Recent Development In Wireless Sensor And Ad Hoc Networks Signals And Communication Technology

A one-stop resource for the use of algorithms and protocols in wireless sensor networks From an established international researcher in the field, this edited volume provides readers with comprehensive coverage of the fundamental algorithms and protocols for wireless sensor networks. It identifies the research that needs to be conducted on a number of levels to design and assess the deployment of wireless sensor networks, and provides an in-depth analysis of the development of the next generation of heterogeneous wireless sensor networks. Divided into nineteen succinct chapters, the book covers: mobility management and resource allocation algorithms; communication models; energy and power consumption algorithms; performance modeling and simulation; authentication and reputation mechanisms; algorithms for wireless sensor and mesh networks; and algorithm methods for pervasive and ubiquitous computing; among other topics. Complete with a set of challenging exercises, this book is a valuable resource for electrical engineers, computer engineers, network engineers, and computer science specialists. Useful for instructors and students alike, Algorithms and Protocols for Wireless Sensor Networks is an ideal textbook for advanced undergraduate and graduate courses in computer science, electrical engineering,and network engineering.

Wireless sensors and sensor networks (WSNs) are nowadays becoming increasingly important due to their decisive advantages. Different trends towards the Internet of Things (IoT), Industry 4.0 and 5G Networks address massive sensing and admit to have wireless sensors delivering measurement data directly to the Web in a reliable and easy manner. These sensors can only be supported, if sufficient energy efficiency and flexible solutions are developed for energy-aware wireless sensor nodes. In the last years, different possibilities for energy harvesting have been investigated showing a high level of maturity. This book gives therefore an overview on fundamentals and techniques for energy harvesting and energy transfer from different points of view. Different techniques and methods for energy transfer, management and energy saving on network level are reported together with selected interesting applications. The book is interesting for researchers, developers and students in the field of sensors, wireless sensors, WSNs, IoT and manifold application fields using related technologies. The book is organized in four major parts. The first part of the book introduces essential fundamentals and methods, while the second part focusses on vibration converters and hybridization. The third part is dedicated to wireless energy transfer, including both RF and inductive energy transfer. Finally, the fourth part of the book treats energy saving and management strategies. The main contents are: Essential fundamentals and methods of wireless sensors Energy harvesting from vibration Hybrid vibration energy converters Electromagnetic transducers Piezoelectric transducers Magneto-electric transducers Non-linear broadband converters Energy transfer via magnetic fields RF energy transfer Energy saving techniques Energy management strategies Energy management on network level Applications in agriculture Applications in structural health monitoring Application in power grids Prof. Dr. Olfa Kanoun is professor for measurement and sensor technology at Chemnitz university of technology. She is specialist in the field of sensors and sensor systems design.

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

The recent development of communication and sensor technology results in the growth of a new attractive and challenging area - wireless sensor networks (WSNs). A wireless sensor network which consists of a large number of sensor nodes is deployed in environmental fields to serve various applications. Facilitated with the ability of wireless communication and intelligent computation, these nodes become smart sensors which do not only perceive ambient physical parameters but also be able to process information, cooperate with each other and self-organize into the network. These new features assist the sensor nodes as well as the network to operate more efficiently in terms of both data acquisition and energy consumption. Special purposes of the applications require design and operation of WSNs different from conventional networks such as the internet. The network design must take into account of the objectives of specific applications. The nature of deployed environment must be considered. The limited of sensor nodes resources such as memory, computational ability, communication bandwidth and energy source are the challenges in network design. A smart wireless sensor network must be able to deal with these constraints as well as to guarantee the connectivity, coverage, reliability and security of network's operation for a maximized lifetime. This book discusses various aspects of designing such smart wireless sensor networks. Main topics includes: design methodologies, network protocols and algorithms, quality of service management, coverage optimization, time synchronization and security techniques for sensor networks.

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.

Wireless sensor networks are penetrating our daily lives, and they are starting to be deployed even in an industrial environment. The research on such industrial wireless sensor networks (IWSNs) considers more stringent requirements of robustness, reliability, and timeliness in each network layer. This Special Issue presents the recent research result on industrial wireless sensor networks. Each paper in this Special Issue has unique contributions in the advancements of industrial wireless sensor network research and we expect each paper to promote the relevant research and the deployment of IWSNs.

Wireless sensor networks have become an intricate and necessary addition to daily life by providing an energy efficient way to

collect and monitor data while rerouting the information to a centralized location. As the application of these networks becomes more common, it becomes imperative to evaluate their effectiveness, as well as other opportunities for possible implementation in the future. The Handbook of Research on Wireless Sensor Network Trends, Technologies, and Applications provides inclusive coverage on the processing and applications of wireless communication, sensor networks, and mobile computing. Investigating emergent research and theoretical concepts in the area of wireless sensors and their applications to daily life, this handbook of research is a critical reference source for students, researchers, engineers, scientists, and working professionals.

