energy 4.0 and Bluetooth 5' starts from the ground up for a new user and does a gradual progression into the technical details around Bluetooth technology. The latest update adds information about Bluetooth 4.0 also known as Bluetooth Low Energy(BLE) and Bluetooth 5.0. Introduction Bluetooth is the name given to a new technology standard using short-range radio links, intended to replace the cables) connecting portable and/or fixed electronic devices. The standard defines a uniform structure for a wide range of devices to communicate with each other, with minimal user effort. Bluetooth key features are robustness, low complexity, low power and low cost. The technology also offers wireless access to LANs, PSTN, the mobile phone network and the Internet for a host of home appliances and portable handheld interfaces. The immediate need for Bluetooth came from the desire to connect peripherals

and devices without cables. The available technology-IrDA OBEX (Infrared Data Association Object Exchange Protocol) is based in infrared links that are limited to line of sight connections. Bluetooth is further fueled by the demand for mobile and wireless access to LANs, Internet over mobile and other existing networks, where the backbone is wired but the interface is free to move. This not only makes the network easier to use but also extends its reach. What is inside Overview on Wireless Technologies, Usage Scenarios and related Taxonomy Bluetooth Architecture: Protocol Stack, Baseband, Link Manager Protocol, Logical Link Control and Adaptation, Service Discovery, Cable Replacement, Telephony Bluetooth Adopted Protocols: PPP, TCP/UDP/IP, OBEX, Content Formats, WAP Bluetooth Usage Models: File Transfer, Synchronization, Three-in-One Phone, Ultimate Headset Bluetooth Specifications: Bluetooth 1.0 and 1.0B, Bluetooth 1.1, Bluetooth 1.2, Bluetooth 2.0 + EDR, Bluetooth 2.1 + EDR, Bluetooth 3.0 + HS, Bluetooth 4.0 + LE (Bluetooth Low Energy), Bluetooth 4.1, Bluetooth 4.2, Bluetooth 5 Bluetooth Connection Establishment, Bluetooth Security Zigbee: Architecture, Zigbee Device Types, Zigbee Network Model

Getting Started with Bluetooth Low Energy Feb 23 2022

Advances in Cyber Security Jan 31 2020 This book presents refereed proceedings of the First International Conference on Advances in Cyber Security, ACeS 2019, held in Penang, Malaysia, in July-August 2019. The 25 full papers and 1 short paper were carefully reviewed and selected from 87 submissions. The papers are organized in topical sections on internet of things, industry and blockchain, and cryptology; digital forensics and

surveillance, botnet and malware, and DDoS and intrusion detection/prevention; ambient cloud and edge computing, wireless and cellular communication.

Radio Link Quality Estimation in Low-Power Wireless Networks Jun 05 2020 This book provides a comprehensive survey on related work for radio link quality estimation, which covers the characteristics of low-power links, the fundamental concepts of link quality estimation in wireless sensor networks, a taxonomy of existing link quality estimators and their performance analysis. It then shows how link quality estimation can be used for designing protocols and mechanisms such as routing and hand-off. The final part is dedicated to radio interference estimation, generation and mitigation.

Bluetooth Low Energy in iOS Swift Dec 24 2021 This book is a practical guide to programming Bluetooth Low Energy in iPhones and iPads. In this book, you will learn the basics of how to program an iOS device to communicate with any Central or Peripheral device over Bluetooth Low Energy. Each chapter of the book builds on the previous one, culminating in three projects: - A Beacon and Scanner - A Echo Server and Client - A Remote Controlled Device Through the course of the book you will learn important concepts that relate to: - How Bluetooth Low Energy works - How data is sent and received - Common paradigms for handling data This book is excellent for anyone who has basic or advanced knowledge of iOS programming in SWIFT.

