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Making Things Talk Beginning Sensor Networks with XBee, Raspberry Pi, and Arduino **Data Mining Techniques in Sensor Networks** **Industrial Sensors and Controls in Communication Networks** **Advances in Wireless Sensors and Sensor Networks** **Network Security Through Data Analysis** **Security and Privacy Issues in IoT Devices and Sensor Networks** *Beginning Sensor Networks with Arduino and Raspberry Pi* *Fundamentals of Sensor Network Programming* *Smart Sensors Networks* *Internet of Things and Sensors Networks in 5G Wireless Communications* **Handbook of Networked and Embedded Control Systems** **Learning from Data Streams** **Energy Harvesting in Wireless Sensor Networks and Internet of Things** **Body Sensor Networks** **Intelligent Sensor Networks** *Security and Privacy in Smart Sensor Networks* **Smart Sensor Networks Using AI for Industry 4.0** **Advances in Sensors: Reviews, Vol. 3** **Optimal Coverage in Wireless Sensor Networks** Multi-hop Routing in Wireless Sensor Networks **Artificial Intelligence Techniques in IoT Sensor Networks** **Modern Sensors, Transducers and Sensor Networks** *Sensor networks in theory and practice* *Wireless Sensor Networks* **Practical Contiki-NG** *Getting Started with Bluetooth Low Energy* **Advances in Sensors: Reviews, Vol. 7: Physical and Chemical Sensors: Design, Applications & Networks.** Application and Multidisciplinary Aspects of Wireless Sensor Networks Introduction to Sensors in IoT and Cloud Computing Applications Ad Hoc and Sensor Networks **Advances in Sensors: Reviews, Vol. 5** **Advances in Sensors: Reviews, Vol.4** *'Sensors and Applications in Measuring and Automation Control Systems'* A Complete Guide to Wireless Sensor Networks Proceedings of International Symposium on Sensor Networks, Systems and Security **Wireless Sensors in Heterogeneous Networked Systems** **Internet of Things and Sensor Network for COVID-19** **Smart Sensor Networks** Embedded Sensor Systems **Multimedia-enabled Sensors in IoT**

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Embedded Sensor Systems Jul 21 2019 This inspiring textbook provides an essential introduction to wireless technologies for sensors, explores the potential use of sensors for numerous applications, and utilizes probability theory and mathematical methods as a means of embedding sensors in system design. The book discusses the need for synchronization and underlying limitations, the interrelation between given coverage and connectivity to the number of sensors needed, and the use of geometrical distance to determine the location of the base station for data collection, while also exploring the use of anchor nodes to determine the

relative positions of sensors. The book addresses energy conservation, communication using TCP, the need for clustering and data aggregation, and residual energy determination and energy harvesting, together with key topics in sensor communication like mobile base stations and relay nodes, delay-tolerant sensor networks, and remote sensing and potential applications. The book defines routing methods and performance evaluation for random and regular sensor topology and covers sensor-based intrusion detection. The book focuses on applications such as interaction with actuators, final design with respect to a given application, personal and body-area networks for health-care applications and sensor networks as an integral component of the IoT. The importance of both coverage and connectivity is examined thoroughly in both randomly deployed sensor networks for defense applications and regularly placed sensors for an industrial setup. The content includes exercises as well as design-based project concepts. The book's comprehensive coverage makes it well suited for use as a textbook for graduate and upper undergraduate courses, or as course material for professional courses.

Smart Sensors Networks Jan 19 2022 **Smart Sensors Networks: Communication Technologies and Intelligent Applications** explores the latest sensor and sensor networks techniques and applications, showing how networked wireless sensors are used to monitor and gather intelligence from our surrounding environment. It provides a systematic look at the unique characteristics of wireless sensor networks through their usage in a broad range of areas, including healthcare for the elderly, energy consumption, industrial automation, intelligent transportation systems, smart homes and cities, and more. The book shows how sensor-networks work and how they are applied to monitor our surrounding environment. It explores the most important aspects of modern sensors technologies, providing insights on the newest technologies and the systems needed to operate them. Readers will find the book to be an entry point for understanding the fundamental differences between the various sensor technologies and their use in for different scenarios. Indexing: The books of this series are submitted to EI-Compendex and SCOPUS Presents numerous specific use-cases throughout, showing practical applications of concepts Contains contributions from leading experts around the globe Collects, in one place, the latest thinking on an emerging topic Addresses the security and privacy issues inherent in sensor deployment

