

Signals and Communication Technology

Shuang-Hua Yang

# Wireless Sensor Networks

Principles, Design and Applications

 Springer

# Wireless Sensor Networks And Applications Signals And Communication Technology

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## **Wireless Sensor Networks And Applications Signals And Communication Technology:**

**Wireless Sensor Networks and Applications** Yingshu Li, My T. Thai, 2008-02-10 Wireless sensor networks are being employed in a variety of applications ranging from medical to military and from home to industry. The principal aim of this book is to provide a reference tool for the increasing number of scientists who depend upon sensor networks in some way. The book is organized into several sections each including chapters exploring a specific topic. Wireless sensor networks are attracting great attention and there are many research topics yet to be studied. In this book the topics covered include network design and modelling, network management, data management, security and applications. The articles presented in the book are expository but of a scholarly nature including the appropriate history, background, a review of the state of the art, thinking relative to the topic as well as a discussion of unsolved problems that are of special interest. The target readers of this book include the researchers in computer science, computer engineering and applied mathematics as well as students in these subjects. Specialists as well as general readers will find the articles stimulating and helpful.

**Book Organization** The book is organized into five sections. Section I introduces the design and modelling of sensor networks. Chapter 1 by Iyer, Kulkarni, Mhatre and Rosenberg presents a taxonomy of wireless sensor networks based on their application level objectives, traffic characteristics and data delivery requirements. Popa and Lewis in Chapter 2 describe some algorithms for systematic exploration of unknown environments using a mobile wireless sensor network.

**Advances in Computing and Communications, Part IV** Ajith Abraham, Jaime Lloret Mauri, John Buford, Junichi Suzuki, Sabu M. Thampi, 2011-07-06 This volume is the fourth part of a four volume set CCIS 190 CCIS 191 CCIS 192 CCIS 193 which constitutes the refereed proceedings of the First International Conference on Computing and Communications ACC 2011 held in Kochi, India in July 2011. The 62 revised full papers presented in this volume were carefully reviewed and selected from a large number of submissions. The papers are the papers of the Workshop on Cloud Computing Architecture Algorithms and Applications CloudComp2011, of the Workshop on Multimedia Streaming MultiStreams2011 and of the Workshop on Trust Management in P2P Systems IWTMP2PS2011.

**Wireless Sensor Networks** Shuang-Hua Yang, 2013-10-23 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

*Wireless Sensor Networks* Hossam Mahmoud Ahmad Fahmy,2016-03-02 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 relate 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** Suraiya Tarannum,2011-06-30 The importance and ubiquity of wireless networks in the modern age justifies the depth and scope of the chapters included in this book with its special focus on sensors Topics covered include MAC protocols with one contribution offering a literature review on them Energy efficiency is also important with several chapters addressing cooperative beamforming modern spatial diversity techniques and MEMS Hardware issues are addressed by a batch of chapters on extending network coverage areas CMOS RF transceivers the use of an accelerometer sensor module and a fall detection monitoring system and a couple of contributions on hierarchical paradigms in wireless sensor networks More mathematical approaches are also included with chapters on data aggregation tree construction and distributed localization algorithms

**Cognitive Radio Sensor Networks: Applications, Architectures, and Challenges** Rehmani, Mubashir Husain,Faheem, Yasir,2014-06-30 This book examines how wireless sensor nodes with cognitive radio capabilities can address these network challenges and improve the spectrum utilization presenting a broader picture on the applications architecture challenges and open research directions in the area of WSN research Provided by publisher

*Recent Development in Wireless Sensor and Ad-hoc Networks* Srikantha Patnaik,Xiaolong Li,Yeon-Mo Yang,2014-12-01 Wireless Sensor Network WSN consists of numerous physically distributed autonomous devices used for sensing and monitoring the physical and or environmental conditions A WSN uses a gateway that provides wireless connectivity to the wired world as well as distributed networks There are many open problems related

to Ad Hoc networks and its applications Looking at the expansion of the cellular infrastructure Ad Hoc network may be acting as the basis of the 4th generation wireless technology with the new paradigm of anytime anywhere communications To realize this the real challenge would be the security authorization and management issues of the large scale WSNs This book is an edited volume in the broad area of WSNs The book covers various chapters like Multi Channel Wireless Sensor Networks its Coverage Connectivity as well as Deployment It covers comparison of various communication protocols and algorithms such as MANNET ODMRP and ADMR Protocols for Ad hoc Multicasting Location Based Coordinated Routing Protocol and other Token based group local mutual exclusion Algorithms The book also covers a chapter on Extended Ad hoc On Demand Distance Vector EAODV routing protocol based on Distributed Minimum Transmission Multicast Routing DMTMR One chapter is dedicated to OCDMA and its future application and another chapter covers development of Home Automation System using SWN