Playstation 3 Aug 27 2019

Ultra Low Power Transceiver for Wireless Body Area Networks Sep 08 2020 Wireless Body Area Networks (WBANs) are expected to promote new applications for

the ambulatory health monitoring of chronic patients and elderly population, aiming to improve their quality of life and independence. These networks are composed by wireless sensor nodes (WSNs) used for measuring physiological variables (e.g., glucose level in blood or body temperature) or controlling therapeutic devices (e.g., implanted insulin pumps). These nodes should exhibit a high degree of energy autonomy in order to extend their battery lifetime or even make the node supply to rely on harvesting techniques. Typically, the power budget of WSNs is dominated by the wireless link and, hence, many efforts have been directed during the last years toward the implementation of power efficient transceivers. Because of the short range (typically no more than a few meters) and low data rate (typically in between 10 kb/s and 1 Mb/s), simple communication protocols can be employed. One of these protocols, specifically tailored for WBAN applications, is the Bluetooth low energy (BLE) standard. This book describes the challenges and solutions for the design of ultra-low power transceivers for WBANs applications and presents the implementation details of a BLE transceiver prototype. Coverage includes not only the main concepts and architectures for achieving low power consumption, but also the details of the circuit design and its implementation in a standard CMOS technology.

Essentials of Short-Range Wireless Oct 10 2020 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 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.

Hybrid ADCs, Smart Sensors for the IoT, and Sub-1V & Advanced Node Analog Circuit Design Feb 11 2021 This book is based on the 18 tutorials presented during the 26th workshop on Advances in Analog Circuit Design. Expert designers present readers with information about a variety of topics at the frontier of analog circuit design, with specific contributions focusing on hybrid ADCs, smart sensors for the IoT, sub-1V and advanced-node analog circuit design. This book serves as a valuable reference to the state-of-the-art, for anyone involved in analog circuit research and development.

Big Data, Cloud Computing, Data Science & Engineering Apr 03 2020 This book presents the outcomes of the 3rd IEEE/ACIS International Conference on Big Data, Cloud Computing, Data Science & Engineering (BCD 2018), which was held on July 10–12, 2018 in Kanazawa. The aim of the conference was to bring together researchers and scientists, businesspeople and entrepreneurs, teachers, engineers, computer users, and students to discuss the various fields of computer science, to share their

experiences, and to exchange new ideas and information in a meaningful way. All aspects (theory, applications and tools) of computer and information science, the practical challenges encountered along the way, and the solutions adopted to solve them are all explored here. The conference organizers selected the best papers from among those accepted for presentation. The papers were chosen on the basis of review scores submitted by members of the program committee and subsequently underwent further rigorous review. Following this second round of review, 13 of the conference's most promising papers were selected for this Springer (SCI) book. We eagerly await the important contributions that we know these authors will make to the field of computer and information science.

Bluetooth Low Energy in Android Java Dec 12 2020 This book is a practical guide to programming Bluetooth Low Energy for Android phones and Tablets In this book, you will learn the basics of how to program an Android device to communicate with any Central or Peripheral device over Bluetooth Low Energy. Each chapter of the book builds on the previous one, culminating in three projects: - A Beacon and Scanner - An Echo Server and Client - A Remote Controlled Device Through the course of the book you will learn important concepts that relate to: - How Bluetooth Low Energy works - How data is sent and received - Common paradigms for handling data Skill Level This book is excellent for anyone who has basic or advanced knowledge of Java programming on Android.

13th EAI International Conference on Body Area Networks Nov 22 2021 The papers in this proceeding discuss current and future trends in wearable

communications and personal health management through the use of wireless body area networks (WBAN). The authors posit new technologies that can provide trustworthy communications mechanisms from the user to medical health databases. The authors discuss not only on-body devices, but also technologies providing information in-body. Also discussed are dependable communications combined with accurate localization and behavior analysis, which will benefit WBAN technology and make the healthcare processes more effective. The papers were presented at the 13th EAI International Conference on Body Area Networks (BODYNETS 2018), Oulu, Finland, 02-03 October 2018.