Handbook of Networked and Embedded Control Systems Nov 17 2021 The vast majority of control systems built today are embedded; that is, they rely on built-in, special-purpose digital computers to close their feedback loops. Embedded systems are common in aircraft, factories, chemical processing plants, and even in cars—a single high-end automobile may contain over eighty different computers. The design of embedded controllers and of the intricate, automated communication networks that support them raises many new questions—practical, as well as theoretical—about network protocols, compatibility of operating systems, and ways to maximize the effectiveness of the embedded hardware. This handbook, the first of its kind, provides engineers, computer scientists, mathematicians, and students a broad, comprehensive source of information and technology to address many questions and aspects of embedded and networked control. Separated into six main sections—Fundamentals, Hardware, Software, Theory, Networking, and Applications—this work unifies into a single reference many scattered articles, websites, and specification sheets. Also included are case studies, experiments, and examples that give a multifaceted view of the subject, encompassing computation and communication considerations.

Ad Hoc and Sensor Networks Mar 29 2020 This book provides a comprehensive yet easy coverage of ad hoc and sensor networks and fills the gap of existing literature in this growing field. It emphasizes that there is a major interdependence among various layers of the network protocol stack. Contrary to wired or even one-hop cellular networks, the lack of a fixed infrastructure, the inherent mobility, the wireless channel, and the underlying routing mechanism by ad hoc and sensor networks introduce a number of technological challenges that are difficult to address within the boundaries of a single protocol layer. All existing textbooks on the subject often focus on a specific aspect of the technology, and fail to provide critical insights on cross-layer interdependencies. To fully understand these intriguing networks, one need to grasp specific solutions individually, and also the many interdependencies and cross-layer interactions.

Application and Multidisciplinary Aspects of Wireless Sensor Networks May 31 2020 It is a general trend in computing that computers are becoming ever smaller and ever more interconnected. Sensor networks – large networks of small, simple devices – are a logical extreme of this trend. Wireless sensor networks (WSNs) are attracting an increasing degree of research interest, with a growing number of industrial applications starting to emerge. Two of these applications, personal health monitoring and emergency/disaster recovery, are the

focus of the European Commission project ProSense: Promote, Mobilize, Reinforce and Integrate Wireless Sensor Networking Research and Researchers. This hands-on introduction to WSN systems development presents a broad coverage of topics in the field, contributed by researchers involved in the ProSense project. An emphasis is placed on the practical knowledge required for the successful implementation of WSNs. Divided into four parts, the first part covers basic issues of sensors, software, and position-based routing protocols. Part two focuses on multidisciplinary issues, including sensor network integration, mobility aspects, georouting, medical applications, and vehicular sensor networks. The remaining two parts present case studies and further applications. Topics and features: presents a broad overview of WSN technology, including an introduction to sensor and sensing technologies; contains an extensive section on case studies, providing details of the development of a number of WSN applications; discusses frameworks for WSN systems integration, through which WSN technology will become fundamental to the Future Internet concept; investigates real-world applications of WSN systems in medical and vehicular sensor networks; with a Foreword by the Nobel Laureate Professor Martin Perl of Stanford University. Providing holistic coverage of WSN technology, this text/reference will enable graduate students of computer science, electrical engineering and telecommunications to master the specific domains of this emerging area. The book will also be a valuable resource for researchers and practitioners interested in entering the field.

Multimedia-enabled Sensors in IoT Jun 19 2019 This book gives an overview of best effort data and real-time multipath routing protocols in WMSN. It provides results of recent research in design issues affecting the development of strategic multipath routing protocols that support multimedia data traffic in WMSN from an IoT perspective, plus detailed analysis on the appropriate traffic models.

Smart Sensor Networks Using AI for Industry 4.0 May 11 2021 Smart Sensor Networks (WSNs) using AI have left a mark on the lives of all by aiding in various sectors, such as manufacturing, education, healthcare, and monitoring of the environment and industries. This book covers recent AI applications and explores aspects of modern sensor technologies and the systems needed to operate them. The book reviews the fundamental concepts of gathering, processing, and analyzing different AI-based models and methods. It covers recent WSN techniques for the purpose of effective network management on par with the standards laid out by international organizations in related fields and focuses on both core concepts along with major applicational areas. The book will be used by technical developers, academicians, data sciences, industrial professionals, researchers, and students interested in the latest innovations on problem-oriented processing techniques in sensor networks using IoT and evolutionary computer applications for Industry 4.0.

