

Wireless Sensor Networks Principles And Practice

Wireless sensor networks consist of small, mostly battery powered computers. Despite their simplicity, each sensor node is equipped with its own memory, CPU and radio transceiver. A typical application is to scatter many of them over a large area. Some sensor nodes can take measurements like temperature, air pressure and humidity. The latest models can also capture audio and images. But even the simplest capabilities like monitoring the temperature can be used e.g., to detect and fight forest fires at an early stage. The strength of this new paradigm comes from the mere number of nodes. Messages are forwarded over long distances from node to node. However, a sensor network does not only provide its own communication infrastructure. Within this book, it will also be shown how it can be used like a massively distributed database or as a compute cluster which filters and analyzes its data prior to transmission. A key-factor to the success of a sensor network is its longevity. Communication algorithms for medium access, routing but also for encryption and time synchronization have to be redesigned carefully with energy efficiency in mind.

A handbook on recent advancements and the state of the art in array processing and sensor Networks Handbook on Array Processing and Sensor Networks provides readers with a collection of tutorial articles contributed by world-renowned experts on recent advancements and the state of the art in array processing and sensor networks. Focusing on fundamental principles as well as applications, the handbook provides exhaustive coverage of: wavelets; spatial spectrum estimation; MIMO radio propagation; robustness issues in sensor array processing; wireless communications and sensing in multi-path environments using multi-antenna transceivers; implicit training and array processing for digital communications systems; unitary design of radar waveform diversity sets; acoustic array processing for speech enhancement; acoustic beamforming for hearing aid applications; undetermined blind source separation using acoustic arrays; array processing in astronomy; digital 3D/4D ultrasound imaging technology; self-localization of sensor networks; multi-target tracking and classification in collaborative sensor networks via sequential Monte Carlo; energy-efficient decentralized estimation; sensor data fusion with application to multi-target tracking; distributed algorithms in sensor networks; cooperative communications; distributed source coding; network coding for sensor networks; information-theoretic studies of wireless networks; distributed adaptive learning mechanisms; routing for statistical inference in sensor networks; spectrum estimation in cognitive radios; nonparametric techniques for pedestrian tracking in wireless local area networks; signal processing and networking via the theory of global games; biochemical transport modeling, estimation, and detection in realistic environments; and security and privacy for sensor networks. Handbook on Array Processing and Sensor Networks is the first book of its kind and will appeal to researchers, professors, and graduate students in array processing, sensor networks, advanced signal processing, and networking.

Assuming only a basic knowledge of communication networks, Principles of Mobile Computing and Communications provides an understanding of wireless networks and relevant standards, highlighting issues that are unique to the mobile computing environment and exploring the differences between conventional and mobile applications. This book covers wireless network standards for cellular networks, WLANs, WPANs, wireless sensor networks, MANETs, and mobile IPs. It discusses location identification techniques as well as location systems. It also explores the issue of security in wireless networks and presents case studies to illustrate the requirements for developing mobile applications. A Web site provides ancillary material for classroom use.

Cooperation in Wireless Networks: Principles and Applications covers the underlying principles of cooperative techniques as well as several applications demonstrating the use of such techniques in practical systems. The book is written in a collaborative manner by several authors from Asia, America, and Europe. This book puts into one volume a comprehensive and technically rich appraisal of the wireless communications scene from a cooperation point of view. Wireless sensor networks are an emerging technology with a wide range of applications in military and civilian domains. This book begins by detailing the basic principles and concepts of wireless sensor networks, including information gathering, energy management and the structure of sensory nodes. It proceeds to examine advanced topics, covering localisation, topology, security and evaluation of wireless sensor networks, highlighting international research being carried out in this area. Finally, it features numerous examples of applications of this technology to a range of domains, such as wireless, multimedia, underwater and underground wireless sensor networks. --

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.