Building Applications with IBeacon May 05 2020 High-precision location information is increasingly useful for mobile application developers, since it allows devices to interact with the world around them. This practical book shows you how to achieve arm's reach accuracy with iBeacons, simple transmitters that enable your applications to react to nearby surroundings and then deliver timely, relevant information—especially indoors, where GPS and cell service are inaccurate. Whether you're enabling a map, giving users directions, creating a game, recommending purchases, letting users check in, or creating an immersive experience, you'll learn how iBeacons provide precise location information, empowering your applications to engage and interact with users nearby. Get examples of several application types you can build with iBeacons Learn how iBeacons provide applications with proximity information Set up, activate, and test iBeacons on both specialized and general-purpose hardware Explore the APIs and tools you

need to develop location-aware mobile applications Use built-in iOS features to interact with iBeacons, including Passbook Build networks to help shoppers, travelers, conference attendees, and others find what they're looking for

Guide to Bluetooth Security Aug 20 2021 This document provides info. to organizations on the security capabilities of Bluetooth and provide recommendations to organizations employing Bluetooth technologies on securing them effectively. It discusses Bluetooth technologies and security capabilities in technical detail. This document assumes that the readers have at least some operating system, wireless networking, and security knowledge. Because of the constantly changing nature of the wireless security industry and the threats and vulnerabilities to the technologies, readers are strongly encouraged to take advantage of other resources (including those listed in this document) for more current and detailed information. Illustrations.

Ultra-Low-Power Short-Range Radios Aug 08 2020 This book explores the design of ultra-low-power radio-frequency integrated circuits (RFICs), with communication distances ranging from a few centimeters to a few meters. The authors describe leading-edge techniques to achieve ultra-low-power communication over short-range links. Many different applications are covered, ranging from body-area networks to transcutaneous implant communications and smart-appliance sensor networks. Various design techniques are explained to facilitate each of these applications.

ZigBee Wireless Networks and Transceivers Oct 29 2019 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 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 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

IoT Development for ESP32 and ESP8266 with JavaScript Mar 15 2021 This book introduces a new approach to embedded development, grounded in modern, industry-standard JavaScript. Using the same language that powers web browsers and Node.js, the Moddable SDK empowers IoT developers to apply many of the same tools and techniques used to build sophisticated websites and mobile apps. The Moddable SDK enables you to unlock the full potential of inexpensive microcontrollers

like the ESP32 and ESP8266. Coding for these microcontrollers in C or C++ with the ESP-IDF and Arduino SDKs works for building basic products but doesn't scale to handle the increasingly complex IoT products that customers expect. The Moddable SDK adds the lightweight XS JavaScript engine to those traditional environments, accelerating development with JavaScript while keeping the performance benefits of a native SDK. Building user interfaces and communicating over the network are two areas where JavaScript really shines. IoT Development for ESP32 and ESP8266 with JavaScript shows you how to build responsive touch screen user interfaces using the Piu framework. You'll learn how easy it is to securely send and receive JSON data over Wi-Fi with elegant JavaScript APIs for common IoT protocols, including HTTP/HTTPS, WebSocket, MQTT, and mDNS. You'll also learn how to integrate common sensors and actuators, Bluetooth Low Energy (BLE), file systems, and more into your projects, and you'll see firsthand how JavaScript makes it easier to combine these diverse technologies. If you're an embedded C or C++ developer who has never worked in JavaScript, don't worry. This book includes an introduction to the JavaScript language just for embedded developers experienced with C or C++. What You'll Learn Building, installing, and debugging JavaScript projects on the ESP32 and ESP8266 Using modern JavaScript for all aspects of embedded development with the Moddable SDK Developing IoT products with animated user interfaces, touch input, networking, BLE, sensors, actuators, and more Who This Book Is For Professional embedded developers who want the speed, flexibility, and power of web development in

their embedded software work Makers who want a faster, easier way to build their hobby projects Web developers working in JavaScript who want to extend their skills to hardware products

Ultra-Low Energy Wireless Sensor Networks in Practice Nov 30 2019 Finally a book on Wireless Sensor Networks that covers real world applications and contains practical advice! Kuorilehto et al. have written the first practical guide to wireless sensor networks. The authors draw on their experience in the development and field-testing of autonomous wireless sensor networks (WSNs) to offer a comprehensive reference on fundamentals, practical matters, limitations and solutions of this fast moving research area. Ultra Low Energy Wireless Sensor Networks in Practice: Explains the essential problems and issues in real wireless sensor networks, and analyzes the most promising solutions. Provides a comprehensive guide to applications, functionality, protocols, and algorithms for WSNs. Offers practical experiences from new applications and their field-testing, including several deployed networks. Includes simulations and physical measurements for energy consumption, bit rate, latency, memory, and lifetime. Covers embedded resource-limited operating systems, middleware and application software. Ultra Low Energy Wireless Sensor Networks in Practice will prove essential reading for Research Scientists, advanced students in Networking, Electrical Engineering and Computer Science as well as Product Managers and Design Engineers.