Proceedings of International Symposium on Sensor Networks, Systems and Security Nov 24 2019 This book presents current trends that are dominating technology and society, including privacy, high performance computing in the cloud, networking and IoT, and bioinformatics. By providing chapters detailing accessible descriptions of the research frontiers in each of these domains, the reader is provided with a unique understanding of what is currently feasible. Readers are also given a vision of what these technologies can be expected to produce in the near future. The topics are covered comprehensively by experts in respective areas. Each section includes an overview that puts the research topics in perspective and integrates the sections into an overview of how technology is evolving. The book represents the proceedings of the International Symposium on Sensor Networks, Systems and Security, August 31 – September 2, 2017, Lakeland Florida.

Body Sensor Networks Aug 14 2021 The last decade has witnessed a rapid surge of interest in new sensing and monitoring devices for wellbeing and healthcare. One key development in this area is wireless, wearable and implantable in vivo monitoring and intervention. A myriad of platforms are now available from both academic institutions and commercial organisations. They permit the management of patients with both acute and chronic symptoms, including diabetes, cardiovascular diseases, treatment of epilepsy and other debilitating neurological disorders. Despite extensive developments in sensing technologies, there are significant research issues related to system integration, sensor miniaturisation, low-power sensor interface, wireless telemetry and signal processing. In the 2nd edition of this popular and authoritative reference on Body Sensor Networks (BSN), major topics related to the latest technological developments and potential clinical applications are discussed, with contents covering. Biosensor Design, Interfacing and Nanotechnology Wireless Communication and Network Topologies Communication Protocols and Standards Energy Harvesting and Power Delivery Ultra-low Power Bio-inspired Processing Multi-sensor Fusion and Context Aware Sensing Autonomic Sensing Wearable, Ingestible Sensor Integration and Exemplar

Applications System Integration and Wireless Sensor Microsystems The book also provides a comprehensive review of the current wireless sensor development platforms and a step-by-step guide to developing your own BSN applications through the use of the BSN development kit.

Multi-hop Routing in Wireless Sensor Networks Feb 08 2021 This brief provides an overview of recent developments in multi-hop routing protocols for Wireless Sensor Networks (WSNs). It introduces the various classifications of routing protocols and lists the pros and cons of each category, going beyond the conceptual overview of routing classifications offered in other books. Recently many researchers have proposed numerous multi-hop routing protocols and thereby created a need for a book that provides its readers with an up-to-date road map of this research paradigm. The authors present some of the most relevant results achieved by applying an algorithmic approach to the research on multi-hop routing protocols. The book covers measurements, experiences and lessons learned from the implementation of multi-hop communication prototypes. Furthermore, it describes future research challenges and as such serves as a useful guide for students and researchers alike.

Sensor networks in theory and practice Nov 05 2020 The book provides an important foundation for understanding the Internet of Things by offering insight into common networking protocols from the microcontroller world and introducing important sensors and other devices, as well as their use and programming. All concepts shown are illustrated with practical circuit and programming examples from the authors' many years of experience. In addition, open libraries for controlling the devices presented in the book are available for readers to download from the publisher's home page. The second edition includes some new devices, especially in the area of networks, a more detailed description of the operating principles of some sensors as well as further tips and tricks for programming.

Intelligent Sensor Networks Jul 13 2021 Although governments worldwide have invested significantly in intelligent sensor network research and applications, few books cover intelligent sensor networks from a machine learning and signal processing perspective. Filling this void, *Intelligent Sensor Networks: The Integration of Sensor Networks, Signal Processing and Machine Learning* focuses on the close integration of sensing, networking, and smart signal processing via machine learning. Based on the world-class research of award-winning authors, the book provides a firm grounding in the fundamentals of intelligent sensor networks, including compressive sensing and sampling, distributed signal processing, and intelligent signal learning. Presenting recent research results of world-renowned sensing experts, the book is organized into three parts: Machine Learning—describes the application of machine learning and other AI principles in sensor network intelligence—covering smart sensor/transducer architecture and data representation for intelligent sensors Signal Processing—considers the optimization of sensor network performance based on digital signal processing techniques—including cross-layer integration of routing and application-specific signal processing as well as on-board image processing in wireless multimedia sensor networks for intelligent transportation systems Networking—focuses on network protocol design in order to achieve an intelligent sensor networking—covering energy-efficient opportunistic routing protocols for sensor networking and multi-agent-driven wireless sensor cooperation Maintaining a focus on "intelligent" designs, the book details signal processing principles in sensor networks. It elaborates on critical platforms for intelligent sensor networks and illustrates key applications—including target tracking, object identification, and structural health monitoring. It also includes a paradigm for validating the extent of spatiotemporal associations among data sources to enhance data cleaning in sensor networks, a sensor stream reduction application, and also considers the use of Kalman filters for attack detection in a water system sensor network that consists of water level sensors and velocity sensors.

