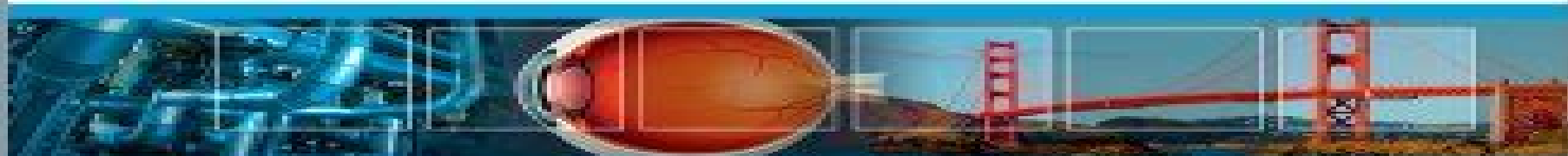


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Wireless Sensor Networks Book

**Mohamed Elhoseny, Aboul Ella
Hassanien**



Wireless Sensor Networks Book:

Wireless Sensor Networks Ian F. Akyildiz, Mehmet Can Vuran, 2010-06-10 This book presents an in depth study on the recent advances in Wireless Sensor Networks WSNs The authors describe the existing WSN applications and discuss the research efforts being undertaken in this field Theoretical analysis and factors influencing protocol design are also highlighted The authors explore state of the art protocols for WSN protocol stack in transport routing data link and physical layers Moreover the synchronization and localization problems in WSNs are investigated along with existing solutions Furthermore cross layer solutions are described Finally developing areas of WSNs including sensor actor networks multimedia sensor networks and WSN applications in underwater and underground environments are explored The book is written in an accessible textbook style and includes problems and solutions to assist learning Key Features The ultimate guide to recent advances and research into WSNs Discusses the most important problems and issues that arise when programming and designing WSN systems Shows why the unique features of WSNs self organization cooperation correlation will enable new applications that will provide the end user with intelligence and a better understanding of the environment Provides an overview of the existing evaluation approaches for WSNs including physical testbeds and software simulation environments Includes examples and learning exercises with a solutions manual supplemented by an accompanying website containing PPT slides Wireless Sensor Networks is an essential textbook for advanced students on courses in wireless communications networking and computer science It will also be of interest to researchers system and chip designers network planners technical managers and other professionals in these fields

Security for Wireless Sensor Networks

Donggang Liu, Peng Ning, 2007-02-15 The recent technological advances have made it possible to deploy small low power low bandwidth and multi functional wireless sensor nodes to monitor and report the conditions and events in their local environments A large collection of these sensor nodes can thus form a wireless sensor network in an ad hoc manner creating a new type of information systems Such sensor networks have recently emerged as an important means to study and interact with the physical world and have received a lot of attention due to their wide applications in military and civilian operations such as target tracking and data acquisition However in many of these applications wireless sensor networks could be deployed in hostile environments where there are malicious attacks against the network Providing security services in sensor networks however turns out to be a very challenging task First sensor nodes usually have limited resources such as storage bandwidth computation and energy It is often undesirable to implement expensive algorithms e g frequent public key operations on sensor nodes Second sensor nodes are usually deployed unattended and built without compromise prevention in mind An attacker can easily capture and compromise a few sensor nodes without being noticed When sensor nodes are compromised the attacker can learn all the secrets stored on them and launch a variety of attacks Thus any security mechanism for sensor networks has to be resilient to compromised sensor nodes