IoT Projects with Bluetooth Low Energy Jun 29 2022 Use the power of BLE to create exciting IoT applicationsAbout This Book* Build hands-on IoT projects using Bluetooth

Low Energy and learn about Bluetooth 5 and its features.* Build a health tracking system, and indoor navigation and warehouse weather monitoring projects using smart devices.* Build on a theoretical foundation and create a practice-based understanding of Bluetooth Low Energy.Who This Book Is ForIf you're an application developer, a hardware enthusiast, or just curious about the Internet of Things and how to convert it into hands-on projects, then this book is for you. Having some knowledge of writing mobile applications will be advantageous.What You Will Learn* Learn about the architecture and IoT uses of BLE, and in which domains it is being used the most* Set up and learn about various development platforms (Android, iOS, Firebase, Raspberry Pi, Beacons, and GitHub)* Create an Explorer App (Android/iOS) to diagnose a Fitness Tracker* Design a Beacon with the Raspberry Pi and write an app to detect the Beacon* Write a mobile app to periodically poll the BLE tracking sensor* Compose an app to read data periodically from temperature and humidity sensors* Explore more applications of BLE with IoT* Design projects for both Android and iOS mobile platformsIn DetailBluetooth Low Energy, or Bluetooth Smart, is Wireless Personal Area networking aimed at smart devices and IoT applications. BLE has been increasingly adopted by application developers and IoT enthusiasts to establish connections between smart devices.This book initially covers all the required aspects of BLE, before you start working on IoT projects. In the initial stages of the book, you will learn about the basic aspects of Bluetooth Low Energy--such as discovering devices, services, and characteristics--that will be helpful for advanced-level

projects. This book will guide you through building hands-on projects using BLE and IoT. These projects include tracking health data, using a mobile App, and making this data available for health practitioners; Indoor navigation; creating beacons using the Raspberry Pi; and warehouse weather Monitoring. This book also covers aspects of Bluetooth 5 (the latest release) and its effect on each of these projects.By the end of this book, you will have hands-on experience of using Bluetooth Low Energy to integrate with smart devices and IoT projects.Style and approachA practical guide that will help you promote yourself into an expert by building and exploring practical applications of Bluetooth Low Energy.

Protocols and Applications for the Industrial Internet of Things May 17 2021 The Internet of Things (IoT) has become a major influence on the development of new technologies and innovations. When utilized properly, these applications can enhance business functions and make them easier to perform. Protocols and Applications for the Industrial Internet of Things discusses and addresses the difficulties, challenges, and applications of IoT in industrial processes and production and work life. Featuring coverage on a broad range of topics such as industrial process control, machine learning, and data mining, this book is geared toward academicians, computer engineers, students, researchers, and professionals seeking current and relevant research on applications of the IoT.

Beacon Technologies Jun 17 2021 Learn the key standards—iBeacon, Eddystone, Bluetooth 4.0, and AltBeacon—and how they work with other proximity technologies. Then build your understanding of the

proximity framework and how to identify and deploy the best solutions for your own business, institutional, or consulting needs. Proximity technology—in particular, Bluetooth beacons—is a major source of business opportunity, and this book provides everything you need to know to architect a solution to capitalize on that opportunity. What You'll Learn Understand the disruptive implications of digital–physical convergence and the new applications it makes possible Review the key standards that solutions developers need to understand to capitalize on the business opportunity of proximity technology Discover the new phenomenon of beacon networks, which will be hugely significant in driving strategic decisions and creating wealth See other technologies in the proximity ecosystem catalyzed by and complementary to Bluetooth beacons, including visual light communication, magnetic resonance, and RFID Examine the Beacosystem framework for analyzing the proximity ecosystem Who This Book Is For Solutions architects of all types—venture capitalists, founders, CEOs, strategists, product managers, CTOs, business developers, and programmers Stephen Statler is a writer, public speaker, and consultant working in the beacon ecosystem. He trains and advises retailers, venue owners, VCs, as well as makers of beacon software and hardware, and is a thought leader in the beacosystem community. Previously he was the Senior Director for Strategy and Solutions Management at Qualcomm's Retail Solutions Division, helping to incubate Gimbal, one of the leading Bluetooth beacons in the market. He is also the CEO of Cause Based Solutions, creators of Give the Change, democratizing philanthropy, enabling non-profit