Introduction to Sensors in IoT and Cloud Computing Applications Apr 29 2020 *Introduction to Sensors in IoT and Cloud Computing Applications* provides information about sensors and their applications. Readers are first introduced to the concept of small instruments and their application as sensors. The chapters which follow explain Internet of Things (IoT) architecture while providing notes on the implementation, demonstration and related issues of IoT systems. The book continues to explore the topic by providing information about sensor-cloud infrastructure, mobile cloud, fog computing (an extension of cloud computing that takes cloud computing to the cutting-edge of networking where data is produced) and integration of IoT devices with cloud computing. The book also presents notes on the taxonomy of fog-computing systems. The six chapters in this book provide essential information for general readers, and students of computer science to understand the basics of cloud computing networks, related concepts and

applications.

Fundamentals of Sensor Network Programming Feb 20 2022 This book provides the basics needed to develop sensor network software and supplements it with many case studies covering network applications. It also examines how to develop onboard applications on individual sensors, how to interconnect these sensors, and how to form networks of sensors, although the major aim of this book is to provide foundational principles of developing sensor networking software and critically examine sensor network applications.

Beginning Sensor Networks with XBee, Raspberry Pi, and Arduino Sep 27 2022 Build sensor networks with Python and MicroPython using XBee radio modules, Raspberry Pi, and Arduino boards. This revised and updated edition will put all of these together to form a sensor network, and show you how to turn your Raspberry Pi into a MySQL database server to store your sensor data! You'll review the different types of sensors and sensor networks, along with new technology, including how to build a simple XBee network. You'll then walk through building an sensor nodes on the XBee, Raspberry Pi, and Arduino, and also learn how to collect data from multiple sensor nodes. The book also explores different ways to store sensor data, including writing to an SD card, sending data to the cloud, and setting up a Raspberry Pi MySQL server to host your data. You'll even learn how to connect to and interact with a MySQL database server directly from an Arduino! Finally you'll see how to put it all together by connecting your sensor nodes to your new Raspberry Pi database server. If you want to see how well XBee, Raspberry Pi, and Arduino can get along, especially to create a sensor network, then *Beginning Sensor Networks with XBee, Raspberry Pi, and Arduino* is just the book you need. What You'll Learn Code your sensor nodes with Python and MicroPython Work with new XBee 3 modules Host your data on Raspberry Pi Get started with MySQL Create sophisticated sensor networks Who This Book Is For Those interested in building or experimenting with sensor networks and IoT solutions, including those with little or no programming experience. A secondary target includes readers interested in using XBee modules with Raspberry Pi and Arduino, those interested in controlling XBee modules with MicroPython.

Wireless Sensors in Heterogeneous Networked Systems Oct 24 2019 This book presents an examination of the middleware that can be used to configure and operate heterogeneous node platforms and sensor networks. The middleware requirements for a range of application scenarios are compared and analysed. The text then defines middleware architecture that has been integrated in an approach demonstrated live in a refinery. Features: presents a thorough introduction to the major concepts behind wireless sensor networks (WSNs); reviews the various application scenarios and existing middleware solutions for WSNs; discusses the middleware mechanisms necessary for heterogeneous WSNs; provides a detailed examination of platform-agnostic middleware architecture, including important implementation details; investigates the programming paradigms for WSNs, and for heterogeneous sensor networks in general; describes the results of extensive experimentation and testing, demonstrating that the generic architecture is viable for implementation on multiple platforms.

Advances in Sensors: Reviews, Vol. 5 Feb 26 2020 The Vol. 5 of this Book Series contains 22 chapters written by 79 contributors-experts from universities, research centres and industry from 15 countries: Australia, Canada, China, France, Germany, Italy, Malaysia, Mexico, Poland, Portugal, Russia, Slovenia, Spain, Ukraine and USA. This volume contains information at the cutting edge of sensor research and related topics from the following three areas: Physical Sensors, Sensor Networks and Remote Sensing. Coverage includes current developments in various sensors, sensor instrumentation and applications. In order to offer a fast and easy reading of each topic, every chapter in this volume is independent and self-contained. With the unique combination of information in this volume, the 'Advances in Sensors: Reviews' Book Series will be of value for scientists and engineers in industry and at universities, to sensors developers, distributors, and end users.