With modern communication networks continuing to grow in traffic, size, complexity, and variety, control systems are critical to ensure quality and effectively manage network traffic. Providing a thorough and authoritative introduction, *Wireless Ad hoc and Sensor Networks: Protocols, Performance, and Control* examines the theory, architectures, and technologies needed to implement quality of service (QoS) in a wide variety of communication networks. Based on years of research and practical experience, this book examines the technical concepts underlying the design, implementation, research, and invention of both wired and wireless networks. The author builds a strong understanding of general concepts and common principles while also exploring issues that are specific to wired, cellular, wireless ad hoc, and sensor networks. Beginning with an overview of networks and QoS control, he systematically explores timely areas such as Lyapunov analysis, congestion control of high-speed networks, admission control based on hybrid system theory, distributed power control of various network types, link state routing using QoS parameters, and predictive congestion control. The book also provides a framework for implementing QoS control using mote hardware. Providing a deeply detailed yet conveniently practical guide to QoS implementation, *Wireless Ad hoc and Sensor Networks: Protocols, Performance, and Control* is the perfect introduction for anyone new to the field as well as an ideal reference guide for seasoned network practitioners.

Wireless sensor networks (WSNs) utilize fast, cheap, and effective applications to imitate the human intelligence capability of sensing on a wider distributed scale. But acquiring data from the deployment area of a WSN is not always easy and multiple issues arise, including the limited resources of sensor devices run with one-time batteries. Additi

This book focuses on the principles of wireless sensor networks (WSNs), their applications, and their analysis tools, with meticulous attention paid to definitions and terminology. This book presents the adopted technologies and their manufacturers in detail, making WSNs tangible for the reader. In introductory computer networking books, chapter sequencing follows the bottom-up or top-down architecture of the 7-layer protocol. This book addresses subsequent steps in this process, both horizontally and vertically, thus fostering a clearer and deeper understanding through chapters that elaborate on WSN concepts and issues. With such depth, this book is intended for a wide audience; it is meant to be a helper and motivator for senior undergraduates, postgraduates, researchers, and practitioners. It lays out important concepts and WSN-related applications; uses appropriate literature to back research and practical issues; and focuses on new trends. Senior undergraduate students can use it to familiarize themselves with conceptual foundations and practical project implementations. For graduate students and researchers, test beds and simulators provide vital insights into analysis methods and tools for WSNs. Lastly, in addition to applications and deployment, practitioners will be able to learn more about WSN manufacturers and components within several platforms and test beds.

Wireless sensor networks (WSNs) have emerged as a phenomenon of the twenty-first century with numerous kinds of sensor being developed for specific applications. The origins of WSNs can, however, be traced back to the early days of connectivity between computers and their peripherals. Work with distributed sensor networks is evidenced in the literature during the latter part of the 1970s, continuing in functionality increases in the 1980s and 1990s. As a configuration of independent devices in a data communications network, WSNs are now pre-eminent as working solutions to numerous precision data collection situations where software control of instruments and routing protocols are needed. In this book, the authors have chosen a selection of specific topics relating to WSNs: their design, development, implementation and function. Some operating topics are addressed such as power management, data interchange protocols, instrument reliability and system security. Other topics are more application oriented, where particular hardware and software configurations are described to deliver system solutions for specific needs. All are clearly written with considerable detail relating to each of the issues addressed by the authors. Each of the chapters provides a rationale for the topic being covered and some general WSN details where appropriate. The citations used in the chapters are comprehensively referred to, which adds depth to the information being presented.

The idea of this book comes from the observation that sensor networks represent a topic of interest from both theoretical and practical perspectives. The title underlines that sensor networks offer the unique opportunity of clearly linking theory with practice. In fact, owing to their typical low-cost, academic researchers have the opportunity of implementing sensor network testbeds to check the validity of their theories, algorithms, protocols, etc., in reality. Likewise, a practitioner has the opportunity of understanding what are the principles behind the sensor networks under use and, thus, how to properly tune some accessible network parameters to improve the performance. On the basis of the observations above, the book has been structured in three parts: Part I is denoted as "Theory," since the topics of its ve chapters are apparently "detached" from real scenarios; Part II is denoted as "Theory and Practice," since the topics of its three chapters, although theoretical, have a clear connection with specific practical scenarios; Part III is denoted as "Practice," since the topics of its ve chapters are clearly related to practical applications.