supporters to donate the change from charity branded debit cards, and developer of The Good Traveler program. Contributors: Anke Audenaert, CEO, Favrit John Coombs, CEO, Rover Labs Theresa Mary Gordon, Co-Founder, tapGOconnect Phil Hendrix, Director, immr Kris Kolodziej, President, IndoorLBS Patrick Leddy, CEO, Pulsate Ben Parker, VP Business Development, AccelerateIT Mario Proietti, CEO, Location Smart Ray Rotolo, SVP OOH, Gimbal Kjartan Slette, COO, Unacast Jarno Vanto, Partner, Borenius Attorneys LLP David Young, Chief Engineer, Radius Networks Foreword by Asif Khan, President LBMA

Intro to Bluetooth Low Energy Dec 04 2022 Bluetooth Low Energy (BLE) is an exciting new technology that was introduced in 2010. It targets applications in the Internet of Things (IoT) space. With the recent release of Bluetooth 5 in late 2016 and Bluetooth mesh in mid-2017 (which builds on top of BLE), Bluetooth is now more capable than ever of becoming the standard wireless protocol used in many IoT applications including: smart homes, smart cities, medical devices, wearables, and sensor connectivity. Learning a new technology is always challenging and usually comes with a learning curve. Some technologies are easier to learn than others. Unfortunately, Bluetooth Low Energy (BLE) can be one of those hard ones. The lack of good resources including blogs, tutorials, and up-to-date books that help a beginner to learn BLE, makes the task even more difficult. That is, in fact, the primary goal of this book: to provide you with a complete understanding of the basics and core concepts of BLE that you can learn in a single weekend. Here's a tiny list of the benefits this book will help you achieve: Understand what Bluetooth Low Energy

is and how it compares to Bluetooth Classic. Become better informed about the use cases where BLE makes the most sense. Learn all about Bluetooth 5 and the new features it brought us. Understand how two BLE devices discover and connect with each other. Understand how BLE devices exchange and transfer data between each other. Fully grasp concepts such as Peripherals, Centrals, Advertising, Connections, GATT, GAP, and many others. Learn about the newly released Bluetooth mesh standard. What readers are saying "I bought your BLE book and I love it. I am an iOS developer and your material helped me understand some of the finer points of BLE" -Alex Carrizo, Senior iOS Developer, iOS SME at Mobile Apps Company Topics include: The basics of Bluetooth Low Energy & Bluetooth 5.0. The difference between BLE and Bluetooth Classic (the one used for streaming audio and connecting headsets). The benefits and limitations of using BLE and which use cases make the most sense for BLE. The difference between a BLE Central and a BLE Peripheral. All about GATT (Generic Attribute Profile) and GAP (Generic Access Profile). How Bluetooth 5 achieves double the speed, four times the range, and eight times the advertising capacity.- How BLE devices advertise and discover each other. How two BLE devices connect to each other. How BLE devices exchange and transfer data between each other. Profiles, Services, and Characteristics. How secure BLE is, and how BLE devices secure the communication channel between them. The different connection and advertising parameters and what each of them means. An introduction to Bluetooth mesh. About the Author Mohammad Afaneh has been an embedded engineer for over 10 years. Since 2014, he has

focused solely on learning and developing Bluetooth Low Energy applications. He even spent days and weeks reading through the 2,800+ page Bluetooth specification document looking for answers to questions he couldn't find answers to in other books and resources. He shares everything he knows about development for BLE technology at his website www.novelbits.io, and via training classes around the world.