Mobile ad-hoc networks have attracted considerable attention and interest from the commercial sector as well as the standards community. Many new ad-hoc networking applications have been conceived to help enable new commercial and personal communication beyond the domain of tactical networks, including personal area networking, home networking, law enforcement operations, search and rescue operations, commercial and educational applications, and sensor networks. Emerging Technologies in Wireless Ad-hoc Networks: Applications and Future Development provides the rationale, state-of-the-art studies and practical applications, proof-of-concepts, experimental studies, and future development on the use of emerging technologies in wireless ad-hoc networks. In addition, this work explores emerging wireless ad hoc technologies based on communication coverage areas: body sensor networks, personal area networks, local area networks, and metropolitan area networks and their applications in critical sectors, for example, agriculture, environment, public health and public transportation.

Tremendous technological advances have been made in the development of low-cost sensor devices equipped with wireless network interfaces. The area of wireless sensor networks is rapidly growing as new technologies emerge and new applications are developed. This book introduces networked embedded systems, smart sensors, and wireless sensor networks, with a strong focus on architecture, applications, networks and distributed systems support for wireless sensor networks. The issues and challenges for the development of wireless sensor networks not only encompass a broad spectrum of research topics but also give rise to the evolution of a new breed of multi-disciplinary wireless network applications. Such sensor networks may be used for applications spanning several domains including military, medical, industrial, and home networks. Wireless Sensor Network Designs: Covers the newest sensor technology, design issues, problems and solutions Explains a broad range of topics such as networked embedded systems, smart sensor networks, power-aware sensor networks, routing, clustering, security, operating systems, and networks support Includes a comprehensive bibliography Provides a descriptive tutorial suitable for graduate students and newcomers to this exciting field of telecoms

The aim of this book is to present few important issues of WSNs, from the application, design and technology points of view. The book highlights power efficient design issues related to wireless sensor networks, the existing WSN applications, and discusses the research efforts being undertaken in this field which put the reader in good pace to be able to understand more advanced research and make a contribution in this field for themselves. It is believed that this book serves as a comprehensive reference for graduate and undergraduate senior students who seek to learn latest development in wireless sensor networks.

"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.

Security of Wireless Sensor Networks: Current Status and Key Issues.

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.

Industrial Wireless Sensor Networks: Monitoring, Control and Automation explores the explosive growth that has occurred in the use of wireless sensor networks in a variety of applications during the last few years. As wireless technology can reduce costs, increase productivity, and ease maintenance, the book looks at the progress in standardization efforts regarding reliability, security, performance, power consumption, and integration. Early sections of the book discuss issues such as media access control (MAC), antenna design and site survey, energy harvesting, and explosion-proof design. Subsequent sections present WSN standards, including ISA100, ZigBeeTM, WifiTM, WirelessHARTTM and 6loWPAN, and the applications of WSNs in the oil and gas, chemical, food, and nuclear power industries. Reviews technologies and standards for industrial wireless sensor networks Considers particular applications for the technology and their ability to reduce costs, increase productivity, and ease maintenance Focuses on industry needs and standardization efforts regarding reliability, security, performance, power consumption, and integration.

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 trend 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 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.

This book is a printed edition of the Special Issue "Wireless Sensor and Actuator Networks for Smart Cities" that was published in JSAN

Information processing in sensor networks is a rapidly emerging area of computer science and electrical engineering research. This text introduces the fundamental issues and constraints concerning various aspects of sensor networks, using examples from current research and implementation efforts.

This book constitutes the refereed proceedings of the First European Conference on Software Architecture, ECSA 2007, held in Aranjuez, Spain, September 24-26, 2007.The 12 revised long papers presented together with 4 short papers were carefully reviewed and selected from 62 submissions. Topics include description languages and metamodels, architecture-based code generation, run-time monitoring, requirements engineering, service-oriented architectures, aspect-oriented software architectures, ontology-based approaches, autonomic systems, middleware and web services.