**The Art of Wireless Sensor Networks** Habib M. Ammari, 2013-12-13 During the last one and a half decades wireless sensor networks have witnessed significant growth and tremendous development in both academia and industry The Art of Wireless Sensor Networks Volume 1 Fundamentals focuses on the fundamentals concepts in the design analysis and implementation of wireless sensor networks It covers the various layers of the lifecycle of this type of network from the physical layer up to the application layer Its rationale is that the first volume covers contemporary design issues tools and protocols for radio based two dimensional terrestrial sensor networks All the book chapters in this volume include up to date research work spanning various classic facets of the physical properties and functional behavior of wireless sensor networks including physical layer medium access control data routing topology management mobility management localization task management data management data gathering security middleware sensor technology standards and operating systems This book will be an excellent source of information for both senior undergraduate and graduate students majoring in computer science computer engineering electrical engineering or any related discipline In addition computer scientists researchers and practitioners in both academia and industry will find this book useful and interesting

*Wireless Sensor Networks* Holger Karl, 2006-02 This book constitutes the refereed proceedings of the Third European Workshop on Wireless Sensor Networks February 2006 The 21 revised full papers presented together with the abstracts of one invited talk and two tutorials were carefully reviewed and selected from 133 submissions The papers are organized in topical sections on query systems sensor network services routing localization platforms and development medium access control and measurements

*Sensor Networks for Smart Hospitals* Tuan Anh Nguyen, 2025-01-23 Sensor Networks for Smart Hospitals shows how the use of sensors to gather data on a patient's condition and the environment in which their care takes place can allow healthcare professionals to monitor well being and make informed decisions about treatment Written by experts in the field this book is an invaluable resource for researchers and healthcare practitioners in their drive to use technology to improve the lives of patients Data from sensor networks via the smart hospital framework is

comprised of three main layers data insights and access Medical data is collected in real time from an array of intelligent devices systems deployed within the hospital This data offers insight from the analytics or machine learning software that is accessible to healthcare staff via a smartphone or mobile device to facilitate swifter decisions and greater efficiency Describes the fundamentals of sensors biosensors and smart hospitals Explains how sensors and implanted nanodevices can be used in smart healthcare Discusses how intelligent wireless medical sensor networks can be used for healthcare in the future Companion volume to *Advanced Sensors for Smart Healthcare* *The Art of Wireless Sensor Networks* Habib M. Ammari, 2013-12-17 During the last one and a half decades wireless sensor networks have witnessed significant growth and tremendous development in both academia and industry A large number of researchers including computer scientists and engineers have been interested in solving challenging problems that span all the layers of the protocol stack of sensor networking systems Several venues such as journals conferences and workshops have been launched to cover innovative research and practice in this promising and rapidly advancing field Because of these trends I thought it would be beneficial to provide our sensor networks community with a comprehensive reference on as much of the findings as possible on a variety of topics in wireless sensor networks As this area of research is in continuous progress it does not seem to be a reasonable solution to keep delaying the publication of such reference any more This book relates to the second volume and focuses on the advanced topics and applications of wireless sensor networks Our rationale is that the second volume has all application specific and non conventional sensor networks emerging techniques and advanced topics that are not as matured as what is covered in the first volume Thus the second volume deals with three dimensional underground underwater body mounted and societal networks Following Donald E Knuth s above quoted elegant strategy to focus on several important fields *The Art of Computer Programming Fundamental Algorithms* 1997 all the book chapters in this volume include up to date research work spanning various topics such as stochastic modeling barrier and spatiotemporal coverage tracking estimation counting coverage and localization in three dimensional sensor networks topology control and routing in three dimensional sensor networks underground and underwater sensor networks multimedia and body sensor networks and social sensing Most of these major topics can be covered in an advanced course on wireless sensor networks This book will be an excellent source of information for graduate students majoring in computer science computer engineering electrical engineering or any related discipline Furthermore computer scientists researchers and practitioners in both academia and industry will find this book useful and interesting **Wireless Sensor Networks and Energy Efficiency: Protocols, Routing and Management** Zaman, Noor, Ragab, Khaled, Abdullah, Azween Bin, 2012-01-31 This book focuses on wireless sensor networks and their operation covering topics including routing energy efficiency and management *Concepts, Applications, Experimentation and Analysis of Wireless Sensor Networks* Hossam Mahmoud Ahmad Fahmy, 2020-11-24 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 *Handbook of Research on Advanced Wireless Sensor Network Applications, Protocols, and Architectures* Ray, Niranjan K.,Turuk, Ashok Kumar,2016-08-01 The implementation of wireless sensor networks has wide ranging applications for monitoring various physical and environmental settings However certain limitations with these technologies must be addressed in order to effectively utilize them The Handbook of Research on Advanced Wireless Sensor Network Applications Protocols and Architectures is a pivotal reference source for the latest research on recent innovations and developments in the field of wireless sensors Examining the advantages and challenges presented by the application of these networks in various areas this book is ideally designed for academics researchers students and IT developers *Coexisting problems for wireless sensor networks working in 2.4 GHz frequency band* Vikram Kulkarni,2019-12-03 Document from the year 2019 in the subject Computer Science Internet New Technologies course Wireless Sensor Networks Home Area Networks language English abstract The objectives of this research are To propose a scheme to estimate the future interference and enable efficient channel switching mechanism to avoid interference for Wireless Sensor Network WSN as per the latency requirements specified by Smart Grid SG To propose an algorithm for efficient data recovery mechanism so that ZigBee devices can quickly familiarize with the encoding according to the highly dynamic WiFi traffic To propose an efficient frequency shifting mechanism for different frame sizes of data under interference conditions to guarantee the reliable data transmission within the delay requirements of the SG To propose an effective mechanism to guarantee the ZigBee communications within the maximum tolerable delay under the coexistence of WiFi for carrying out effective smart home solutions To propose an algorithm based on effective transmission power control to increase WSN life time under coexistence scenarios for efficient monitoring and controlling purposes at smart homes With the introduction of Information and Data Communication Technology ICT to the present electrical power