Sensor networks continue to grow in importance for modern communication networks. The fruit of recent efforts aimed at miniaturization and highly advanced functionality, smart dust sensor networks offer powerful, cost-effective solutions to densely distributed, high-resolution applications. In chapters carefully selected from the popular *Handbook of Sensor Networks, Smart Dust: Sensor Network Applications, Architecture, and Design* supplies a sharply focused reference on the applications, design, and performance of smart dust that is ideal for specialists in the field. Providing a succinct survey of the principles and technologies associated with smart dust networks, this book focuses on eight main areas: applications; architecture; protocols; tracking technologies; data gathering and processing; energy management; security, reliability, and fault tolerance; and performance and design aspects. Following a look at the opportunities and challenges facing the field, expert contributors authoritatively cover sensor network management, miniaturizing sensor networks with MEMS, sensor network architecture, energy-efficient technologies, positioning and tracking, comparison of cooperative computing in sensor networks, dynamic power management, low-power design for smart dust networks, and more. *Smart Dust: Sensor Network Applications, Architecture, and Design* details the applications and technologies that are at the frontier of modern sensor networks. It is an ideal reference for anyone interested in designing, planning, or building emerging sensor and communications networks.

The new edition of this popular book has been transformed into a hands-on textbook, focusing on the principles of wireless sensor networks (WSNs), their applications, their protocols and standards, and their analysis and test tools; a meticulous care has been accorded to the definitions and terminology. To make WSNs felt and seen, the adopted technologies as well as their manufacturers are presented in detail. In introductory computer networking books, chapters sequencing follows the bottom up or top down architecture of the seven layers protocol. This book starts some steps later, with chapters ordered based on a topic's significance to the elaboration of wireless sensor networks (WSNs) concepts and issues. With such a depth, this book is intended for a wide audience, it is meant to be a helper and motivator, for both the senior undergraduates, postgraduates, researchers, and practitioners; concepts and WSNs related applications are laid out, research and

practical issues are backed by appropriate literature, and new trends are put under focus. For senior undergraduate students, it familiarizes readers with conceptual foundations, applications, and practical project implementations. For graduate students and researchers, transport layer protocols and cross-layering protocols are presented and testbeds and simulators provide a must follow emphasis on the analysis methods and tools for WSNs. For practitioners, besides applications and deployment, the manufacturers and components of WSNs at several platforms and testbeds are fully explored.

This book explores both the state-of-the-art and the latest developments in wireless sensor networks technology. It describes the fundamental concepts and practical aspects of wireless sensor networks and addresses challenges faced in their design, analysis and deployment. It is believed that the book will serve as a comprehensive reference for graduate and undergraduate senior students who seek to learn the latest developments in wireless sensor networks.

Written by award-winning engineers whose research has been sponsored by the U.S. National Science Foundation (NSF), IBM, and Cisco's University Research Program, *Wireless Sensor Networks: Principles and Practice* addresses everything product developers and technicians need to know to navigate the field. It provides an all-inclusive examina

This book systematically summarizes the fundamentals and various technologies in both terrestrial radio wireless networks and underwater acoustic networks (UWANs). It addresses the basic issues frequently investigated in terrestrial radio wireless networks and the key technologies suitable for the newly developing research area of UWANs. Starting with a review of our current understanding of wireless networks, it then introduces the principles of the main technologies, including error control, medium access control (MAC) protocols, routing protocols, end-to-end transmission control and mobility issues as well as network security for terrestrial radio wireless networks, and offers detailed surveys of these technologies for UWANs. Providing readers with the basic knowledge of terrestrial radio wireless networking technologies and raising readers' awareness of the developing topic of UWANs in ocean , it is a valuable resource for researchers and practitioners in terrestrial radio wireless networks and UWANs.

This book presents a comprehensive overview of wireless sensor networks (WSNs) with an emphasis on security, coverage, and localization. It offers a structural treatment of WSN building blocks including hardware and protocol architectures and also provides a systems-level view of how WSNs operate. These building blocks will allow readers to program specialized applications and conduct research in advanced topics. A brief introductory chapter covers common applications and communication protocols for WSNs. Next, the authors review basic mathematical models such as Voroni diagrams and Delaunay triangulations. Sensor principles, hardware structure, and medium access protocols are examined. Security challenges ranging from defense strategies to network robustness are explored, along with quality of service measures. Finally, this book discusses recent developments and future directions in WSN platforms. Each chapter concludes with classroom-tested exercises that reinforce key concepts. This book is suitable for researchers and for practitioners in industry. Advanced-level students in electrical engineering and computer science will also find the content helpful as a textbook or reference.