Trends and Advances in Information Systems and Technologies Jul 07 2020 This book includes a selection of papers from the 2018 World Conference on Information Systems and Technologies (WorldCIST'18), held in Naples, Italy on March27-29, 2018. WorldCIST is a global forum for researchers and practitioners to present and discuss recent results and innovations, current trends, professional experiences and the challenges of modern information systems and technologies research together with their technological development and applications. The main topics covered are: A) Information and Knowledge Management; B) Organizational Models and Information Systems; C) Software and Systems Modeling; D) Software Systems, Architectures, Applications and Tools; E) Multimedia Systems and Applications; F) Computer Networks, Mobility and Pervasive Systems; G) Intelligent and Decision Support Systems; H) Big Data Analytics and Applications; I) Human–Computer Interaction; J) Ethics, Computers & Security; K) Health Informatics; L) Information Technologies in Education; M) Information Technologies in Radiocommunications; N) Technologies for Biomedical Applications.

Advances in Electrical and Computer Technologies Jan 01 2020 This book comprises select proceedings of the

International Conference on Advances in Electrical and Computer Technologies 2020 (ICAECT 2020). The papers presented in this book are peer-reviewed and cover latest research in electrical, electronics, communication and computer engineering. Topics covered include smart grids, soft computing techniques in power systems, smart energy management systems, power electronics, feedback control systems, biomedical engineering, geo informative systems, grid computing, data mining, image and signal processing, video processing, computer vision, pattern recognition, cloud computing, pervasive computing, intelligent systems, artificial intelligence, neural network and fuzzy logic, broad band communication, mobile and optical communication, network security, VLSI, embedded systems, optical networks and wireless communication. The volume can be useful for students and researchers working in the different overlapping areas of electrical, electronics and communication engineering.

Precision Positioning with Commercial Smartphones in Urban Environments Mar 03 2020 This book discusses recent technologies and case studies that aim to enhance positioning obtained with commercial smartphones in urban environments, overcoming difficulties with GPS. The authors provide insight into recent trends and innovation on technologies, solutions and approaches to overcome GPS issues in urban environments, due to the existence of a big number of buildings. Topics include security and legal aspects related to positioning systems, the usage of crowdsourcing approaches to enhance positioning, location-based services, proximity based-social networking, satellite navigation and Bluetooth low-

energy based systems. The book provides important information for developers that intend to make use of precise positioning for the purpose of commercial applications as well as for research and innovation. Discusses technologies that enhance positioning obtained with commercial smartphones in urban environments; Presents innovations to overcome GPS issues in urban environments caused by dense cities; Includes applications of precise positioning, including their security issues and challenges.

Bluetooth Low Energy in Arduino 101 Jan 25 2022 This book is a practical guide to programming Bluetooth Low Energy for Arduino 101. In this book, you will learn the basics of how to program an Arduino 101 to communicate with any Central or Peripheral device over Bluetooth Low Energy. Each chapter of the book builds on the previous one, culminating in three projects: - A Beacon and Scanner - An Echo Server and Client - A Remote Controlled Device Through the course of the book you will learn important concepts that relate to: - How Bluetooth Low Energy works - How data is sent and received - Common paradigms for handling data This book is excellent for anyone who has basic or advanced knowledge of Arduino programming or C++.

Inside Bluetooth Low Energy May 29 2022

Inside Bluetooth Low Energy, Second Edition Jul 19 2021 This updated and expanded second edition of the Artech House bestseller, Inside Bluetooth Low Energy, presents the recent developments within the Bluetooth Core Specifications 4.1 and 4.2. This new edition explores both Internet of Things (IoT) and Bluetooth Low Energy (LE) in one single flow and demonstrates how this technology is

very well suited for IoT implementations. The book covers all the advances within the new specifications including Bluetooth LE enhanced power efficiency, faster connections, and enhanced privacy and security. Developed for ultra-low power devices, such as heart rate monitors, thermometers, and sensors, Bluetooth LE is one of the latest, most exciting enhancements to Bluetooth technology. This cutting-edge book presents an easy-to-understand, broad-based explanation of Bluetooth LE, its building blocks and how they all come together. Packed with examples and practical scenarios, the book helps readers rapidly gain a clear, solid understanding of Bluetooth LE in order to work more effectively with its specification. This book explores the architecture of the Bluetooth LE stack and functionality of its layers and includes a broad view of the technology, identifies the various building blocks, and explains how they come together. Readers will also find discussions on Bluetooth basics, providing the background information needed to master Bluetooth LE.