Energy Harvesting in Wireless Sensor Networks and Internet of Things Sep 15 2021 The energy efficiency paradigm is a major bottleneck for the development of wireless sensor networks (WSNs) and Internet of Things (IoT) architectures and technologies. This edited book presents comprehensive coverage of energy harvesting sources and techniques that can be used for WSN and IoT systems.

Advances in Sensors: Reviews, Vol. 7: Physical and Chemical Sensors: Design, Applications & Networks. Jul 01 2020

Advances in Sensors: Reviews, Vol. 3 Apr 10 2021 Sensors, Transducers, Signal Conditioning and Wireless (Book Series 'Advances in Sensors: Reviews', Vol. 3) is a premier sensor review source and contains 19

chapters with sensor related state-of-the-art reviews and descriptions of latest achievements written by 55 authors from academia and industry from 19 countries: Botswana, Canada, China, Finland, France, Germany, India, Jordan, Mexico, Portugal, Romania, Russia, Senegal, Serbia, South Africa, South Korea, UK, Ukraine and USA. Coverage includes current developments in physical sensors and transducers, chemical sensors, biosensors, sensing materials, signal conditioning energy harvesters and wireless sensor networks. This book ensures that readers will stay at the cutting edge of the field and get the right and effective start point and road map for the further researches and developments.

Internet of Things and Sensors Networks in 5G Wireless Communications Dec 18 2021 The Internet of Things (IoT) has attracted much attention from society, industry and academia as a promising technology that can enhance day to day activities, and the creation of new business models, products and services, and serve as a broad source of research topics and ideas. A future digital society is envisioned, composed of numerous wireless connected sensors and devices. Driven by huge demand, the massive IoT (mIoT) or massive machine type communication (mMTC) has been identified as one of the three main communication scenarios for 5G. In addition to connectivity, computing and storage and data management are also long-standing issues for low-cost devices and sensors. The book is a collection of outstanding technical research and industrial papers covering new research results, with a wide range of features within the 5G-and-beyond framework. It provides a range of discussions of the major research challenges and achievements within this topic.

Advances in Sensors: Reviews, Vol.4 'Sensors and Applications in Measuring and Automation Control Systems' Jan 27 2020 The fourth volume titled 'Sensors and Applications in Measuring and Automation Control Systems' contains twenty four chapters with sensor related state-of-the-art reviews and descriptions of latest advances in sensor related area written by 81 authors from academia and industry from 5 continents and 20 countries: Australia, Austria, Brazil, Finland, France, Japan, India, Iraq, Italia, México, Morocco, Portugal, Senegal, Serbia, South Africa, South Korea, Spain, UK, Ukraine and USA. Coverage includes current developments in physical sensors and transducers, chemical sensors, biosensors, sensing materials, signal conditioning, energy harvesters and sensor networks.

Optimal Coverage in Wireless Sensor Networks Mar 09 2021 This book will serve as a reference, presenting state-of-the-art research on theoretical aspects of optimal sensor coverage problems. Readers will find it a useful tool for furthering developments on theory and applications of optimal coverage; much of the content can serve as material for advanced topics courses at the graduate level. The book is well versed with the hottest research topics such as Lifetime of Coverage, Weighted Sensor Cover, k-Coverage, Heterogeneous Sensors, Barrier, Sweep and Partial Coverage, Mobile Sensors, Camera Sensors and Energy-Harvesting Sensors, and more. Topics are introduced in a natural order from simple covers to connected covers, to the lifetime problem. Later, the book begins revisiting earlier problems ranging from the introduction of weights to coverage by k sensors and partial coverage, and from sensor heterogeneity to novel problems such as the barrier coverage problem. The book ends with coverage of mobile sensors, camera sensors, energy-harvesting sensors, underwater sensors, and crowdsensing.

Learning from Data Streams Oct 16 2021 Processing data streams has raised new research challenges over the last few years. This book provides the reader with a comprehensive overview of stream data processing, including famous prototype implementations like the Nile system and the TinyOS operating system. Applications in security, the natural sciences, and education are presented. The huge bibliography offers an excellent starting point for further reading and future research.