"This book focuses on wireless sensor networks and their operation, covering topics including routing, energy efficiency and management"--

After a brief introduction and contextualization on the Internet of Things (IoT) and Web of Things (WoT) paradigms, this timely new book describes one of the first research initiatives aimed at tackling the several challenges involved in building a middleware-layer infrastructure capable of realizing the WoT vision: the SmartSensor infrastructure. It is based on current standardization efforts and designed to manage a specific type of physical devices, those organized to shape a Wireless Sensor Network (WSN), where sensors work collaboratively, extracting data and transmitting it to external networks to be further analysed and processed. *Middleware Solutions for the Internet of Things* describes this infrastructure and its RESTful-based programming model that allows developers create applications without having specific knowledge about physical devices or networking environments. It is also shown, step by step, how to create a Web Mashup application using SmartSensor.

Learn all you need to know about wireless sensor networks! *Protocols and Architectures for Wireless Sensor Networks* provides a thorough description of the nuts and bolts of wireless sensor networks. The authors give an overview of the state-of-the-art, putting all the individual solutions into perspective with one and other. Numerous practical examples, case studies and illustrations demonstrate the theory, techniques and results presented. The clear chapter structure, listing learning objectives, outline and summarizing key points, help guide the reader expertly through the material. *Protocols and Architectures for Wireless Sensor Networks: Covers architecture and communications protocols in detail with practical implementation examples and case studies. Provides an understanding of mutual relationships and dependencies between different protocols and architectural decisions. Offers an in-depth investigation of relevant protocol mechanisms. Shows which protocols are suitable for which tasks within a wireless sensor network and in which circumstances they perform efficiently. Features an extensive website with the bibliography, PowerPoint slides, additional exercises and worked solutions. This text provides academic researchers, graduate students in computer science, computer engineering, and electrical engineering, as well as practitioners in industry and research engineers with an understanding of the specific design challenges and solutions for wireless sensor networks. Check out*

www.wiley.com/go/wsn for accompanying course material! "I am deeply impressed by the book of Karl & Willig. It is by far the most complete source for wireless sensor networks...The book covers almost all topics related to sensor networks, gives an amazing number of references, and, thus, is the perfect source for students, teachers, and researchers. Throughout the book the reader will find high quality text, figures, formulas, comparisons etc. - all you need for a sound basis to start sensor network research." Prof. Jochen Schiller, Institute of Computer Science, Freie Universität Berlin

Internet of Things: Principles and Paradigms captures the state-of-the-art research in Internet of Things, its applications, architectures, and technologies. The book identifies potential future directions and technologies that facilitate insight into numerous scientific, business, and consumer applications. The Internet of Things (IoT) paradigm promises to make any electronic devices part of the Internet environment. This new paradigm opens the doors to new innovations and interactions between people and things that will enhance the quality of life and utilization of scarce resources. To help realize the full potential of IoT, the book addresses its numerous challenges and develops the conceptual and technological solutions for tackling them. These challenges include the development of scalable architecture, moving from closed systems to open systems, designing interaction protocols, autonomic management, and the privacy and ethical issues around data sensing, storage, and processing. Addresses the main concepts and features of the IoT paradigm Describes different architectures for managing IoT platforms Provides insight on trust, security, and privacy in IoT environments Describes data management techniques applied to the IoT environment Examines the key enablers and solutions to enable practical IoT systems Looks at the key developments that support next generation IoT platforms Includes input from expert contributors from both academia and industry on building and deploying IoT platforms and

applications

Wireless sensor network is a group of dedicated and spatially distributed sensors used to monitor and record the physical conditions of the environment. It also organizes the collected data at a central location. It helps in measuring the environmental conditions such as temperature, pollution levels, sound, humidity, and wind. They rely on wireless connectivity and spontaneously form a network to ensure the wireless transportation of sensor data. Modern wireless sensor networks are bi-directional that enable the control of sensor activity. It plays an important role in military applications such as battlefield surveillance. Such networks are also used in many industrial and consumer applications such as industrial process monitoring and control and machine health monitoring. This book elucidates the concepts and innovative models around prospective developments with respect to wireless sensors network. Some of the diverse topics covered herein book address the varied branches that fall under this category. The book is appropriate for those seeking detailed information in this area.