systems the traditional electrical grid system is becoming more intelligent and adaptive The ICT successfully establishes bi directional communication between Utility companies and the consumer for improving the generation and utilization of power Wireless Sensor Network WSN is efficiently utilized by wide ranging Smart Grid SG applications Despite many advantages WSN faces a challenge of avoiding interference experiencing from other coexisting wireless technologies working in the 2.4GHz unlicensed frequency band Providing support for WSN in terms of avoiding interference is a very challenging issue due to the dynamic wireless communication environment and extremely limited resources In the present thesis the problem of interference experienced by WSN in 2.4GHz has been investigated The challenges limitations and requirements for avoiding the interference for WSN working in the vicinity of other technologies like WiFi and Bluetooth have been identified As a result of the literature survey carried out it was identified that proper channel selection and channel prioritization for WSNs working in the coexisting environment had not been adequately developed till then Hence there was a requirement for addressing these issues The proposed schemes in this thesis are based on simulation results obtained

Wireless Ad Hoc and Sensor Networks Raja Jurdak, 2007-04-27 Wireless Ad Hoc and Sensor Networks A Cross Layer Design Perspective deals with the emerging design trend that transcends traditional communication layers for performance gains in ad hoc and sensor networks The author explores the current state of the art in cross layer approaches for ad hoc and sensor networks providing a comprehensive design resource The book offers a structured comparison and analysis of both layered and cross layer design providing readers with an overview of the many issues relating to ad hoc and sensor networks The benefits of these cross layer approaches are examined through three diverse case studies a monitoring sensor network using Radio Frequency waves an ad hoc network that uses Ultra Wide Band Radio and an acoustic underwater sensor network for environmental monitoring Wireless Ad Hoc and Sensor Networks A Cross Layer Design Perspective is interdisciplinary in character and should be of value to software engineers hardware engineers application developers network protocol designers graduate students communication engineers systems engineers and university professors

*Mechanical Engineering, Industrial Electronics and Information Technology Applications in Industry* B.L. Liu, Ming Hai Yuan, Guo Rong Chen, Jun Peng, 2013-09-27 Selected peer reviewed papers from the 2013 2nd International Conference on Mechanical Engineering Industrial Electronics and Informatization MEIEI 2013 September 14 15 2013 Chongqing China

Communication, Signal Processing & Information Technology Faouzi Derbel, 2020-02-10 The volume is dedicated to fields related to design modeling fundamentals and application of communication systems Focusing on wireless technology it covers content based video retrieval B4G wireless communication systems and their application data fusion and pattern recognition It also discusses the influences of coding compression and e mobility on information and communication technology *Mechatronics and Intelligent Materials II* Ran Chen, Wen Pei Sung, 2012-03-15 Selected peer reviewed papers from the 2012 International conference on Mechatronics and Intelligent Materials MIM 2012 May 18 19 2012 GuiLin China



*Conference Record of the Thirty-Eighth Asilomar Conference on Signals, Systems & Computers, November 7-10, 2004,  
Pacific Grove, California* Michael B. Matthews, 2004

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