Practical Contiki-NG Sep 03 2020 Explore how to develop and implement wireless sensor networks (WSN) using Contiki-NG, branded as the operating system for the IoT. The book explains Contiki-NG's advantages in sensing, communication, and energy optimization and enables you to begin solving problems in automation with WSN. Practical Contiki-NG is a guide to getting started with Contiki-NG programming featuring projects that demonstrate a variety of applications. This book takes a practical and content-driven approach to the latest technologies, including Raspberry Pi, IoT and cloud servers. Readers will go through step-by-step guides and sample scenarios such as sensing, actuating, connectivity, building middleware, and utilizing IoT and cloud-based technologies. If you're looking to go from zero to hero in using Contiki-NG to build Wireless Sensor Network (WSN) applications then this is the book for you. What You'll Learn Prepare and set up Contiki-NG development Review the basics of the Contiki-NG platform to build Wireless Sensor Networks (WSN) Develop your own Contiki-NG program Perform sensing and actuating on the Contiki-NG

platform Implement a middleware for Contiki-NG notes Build a simple IoT program using the Contiki-NG environment Who This Book Is For Developers, students, researchers and anyone who has an interest in Wireless Sensor Network (WSN).

Data Mining Techniques in Sensor Networks Aug 26 2022 Sensor networks comprise of a number of sensors installed across a spatially distributed network, which gather information and periodically feed a central server with the measured data. The server monitors the data, issues possible alarms and computes fast aggregates. As data analysis requests may concern both present and past data, the server is forced to store the entire stream. But the limited storage capacity of a server may reduce the amount of data stored on the disk. One solution is to compute summaries of the data as it arrives, and to use these summaries to interpolate the real data. This work introduces a recently defined spatio-temporal pattern, called trend cluster, to summarize, interpolate and identify anomalies in a sensor network. As an example, the application of trend cluster discovery to monitor the efficiency of photovoltaic power plants is discussed. The work closes with remarks on new possibilities for surveillance enabled by recent developments in sensing technology.

Artificial Intelligence Techniques in IoT Sensor Networks Jan 07 2021 Artificial Intelligence Techniques in IoT Sensor Networks is a technical book which can be read by researchers, academicians, students and professionals interested in artificial intelligence (AI), sensor networks and Internet of Things (IoT). This book is intended to develop a shared understanding of applications of AI techniques in the present and near term. The book maps the technical impacts of AI technologies, applications and their implications on the design of solutions for sensor networks. This text introduces researchers and aspiring academicians to the latest developments and trends in AI applications for sensor networks in a clear and well-organized manner. It is mainly useful for research scholars in sensor networks and AI techniques. In addition, professionals and practitioners working on the design of real-time applications for sensor networks may benefit directly from this book. Moreover, graduate and master's students of any departments related to AI, IoT and sensor networks can find this book fascinating for developing expert systems or real-time applications. This book is written in a simple and easy language, discussing the fundamentals, which relieves the requirement of having early backgrounds in the field. From this expectation and experience, many libraries will be interested in owning copies of this work.

Wireless Sensor Networks Oct 04 2020 Although there are many books available on WSNs, most are low-level, introductory books. The few available for advanced readers fail to convey the breadth of knowledge required for those aiming to develop next-generation solutions for WSNs. Filling this void, *Wireless Sensor Networks: From Theory to Applications* supplies comprehensive coverage of WS

Modern Sensors, Transducers and Sensor Networks Dec 06 2020 "Modern Sensors, Transducers and Sensor Networks is the first book from the *Advances in Sensors: Reviews* book Series contains dozen collected sensor related, advanced state-of-the-art reviews written by 31 internationally recognized experts from academia and industry. Built upon the series *Advances in Sensors: Reviews* - a premier sensor review source, it presents an overview of highlights in the field. Coverage includes current developments in sensing nanomaterials, technologies, MEMS sensor design, synthesis, modeling and applications of sensors, transducers and wireless sensor networks, signal detection and advanced signal processing, as well as new sensing principles and methods of measurements. This volume is divided into three main sections: physical sensors, chemical sensors and biosensors, and sensor networks including sensor technology, sensor market reviews and applications." -- Back cover.

Security and Privacy in Smart Sensor Networks Jun 12 2021 Security and privacy protection within computer networks can be a challenge. By examining the current problems and challenges this domain is facing, more efficient strategies can be established to safeguard personal information against invasive pressures. *Security and Privacy in Smart Sensor Networks* is a critical scholarly resource that examines recent developments and emerging trends in smart sensor security and privacy by providing new models, practical solutions, and technological advances related to security. Featuring coverage on a broad range of topics such as cloud security, encryption, and intrusion detection systems, this book is geared towards academicians, engineers, IT specialists, researchers, and students seeking current research on authentication and intrusion detection.