Wireless sensor networks are an essential part of the Internet of Things (IoT) "perception" layer. IoT connects the digital world created by conventional computer networks to the physical world. They continually bring new applications to life through a large number of elements that collect, process and disseminate environmental data. Today, moves across the IoT a large and varied volume of data. Data is generated in a continuous way with a greater emphasis on information and not on its source. This indifference to the source is reinforced by the interchangeable and redundant deployments of the sensor networks. In this thesis, we focus on integrating the principles and mechanisms of content-oriented networks in wireless sensor networks to improve the operation and performance of these networks. Hence, we first focused on the temporal relevance of data in content-centric sensor networks. Indeed, we considered the content lifetime (or freshness) and we proposed two approaches (one reactive and the other proactive) for their update. In the second part of the thesis, we proposed a mechanism based on the control of the duty-cycle to overcome the impact of the flooding mainly used to disseminate the interests sent by the users and the corresponding contents. For this purpose, we tried to maintain a sufficient subset of nodes necessary to satisfy the interests received by the network. The main challenge was to reduce energy consumption thanks to a mechanism controlling the node activity while keeping a good interest satisfaction rate. Finally, to improve the content caching in a sensor network, we have studied the existing strategies and identified the parameters impacting their performance. We then proposed a strategy placing the contents according to the degree of the nodes and their distance from the source. An exhaustive comparative study with other solutions show that the proposed mechanisms guarantee good performance in terms of latency, energy consumption and interest satisfaction rate.

Advances such as 3-G mobile communications networks demonstrate the increasing capability of high-quality data transmission over wireless media. Adapting wireless functionality into instrument and sensor systems endows them with unmatched flexibility, robustness, and intelligence. *Wireless Sensors and Instruments: Networks, Design, and Applications* explains the principles, state-of-the-art technologies, and modern applications of this burgeoning field. From underlying concepts to practical applications, this book outlines all the necessary information to plan, design, and implement wireless instrumentation and sensor networks effectively and efficiently. The author covers the basics of instruments, measurement, sensor technology, communication systems, and networks along with the theory, methods, and components involved in digital and wireless instruments. Placing these technologies in context, the book also examines the principles, components, and techniques of modern communication systems followed by network standards, protocols, topologies, and security. Building on these discussions, the book uses examples to illustrate the practical aspects of constructing sensors and instruments. Finally, the author devotes the closing chapter to applications in a broad array of fields, including commercial, human health, and consumer products applications. Filled with up-to-date information and thorough coverage of fundamentals, *Wireless Sensors and Instruments: Networks, Design, and Applications* supplies critical, hands-on tools for efficiently, effectively, and immediately implementing advanced wireless systems.

The military, the research community, emergency services, and industrial environments all rely on ad hoc mobile wireless networks because of their simple infrastructure and minimal central administration. Now in its second edition, *Ad Hoc Mobile Wireless Networks: Principles, Protocols, and Applications* explains the concepts, mechanism, design, and performance of these highly valued systems. Following an overview of wireless network fundamentals, the book explores MAC layer, routing, multicast, and transport layer protocols for ad hoc mobile wireless networks. Next, it examines quality of service and energy management systems. Additional chapters cover mobility models for multi-hop ad hoc wireless networks as well as cross-layer design issues. Exploring Bluetooth, IrDA (Infrared Data Association), HomeRF, WiFi, WiMax, Wireless Internet, and Mobile IP, the book contains appropriate examples and problems at the end of each chapter to illustrate each concept. This second edition has been completely updated with the latest technology and includes a new chapter on recent developments in the field, including sensor networks, personal area networks (PANs), smart dress, and vehicular ad hoc networks. Self-organized, self-configured, and self-controlled, ad hoc mobile wireless networks will continue to be valued for a range of applications, as they can be set up and deployed anywhere and anytime. This volume captures the current state of the field as well as upcoming challenges awaiting researchers.