Ultra-Low Power FM-UWB Transceivers for IoT Sep 28 2019 Over the past two decades we have witnessed the increasing popularity of the internet of things. The vision of billions of connected objects, able to interact with their environment, is the key driver directing the development of future communication devices. Today, power consumption as well as the cost and size of radios remain some of the key obstacles towards fulfilling this vision. Ultra-Low Power FM-UWB Transceivers for IoT presents the latest developments in the field of low power wireless communication. It promotes the FM-UWB modulation scheme as a candidate for short range communication in

different IoT scenarios. The FM-UWB has the potential to provide exactly what is missing today. This spread spectrum technique enables significant reduction in transceiver complexity, making it smaller, cheaper and more energy efficient than most alternative options. The book provides an overview of both circuit-level and architectural techniques used in low power radio design, with a comprehensive study of state-of-the-art examples. It summarizes key theoretical aspects of FM-UWB with a glimpse at potential future research directions. Finally, it gives an insight into a full FM-UWB transceiver design, from system level specifications down to transistor level design, demonstrating the modern power reduction circuit techniques. Ultra-Low Power FM-UWB Transceivers for IoT is a perfect text and reference for engineers working in RF IC design and wireless communication, as well as academic staff and graduate students engaged in low power communication systems research.

Unraveling Bluetooth LE Audio Oct 22 2021 Explore how Bluetooth Low Energy (LE) has transformed the audio landscape, from music streaming to voice recognition applications. This book describes the rationale behind moving to LE audio, the potential power savings, and how various specifications need to be linked together to develop a final end product. LE Audio is a natural development of the Bluetooth audio standard. The standard is spread across more than a dozen different specifications, from application profiles, down to the core transports in both Host part and Controller part. You'll see how this new architecture of the Bluetooth audio stack defines a LE Audio stack from the Core Controller to the Host Protocols, and Profiles. You'll also learn how to

free yourself from wires and charging. LE Audio introduces a new audio compression codec called LC3 (Low Complexity Communication Codec), which covers sampling rates for the full range of voice and media application at high fidelity, low complexity and low bit-rate and is ideal for new applications – such as voice assistance and gaming. Unraveling Bluetooth Low Energy Audio provides full context to anyone who is curious to learn about the new LE Audio technology. What You'll Learn Understand the advantages of LE audio over current standards Describe the overall Bluetooth LE audio stack and its various blocks Enable LE audio with the Core Controller specification See how an end-to-end application works its through the LE audio ecosystem Examine how LE Audio addresses current and future trends in interoperable wireless audio Who This Book Is For The target audience for this book are developers, manufacturers, students, lecturers, teachers, technology geeks, platform integrators, and entrepreneurs.

Bluetooth Essentials for Programmers Jan 13 2021 This book provides an introduction to Bluetooth programming, with a specific focus on developing real code. The authors discuss the major concepts and techniques involved in Bluetooth programming, with special emphasis on how they relate to other networking technologies. They provide specific descriptions and examples for creating applications in a number of programming languages and environments including Python, C, Java, GNU/Linux, Windows XP, Symbian Series 60, and Mac OS X. No previous experience with Bluetooth is assumed, and the material is suitable for anyone with some programming background. The authors place special emphasis on the

essential concepts and techniques of Bluetooth programming, starting simply and allowing the reader to quickly master the basic concepts before addressing advanced features.

Building Bluetooth Low Energy Systems Sep 01 2022 Discover and implement a system of your choice using Bluetooth Low Energy. About This Book Learn the basics of Bluetooth Low Energy with its exciting new protocol stack and security. Build customized Bluetooth Low Energy projects that make your web or mobile apps smarter in terms of networking and communications. Using Android, iOS, and the Web, acquire key skills to harness the power of Bluetooth Low Energy in your IoT applications. Who This Book Is For The book is for developers and enthusiasts who are passionate about learning Bluetooth Low Energy technologies and want to add new features and services to their new or existing products. They should be familiar with programming languages such as Swift, Java, and JavaScript. Knowledge of debugging skills would be an advantage. What You Will Learn Bluetooth Low Energy in theory. Bluetooth Low Energy Hardware and Software Development Kits. Implement Bluetooth low energy communication (central and peripheral) using Android. Master BLE Beacons with examples implemented over Eddystone and iBeacons. Implement indoor navigation using Estimote Beacons on iOS. Implement Internet gateways to control BLE devices on a Wi-Fi network. Understand BLE security mechanisms with a special focus on Bluetooth pairing, bonding, and key exchange to cover encryption, privacy, and user data integrity. Implement Bluetooth Mesh using CSRMesh Technology. In Detail Bluetooth Low Energy (BLE) is a