Beginning Sensor Networks with Arduino and Raspberry Pi Mar 21 2022 *Beginning Sensor Networks with Arduino and Raspberry Pi* teaches you how to build sensor networks with Arduino, Raspberry Pi, and XBee radio modules, and even shows you how to turn your Raspberry Pi into a MySQL database server to store your sensor data! First you'll learn about the different types of sensors and sensor networks, including how to

build a simple XBee network. Then you'll walk through building an Arduino-based temperature sensor and data collector, followed by building a Raspberry Pi-based sensor node. Next you'll learn different ways to store sensor data, including writing to an SD card, sending data to the cloud, and setting up a Raspberry Pi MySQL server to host your data. You even learn how to connect to and interact with a MySQL database server directly from an Arduino! Finally you'll learn how to put it all together by connecting your Arduino sensor node to your new Raspberry Pi database server. If you want to see how well Arduino and Raspberry Pi can get along, especially to create a sensor network, then *Beginning Sensor Networks with Arduino and Raspberry Pi* is just the book you need.

Making Things Talk Oct 28 2022 Make microcontrollers, PCs, servers, and smartphones talk to each other. Building electronic projects that interact with the physical world is good fun. But when the devices you've built start to talk to each other, things really get interesting. With 33 easy-to-build projects, *Making Things Talk* shows you how to get your gadgets to communicate with you and your environment. It's perfect for people with little technical training but a lot of interest. Maybe you're a science teacher who wants to show students how to monitor the weather in several locations at once. Or a sculptor looking to stage a room of choreographed mechanical sculptures. In this expanded edition, you'll learn how to form networks of smart devices that share data and respond to commands. Call your home thermostat with a smartphone and change the temperature. Create your own game controllers that communicate over a network. Use ZigBee, Bluetooth, Infrared, and plain old radio to transmit sensor data wirelessly. Work with Arduino 1.0, Processing, and PHP—three easy-to-use, open source environments. Write programs to send data across the Internet, based on physical activity in your home, office, or backyard. Whether you want to connect simple home sensors to the Internet, or create a device that can interact wirelessly with other gadgets, this book explains exactly what you need.

Industrial Sensors and Controls in Communication Networks Jul 25 2022 This informative text/reference presents a detailed review of the state of the art in industrial sensor and control networks. The book examines a broad range of applications, along with their design objectives and technical challenges. The coverage includes fieldbus technologies, wireless communication technologies, network architectures, and resource management and optimization for industrial networks. Discussions are also provided on industrial communication standards for both wired and wireless technologies, as well as for the Industrial Internet of Things (IIoT). Topics and features: describes the FlexRay, CAN, and Modbus fieldbus protocols for industrial control networks, as well as the MIL-STD-1553 standard; proposes a dual fieldbus approach, incorporating both CAN and ModBus fieldbus technologies, for a ship engine distributed control system; reviews a range of industrial wireless sensor network (IWSN) applications, from environmental sensing and condition monitoring, to process automation; examines the wireless networking performance, design requirements, and technical limitations of IWSN applications; presents a survey of IWSN commercial solutions and service providers, and summarizes the emerging trends in this area; discusses the latest technologies and open challenges in realizing the vision of the IIoT, highlighting various applications of the IIoT in industrial domains; introduces a logistics paradigm for adopting IIoT technology on the Physical Internet. This unique work will be of great value to all researchers involved in industrial sensor and control networks, wireless networking, and the Internet of Things.

Internet of Things and Sensor Network for COVID-19 Sep 22 2019 This book examines various models/solutions in areas, such as individuals, home, work and society, where IoT and AI are being utilized to mitigate the Covid-19 pandemic. The world is battling with the novel coronavirus, and government authorities, scientists, medical practitioners, and medical services are striving hard to help people to face the challenges. During this crisis, numerous innovative ideas and solutions have been proposed for using the Internet of things (IoT), sensor networks, and artificial intelligence (AI) to monitor the wellbeing of individuals. Nations are using all available assets to help develop cutting-edge innovations to relieve the impacts of Covid-19 and profile individuals in danger. The advances in IoT frameworks and sensor technologies together with AI are invaluable in the context of this pandemic, and nations and various entities around the globe are discovering innovative solutions to maintain businesses and help people live alongside Covid-19. This book presents the advances in sensor technologies, IoT frameworks, and explores how these technologies are being used to deal with the issues arising from Covid-19, including work in progress and potential applications.