Wireless Sensor Networks presents the latest practical solutions to the design issues presented in wireless-sensor-network-based systems. Novel features of the text, distributed throughout, include workable solutions, demonstration systems and case studies of the design and application of wireless sensor networks (WSNs) based on the first-hand research and development experience of the author, and the chapters on real applications: building fire safety protection; smart home automation; and logistics resource management. Case studies and applications illustrate the practical perspectives of: · sensor node design; · embedded software design; · routing algorithms; · sink node positioning; · co-existence with other wireless systems; · data fusion; · security; · indoor location tracking; · integrating with radio-frequency identification; and · Internet of things *Wireless Sensor Networks* brings together multiple strands of research in the design of WSNs, mainly from software engineering, electronic engineering, and wireless communication perspectives, into an over-arching examination of the subject, benefiting students, field engineers, system developers and IT professionals. The contents have been well used as the teaching material of a course taught at postgraduate level in several universities making it suitable as an advanced text book and a reference book for final-year undergraduate and postgraduate students.

This book incorporates a selection of research and development papers. Its scope is on history and background, underlying design methodology, application domains and recent developments. The readers will be able to understand the underlying technology, philosophy, concepts, ideas, and principles, with regard to broader areas of sensor network. Aspects of sensor network and experimental results have been presented in proper order.

With the advances in small and low-cost radio transceivers and RF front-ends development, the possibility of applying ubiquitous and non-invasive sensors integrated into user's daily clothing and living activities seems more feasible. The ability to share data increases the usefulness of personal information devices, providing features not possible with independent isolated devices. Current wireless sensor solutions are limited in that they do not provide the means to overcome obstacles and shadowing of propagating radio waves. Thus for

reliable communications an increase in power consumption is required, reducing battery life. This book addresses the limitations outlined above by designing efficient and compact antenna systems. These systems will be cooperative and also aware of the surrounding environment and neighboring units, providing efficient and low power wireless connectivity for personal area network (PAN) and body area network (BAN) applications. Analysis of wearable antenna design and performance Addresses the Influence of body-worn antennas on radio channels and radio device performance from a power and error rate perspective. Cooperative networking principles applied to body area networks, showing the pros and cons of such concepts Real life case scenarios using ECG sample signals for potential application to healthcare monitoring.

The first book, by the leading experts, on this rapidly developing field with applications to security, smart homes, multimedia, and environmental monitoring Comprehensive coverage of fundamentals, algorithms, design methodologies, system implementation issues, architectures, and applications Presents in detail the latest developments in multi-camera calibration, active and heterogeneous camera networks, multi-camera object and event detection, tracking, coding, smart camera architecture and middleware This book is the definitive reference in multi-camera networks. It gives clear guidance on the conceptual and implementation issues involved in the design and operation of multi-camera networks, as well as presenting the state-of-the-art in hardware, algorithms and system development. The book is broad in scope, covering smart camera architectures, embedded processing, sensor fusion and middleware, calibration and topology, network-based detection and tracking, and applications in distributed and collaborative methods in camera networks. This book will be an ideal reference for university researchers, R&D engineers, computer engineers, and graduate students working in signal and video processing, computer vision, and sensor networks. Hamid Aghajan is a Professor of Electrical Engineering (consulting) at Stanford University. His research is on multi-camera networks for smart environments with application to smart homes, assisted living and well being, meeting rooms, and avatar-based communication and social interactions. He is Editor-in-Chief of Journal of Ambient Intelligence and Smart Environments, and was general chair of ACM/IEEE ICDCS 2008. Andrea Cavallaro is Reader (Associate Professor) at Queen Mary, University of London (QMUL). His research is on target tracking and audiovisual content analysis for advanced surveillance and multi-sensor systems. He serves as Associate Editor of the IEEE Signal Processing Magazine and the IEEE Trans. on Multimedia, and has been general chair of IEEE AVSS 2007, ACM/IEEE ICDCS 2009 and BMVC 2009. The first book, by the leading experts, on this rapidly developing field with applications to security, smart homes, multimedia, and environmental monitoring Comprehensive coverage of fundamentals, algorithms, design methodologies, system implementation issues, architectures, and applications Presents in detail the latest developments in multi-camera calibration, active and heterogeneous camera networks, multi-camera object and event detection, tracking, coding, smart camera architecture and middleware