Dynamic Wireless Sensor Networks

Mohamed Elhoseny, Aboul Ella Hassanien, 2018-05-25 This book provides a collection of high quality research works that address broad challenges in both theoretical and applied aspects of dynamic wireless sensor networks WSNs for intelligent and smart applications in a variety of environments It presents the most central concepts associated with Dynamic Wireless Sensor Networks applications and discusses issues surrounding Wireless Sensor Network Structures for complex and mobile based applications The book subsequently discusses several topics related to energy management in dynamic WSNs and reviews the steps involved in building a secure and trusted data transmission model using the WSN applications of intelligent environments Lastly it discusses the applications of WSNs in live data systems such as SCADA systems Readers will discover a collection of high quality research works that address broad challenges in both theoretical and applied aspects of WSNs for intelligent real life applications In addition the book presents original research on the application of a dynamic WSN to solve the problem of energy consumption in a secure WSN during the process of data aggregation and transmission Written by respected experts in the field the book will stimulate further efforts in the application of the intelligent WSNs model helping to solve the problem of data processing in a limited resource WSN based environment *Wireless Sensor Networks* Siva Yellampalli, 2021-09-15 Wireless sensor networks WSNs consist of tiny sensors capable of sensing computing and communicating Due to advances in semiconductors networking and material science technologies it is now possible to deploy large scale WSNs The advancement in these technologies has not only decreased the deployment and maintenance costs of networks but has also increased the life of networks and made them more rugged As WSNs become more reliable with lower maintenance costs they are being deployed and used across various sectors for multiple applications This book discusses the applications challenges and design and deployment techniques of WSNs **Handbook of Research on Developments and Trends in Wireless Sensor Networks** Hai Jin, 2010 This book showcases the work many devoted wireless sensor network researchers all over world and exhibits the up to date developments of WSNs from various perspectives Provided by publisher Principles of Wireless Sensor Networks Mohammad S. Obaidat, Sudip Misra, 2014-12-04 Wireless sensor networks are an emerging technology with a wide range of applications in military and civilian domains The 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 The concise but clear presentation of the important principles techniques and applications of wireless sensor networks makes this guide an excellent introduction for anyone new to the subject as well as an ideal reference for practitioners and researchers *Wireless Sensor Networks* Feng Zhao, Leonidas J. Guibas, 2004-07-06 Publisher Description Building Sensor Networks Ioanis Nikolaidis, Krzysztof Iniewski, 2013-09-19 For all the interest that

wireless sensor networks have created over the past decade there are few examples to show that they are truly delivering on this promise and anticipation What is missing Deviating from the usual focus on routing and energy efficiency Building Sensor Networks From Design to Applications attempts to stitch together the path from conceptual development of applications on one end to actual complete applications at the other With this change in perspective the book examines important facets of wireless sensor networks WSNs that are not often discussed in the literature From Design Practices to the Networking Protocols that Glue Applications Together Organized into three sections the book presents insights from international experts representing both industry and academia The first section on design practices explores alternative ways to approach the tasks of developing a suitable WSN solution to an application and assisting that development in a manner that is not necessarily tied to a particular application The second section on networking protocols illustrates the impact of the intermediaries the glue of putting applications together Chapters look at ways to address traffic delays in network clustering and the coexistence of a WSN with other systems on a frequency band The final section of the book delves into experiences with applications in chemical sensing defense global trade and security and ecosystem monitoring Although these applications may fail the purist definition of an ideal WSN they offer valuable lessons for the future development and deployment of WSNs Challenge Your Thinking about Designing WSN Applications Emphasizing the need to build applications the contributors present examples of what applications of WSNs could look like and identify the constraints Throughout the book challenges and illuminates your thinking about how to tame the complexity of designing a WSN application It is essential reading for anyone interested in future wireless technologies *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 **Introduction to Wireless Sensor Networks** Anna Forster, 2016-12-14 Explores real world wireless sensor network development deployment and applications Presents state of the art protocols and algorithms

Includes end of chapter summaries exercises and references For students there are hardware overviews reading links programming examples and tests available at website For Instructors there are PowerPoint slides and solutions available at website

Wireless Sensor Networks Jun Zheng, Abbas Jamalipour, 2009-10-27 Learn the fundamental concepts major challenges and effective solutions in wireless sensor networking This book provides a comprehensive and systematic introduction to the fundamental concepts major challenges and effective solutions in wireless sensor networking WSN Distinguished from other books it focuses on the networking aspects of WSNs and covers the most important networking issues including network architecture design medium access control routing and data dissemination node clustering node localization query processing data aggregation transport and quality of service time synchronization network security and sensor network standards With contributions from internationally renowned researchers Wireless Sensor Networks expertly strikes a balance between fundamental concepts and state of the art technologies providing readers with unprecedented insights into WSNs from a networking perspective It is essential reading for a broad audience including academic researchers research engineers and practitioners in industry It is also suitable as a textbook or supplementary reading for electrical engineering computer engineering and computer science courses at the graduate level

Wireless Sensor Networks and Applications Yingshu Li, My T. Thai, 2010-11-29 A crucial reference tool for the increasing number of scientists who depend upon sensor networks in a widening variety of ways Coverage includes network design and modeling network management data management security and applications The topic covered in each chapter receives expository as well as scholarly treatment covering its history reviewing state of the art thinking relative to the topic and discussing currently unsolved problems of special interest