Wireless Personal Area network technology aimed at novel applications for smart devices. High-tech BLE profiles and services are being increasingly used by application developers and hardware enthusiasts to allow devices to interact with the surrounding world. This book will focus on a technical introduction to BLE and how it is reshaping small-distance communication. We will start with IoT, where many technologies such as BLE, Zigbee, and IEEE 802.15.4 Mesh will be introduced. The book will present BLE from an engineering perspective, from which the protocol stack, architecture, and layers are discussed. You will learn to implement customized projects for Peripheral/Central communication, BLE Beacons, indoor navigation using triangulation, and the Internet gateway for Bluetooth Low Energy Personal Network, all using various code samples and APIs on Android, iOS, and the Web. Finally, the book will conclude with a glimpse into future technologies destined to be prominent in years to come. Style and approach The book is a practical tutorial that will help you understand the background and technicalities of BLE and offers a friendly environment to build and create robust BLE projects. This hands-on approach will give you a clear vision of Bluetooth Low Energy and how it can be used in IoT.

IoT Projects with Bluetooth Low Energy Jul 31 2022 Use the power of BLE to create exciting IoT applications About This Book Build hands-on IoT projects using Bluetooth Low Energy and learn about Bluetooth 5 and its features. Build a health tracking system, and indoor navigation and warehouse weather monitoring projects using smart devices. Build on a theoretical foundation and create a practice-based understanding of Bluetooth Low Energy.

Who This Book Is For If you're an application developer, a hardware enthusiast, or just curious about the Internet of Things and how to convert it into hands-on projects, then this book is for you. Having some knowledge of writing mobile applications will be advantageous. What You Will Learn Learn about the architecture and IoT uses of BLE, and in which domains it is being used the most Set up and learn about various development platforms (Android, iOS, Firebase, Raspberry Pi, Beacons, and GitHub) Create an Explorer App (Android/iOS) to diagnose a Fitness Tracker Design a Beacon with the Raspberry Pi and write an app to detect the Beacon Write a mobile app to periodically poll the BLE tracking sensor Compose an app to read data periodically from temperature and humidity sensors Explore more applications of BLE with IoT Design projects for both Android and iOS mobile platforms In Detail Bluetooth Low Energy, or Bluetooth Smart, is Wireless Personal Area networking aimed at smart devices and IoT applications. BLE has been increasingly adopted by application developers and IoT enthusiasts to establish connections between smart devices. This book initially covers all the required aspects of BLE, before you start working on IoT projects. In the initial stages of the book, you will learn about the basic aspects of Bluetooth Low Energy—such as discovering devices, services, and characteristics—that will be helpful for advanced-level projects. This book will guide you through building hands-on projects using BLE and IoT. These projects include tracking health data, using a mobile App, and making this data available for health practitioners; Indoor navigation; creating beacons using the Raspberry Pi; and warehouse weather Monitoring. This book also covers aspects of

Bluetooth 5 (the latest release) and its effect on each of these projects. By the end of this book, you will have hands-on experience of using Bluetooth Low Energy to integrate with smart devices and IoT projects. Style and Approach A practical guide that will help you promote yourself into an expert by building and exploring practical applications of Bluetooth Low Energy.

Getting Started with Bluetooth Low Energy Jan 05 2023 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 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 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

Computational Intelligence, Communications, and

Business Analytics Nov 10 2020 The two volume set CCIS 1030 and 1031 constitutes the refereed proceedings of the Second International Conference on Computational Intelligence, Communications, and Business Analytics, CICBA 2018, held in Kalyani, India, in July 2018. The 76 revised full papers presented in the two volumes were carefully reviewed and selected from 240 submissions. The papers are organized in topical sections on computational intelligence; signal processing and communications; microelectronics, sensors, and intelligent networks; data science & advanced data analytics; intelligent data mining & data warehousing; and computational forensics (privacy and security).