"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 for Wireless Sensor Networks using Identity-Based Cryptography introduces identity-based cryptographic schemes for wireless sensor networks. It starts with an exhaustive survey of the existing layered approach to WSN security—detailing its pros and cons. Next, it examines new attack vectors that exploit the layered approach to security. After providing the necessary background, the book presents a cross-layer design approach that addresses authentication, integrity, and encryption. It also examines new ID-based key management mechanisms using a cross-layer design perspective. In addition, secure routing algorithms using ID-based cryptography are also discussed. Supplying readers with the required foundation in elliptic curve cryptography and identity-based cryptography, the authors consider new ID-based security solutions to overcome cross layer attacks in WSN. Examining the latest implementations of ID-based cryptography on sensors, the book combines cross-layer design principles along with identity-based cryptography to provide you with a new set of security solutions that can boost storage, computation, and energy efficiency in your wireless sensor networks.

Ad hoc mobile wireless networks have seen increased adaptation in a variety of disciplines because they can be deployed with simple infrastructures and virtually no central administration. In particular, the development of ad hoc wireless and sensor networks provides tremendous opportunities in areas including disaster recovery, defense, health car

This book presents state-of-the-art research advances in the field of wireless sensor networks systems and approaches. It provides in-depth study on a number of major topics such as protocols, localization, coverage control, community detection, small world analysis, etc. Multidisciplinary in nature and closely integrating theory and practice, the book will be of interest to all university researchers, telecommunications engineers and graduate students in wireless sensor networks who wish to learn the core principles, methods, algorithms, and applications. It would help readers rapidly grasp major topics of wireless sensor network and their advances.

Applications which use wireless sensors are increasing in number. The emergence of wireless sensor networks has also motivated the integration of a large number of small and lightweight nodes which integrate sensors, processors, and wireless transceivers. Existing books on wireless sensor networks mainly focus on protocols and networks and pay little attention to the sensors themselves which the author believes is the main focus. Without adequate knowledge of sensors as well as how they can be designed, realized and used, books on wireless sensor networks become too theoretical and irrelevant. The purpose of this book is to intimately acquaint readers with the technique of sensing (resistive, capacitive, inductive, magnetic, inertial, etc.) and existing sensor technologies. It also discusses how the sensors are used in a wide application domain and how new sensors can be designed and used in a novel way.

A concise and clear guide to the concepts and applications of wireless sensor networks, ideal for students, practitioners and researchers.

Without sensors most electronic applications would not exist they perform a vital function, namely providing an interface to the real world. The importance of sensors, however, contrasts with the limited information available on them. Today's smart sensors, wireless sensors, and microtechnologies are revolutionizing sensor design and applications. This volume is an up-to-date and comprehensive sensor reference guide to be used by engineers and scientists in industry, research, and academia to help with their sensor selection and system design. It is filled with hard-to-find information, contributed by noted engineers and companies working in the field today. The book will offer guidance on selecting, specifying, and using the optimum sensor for any given application. The editor-in-chief, Jon Wilson, has years of experience in the sensor industry and leads workshops and seminars on sensor-related topics. In addition to background information on sensor technology, measurement, and data acquisition, the handbook provides detailed information on each type of sensor technology, covering: technology fundamentals sensor types, w/

advantages/disadvantages manufacturers selecting and specifying sensors applicable standards (w/ urls of related web sites) interfacing information, with hardware and software info design techniques and tips, with design examples latest and future developments The handbook also contains information on the latest MEMS and nanotechnology sensor applications. In addition, a CD-ROM will accompany the volume containing a fully searchable pdf version of the text, along with various design tools and useful software. *the only comprehensive book on sensors available! *jam-packed with over 800 pages of techniques and tips, detailed design examples, standards, hardware and software interfacing information, and manufacturer pros/cons to help make the best sensor selection for any design *covers sensors from A to Z- from basic technological fundamentals, to cutting-edge info. on the latest MEMS and the hottest nanotechnology applications

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