Low-Power Wireless Sensor Networks Jukka Suhonen, Mikko Kohvakka, Ville Kaseva, Timo D. Hämäläinen, Marko Hännikäinen, 2012-01-14 Wireless sensor network WSN is an ad hoc network technology comprising even thousands of autonomic and self organizing nodes that combine environmental sensing data processing and wireless networking The applications for sensor networks range from home and industrial environments to military uses Unlike the traditional computer networks a WSN is application oriented and deployed for a specific task WSNs are data centric which means that messages are not sent to individual nodes but to geographical locations or regions based on the data content A WSN node is typically battery powered and characterized by extremely small size and low cost As a result the processing power memory and energy resources of an individual sensor node are limited However the feasibility of a WSN lies on the collaboration between the nodes A reference WSN node comprises a Micro Controller Unit MCU having few Million Instructions Per Second MIPS processing speed tens of kilobytes program memory few kilobytes data memory In addition the node contains a short range radio and a set of sensors Supply power is typically obtained with small batteries Assuming a target lifetime of one year using AA size batteries the available power budget is around 1 mW This book covers the low power WSNs services ranging from hardware platforms and communication protocols to network

deployment and sensor data collection and actuation The implications of resource constraints and expected performance in terms of throughput reliability and latency are explained As a case study this book presents experiments with low energy TUTWSN technology to illustrate the possibilities and limitations of WSN applications

Sensor Networks and Configuration Nitaigour P. Mahalik, 2007-06-04 Advances in networking influence many kinds of monitoring and control systems in the most dramatic way Sensor network and configuration falls under the category of modern networking systems Wireless Sensor Network WSN has emerged and caters to the need for real world applications Methodology and design of WSN represents a broad research topic with applications in many sectors such as industry home computing agriculture environment and so on based on the adoption of fundamental principles and the state of the art technology WSN has been preferred choice for the design and development of next generation monitoring and control systems 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 in terms of basics standardization design process practice techniques platforms and experimental results have been presented in proper order

A Complete Guide to Wireless Sensor Networks Ankur Dumka, Sandip K. Chaurasiya, Arindam Biswas, Hardwari Lal Mandoria, 2019-05-31 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

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.

Industrial Wireless Sensor Networks V. Çağrı Güngör, Gerhard P. Hancke, 2017-12-19. The collaborative nature of industrial wireless sensor networks (IWSNs) brings several advantages over traditional wired industrial monitoring and control systems, including self organization, rapid deployment, flexibility and inherent intelligent processing. In this regard, IWSNs play a vital role in creating more reliable, efficient and productive industrial systems, thus improving companies' competitiveness in the marketplace. *Industrial Wireless Sensor Networks: Applications, Protocols and Standards* examines the current state of the art in industrial wireless sensor networks and outlines future directions for research. *What Are the Main Challenges in Developing IWSN Systems?* Featuring contributions by researchers around the world, this book explores the software and hardware platforms, protocols and standards that are needed to address the unique challenges posed by IWSN systems. It offers an in depth review of emerging and already deployed IWSN applications and technologies and outlines technical issues and design objectives. In particular, the book covers radio technologies, energy harvesting techniques and network and resource management. It also discusses issues critical to industrial applications such as latency, fault tolerance, synchronization, real time constraints, network security and cross layer design. A chapter on standards highlights the need for specific wireless communication standards for industrial applications. *A Starting Point for Further Research: Delving into wireless sensor networks from an industrial perspective*, this comprehensive work provides readers with a better understanding of the potential advantages and research challenges of IWSN applications. A contemporary reference for anyone working at the cutting edge of industrial automation, communication systems and networks, it will inspire further exploration in this promising research area.

Building Wireless Sensor Networks Nandini Mukherjee, Sarmistha Neogy, Sarbani Roy, 2017-12-19. *Building Wireless Sensor Networks: Theoretical and Practical Perspectives* presents the state of the art of wireless sensor networks (WSNs) from fundamental concepts to cutting edge technologies. Focusing on WSN topics ideal for undergraduate and postgraduate curricula, this book provides essential knowledge of the contemporary theory and practice of wireless sensor networking.

Describes WSN architectures protocols and operating systems Details the routing and data aggregation algorithms
Addresses WSN security and energy efficiency Includes sample programs for experimentation The book offers overarching coverage of this exciting field filling a critical gap in the existing literature 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** C.S. Raghavendra,Krishna M. Sivalingam,Taieb Znati,2005-07-01 Wireless Sensor Networks presents a comprehensive and tightly organized compilation of chapters that surveys many of the exciting research developments taking place in this field Chapters are written by several of the leading researchers exclusively for this book Authors address many of the key challenges faced in the design analysis and deployment of wireless sensor networks

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