Advances in Wireless Sensors and Sensor Networks Jun 24 2022 In recent times wireless sensors and

sensor networks have become a great interest to research, scientific and technological community. Though the sensor networks have been in place for more than a few decades now, the wireless domain has opened up a whole new application spaces of sensors. Wireless sensors and sensor networks are different from traditional wireless networks as well computer networks and therefore pose more challenges to solve such as limited energy, restricted life time, etc. This book intends to illustrate and to collect recent advances in wireless sensors and sensor networks, not as an encyclopedia but as clever support for scientists, students and researchers in order to stimulate exchange and discussions for further developments.

Security and Privacy Issues in IoT Devices and Sensor Networks Apr 22 2022 Security and Privacy Issues in IoT Devices and Sensor Networks investigates security breach issues in IoT and sensor networks, exploring various solutions. The book follows a two-fold approach, first focusing on the fundamentals and theory surrounding sensor networks and IoT security. It then explores practical solutions that can be implemented to develop security for these elements, providing case studies to enhance understanding. Machine learning techniques are covered, as well as other security paradigms, such as cloud security and cryptocurrency technologies. The book highlights how these techniques can be applied to identify attacks and vulnerabilities, preserve privacy, and enhance data security. This in-depth reference is ideal for industry professionals dealing with WSN and IoT systems who want to enhance the security of these systems. Additionally, researchers, material developers and technology specialists dealing with the multifarious aspects of data privacy and security enhancement will benefit from the book's comprehensive information. Provides insights into the latest research trends and theory in the field of sensor networks and IoT security Presents machine learning-based solutions for data security enhancement Discusses the challenges to implement various security techniques Informs on how analytics can be used in security and privacy

Network Security Through Data Analysis May 23 2022 Traditional intrusion detection and logfile analysis are no longer enough to protect today's complex networks. In this practical guide, security researcher Michael Collins shows you several techniques and tools for collecting and analyzing network traffic datasets. You'll understand how your network is used, and what actions are necessary to protect and improve it. Divided into three sections, this book examines the process of collecting and organizing data, various tools for analysis, and several different analytic scenarios and techniques. It's ideal for network administrators and operational security analysts familiar with scripting. Explore network, host, and service sensors for capturing security data Store data traffic with relational databases, graph databases, Redis, and Hadoop Use SiLK, the R language, and other tools for analysis and visualization Detect unusual phenomena through Exploratory Data Analysis (EDA) Identify significant structures in networks with graph analysis Determine the traffic that's crossing service ports in a network Examine traffic volume and behavior to spot DDoS and database raids Get a step-by-step process for network mapping and inventory

Smart Sensor Networks Aug 22 2019 This book provides IT professionals, educators, researchers, and students a compendium of knowledge on smart sensors and devices, types of sensors, data analysis and monitoring with the help of smart sensors, decision making, impact of machine learning algorithms, and artificial intelligence-related methodologies for data analysis and understanding of smart applications in networks. Smart sensor networks play an important role in the establishment of network devices which can easily interact with physical world through plethora of variety of sensors for collecting and monitoring the surrounding context and allowing environment information. Apart from military applications, smart sensor networks are used in many civilian applications nowadays and there is a need to manage high volume of demands in related applications. This book comprises of 9 chapters and presents a valuable insight on the original research and review articles on the latest achievements that contributes to the field of smart sensor networks and their usage in real-life applications like smart city, smart home, e-healthcare, smart social sensing networks, etc. Chapters illustrate technological advances and trends, examine research opportunities, highlight best practices and standards, and discuss applications and adoption. Some chapters also provide holistic and multiple perspectives while examining the impact of smart sensor networks and the role of data analytics, data sharing, and its control along with future prospects.

Getting Started with Bluetooth Low Energy Aug 02 2020 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

[A Complete Guide to Wireless Sensor Networks](#) Dec 26 2019 This book provides comprehensive coverage of the major aspects in designing, implementing, and deploying wireless sensor networks by discussing present research on WSNs and their applications in various disciplines. It familiarizes readers with the current state of WSNs and how such networks can be improved to achieve effectiveness and efficiency. It starts with a detailed introduction of wireless sensor networks and their applications and proceeds with layered architecture of WSNs. It also addresses prominent issues such as mobility, heterogeneity, fault-tolerance, intermittent connectivity, and cross layer optimization along with a number of existing solutions to stimulate future research.

making-things-talk-using-sensors-networks-and-arduino-to-see-hear-and-feel-your-world-physical-methods-for-connecting-physical-objects

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