The field of computational intelligence has grown tremendously over that past five years, thanks to evolving soft computing and artificial intelligent methodologies, tools and techniques for envisaging the essence of intelligence embedded in real life observations. Consequently, scientists have been able to explain and understand real life processes and practices which previously often remain unexplored by virtue of their underlying imprecision, uncertainties and redundancies, and the unavailability of appropriate methods for describing the incompleteness and vagueness of information represented. With the advent of the field of computational intelligence, researchers are now able to explore and unearth the intelligence, otherwise insurmountable, embedded in the systems under consideration. Computational Intelligence is now not limited to only specific computational fields, it has made inroads in signal processing, smart manufacturing, predictive control, robot navigation, smart cities, and sensor design to name a few. Recent Trends in Computational Intelligence Enabled Research: Theoretical Foundations and Applications explores the use of this computational paradigm across a wide range of applied domains which handle meaningful information. Chapters investigate a broad spectrum of the applications of computational intelligence across different platforms and disciplines, expanding our knowledge base of various research initiatives in this direction. This volume aims to bring together researchers, engineers, developers and practitioners from academia and industry working in all major areas and interdisciplinary areas of computational intelligence, communication systems, computer networks, and soft computing. Provides insights into the theory, algorithms, implementation, and application of computational intelligence techniques Covers a wide range of applications of deep learning across various domains which are researching the applications of computational intelligence Investigates novel techniques and reviews the state-of-the-art in the areas of machine learning, computer vision, soft computing techniques Provides unique coverage of wireless sensor system applications in space, underwater, underground, and extreme industrial environments in one volume This book covers the challenging aspects of wireless sensor systems and the problems and conditions encountered when applying them in outer space, under the water, below the ground, and in extreme industrial environments. It explores the unique aspects of designs and solutions that address those problems and challenges, and illuminates the connections, similarities, and differences between the challenges and solutions in those various environments. The creation of Wireless Sensor Systems for Extreme Environments is a response to the spread of wireless sensor technology into fields of health, safety, manufacturing, space, environmental, smart cities, advanced robotics, surveillance, and agriculture. It is the first of its kind to present, in a single reference, the unique aspects of wireless sensor system design, development, and deployment in such extreme environments—and to explore the similarities and possible synergies between them. The application of wireless sensor systems in these varied environments has been lagging dramatically behind their application in more conventional environments, making this an especially relevant book for investigators and practitioners in all of these areas. Wireless Sensor Systems for Extreme Environments is presented in five parts that cover: Wireless Sensor Systems for Extreme Environments—Generic Solutions Space WSS Solutions and Applications Underwater and Submerged WSS Solutions Underground and Confined Environments WSS Solutions Industrial and Other WSS Solutions This book is a welcome guide for researchers, post-graduate students, engineers and scientists who design and build operational and environmental control systems, emergency response systems, and situational awareness systems for unconventional environments.

The twentieth century ended with the vision of smart dust: a network of wirelessly connected devices whose size would match that of a dust particle, each one a se- containedpackageequippedwithsensing,computation,communication,andpower. Smart dust held the promise to bridge the physical and digital worlds in the most unobtrusive manner, blending together realms that were previously considered well separated. Applications involved scattering hundreds, or even thousands, of smart dust devices to monitor various environmental quantities in scenarios ranging from habitat monitoring to disaster management. The devices were envisioned to se- organize to accomplish their task in the most ef?cient way. As such, smart dust would become a powerful tool, assisting the daily activities of scientists and en- neers in a wide range of disparate disciplines. Wireless sensor networks (WSNs), as we know them today, are the most no- worthy attempt at implementing the smart dust vision. In the last decade, this ?eld has seen a fast-growing investment from both academia and industry. Signi?cant ?nancial resources and manpower have gone into making the smart dust vision a reality through WSNs. Yet, we still cannot claim complete success. At present, only specialist computerscientists or computerengineershave the necessary background to walk the road from conception to a ?nal, deployed, and running WSN system.

Recent Development in Wireless Sensor and Ad-hoc NetworksSpringer

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.

When choosing the technology options to develop a wireless sensor network (WSN), it is vital that their performance levels can be assessed for the type of application intended. This book describes the different technology options – MAC protocols, routing protocols, localisation and data fusion techniques – and provides the means to numerically measure their performance, whether by simulation, mathematical models or experimental test beds. Case studies, based on the authors' direct experience of implementing wireless sensor networks, describe the design methodology and the type of measurements used, together with samples of the performance measurements attained. The book will enable you to answer vital questions such as: * How long will my network remain alive given the amount of sensing required of it? * For how long should I set the sleeping state of my motes? * How many sensors should I distribute to meet the expected requirements of the application? * What type of throughput should I expect as a function of the number of nodes deployed and the radio interface chosen (whether it be Bluetooth or Zigbee)? * How is the Packet Error Rate of my Zigbee motes affected by the selection of adjacent frequency sub bands in the ISM 2.4GHz band? * How is the localisation precision dependant on the number of nodes deployed in a corridor? Communications and signal processing engineers, researchers and graduate students working in wireless sensor networks will find this book an invaluable practical guide to this important technology. "This book gives a proper balance between theory and application; it is a book for those R&D engineers that want to appreciate both why, how and in which domains Wireless Sensor Networks can be best applied." - Fabio Bellifemine, Telecom Italia "This book is a thorough and accessible exposition on wireless sensor networks with a good balance between theory and practice; it is valuable for both students and practicing engineers, and is an essential addition for engineering libraries." - Professor Moe Win, Associate Professor at the Laboratory for Information and Decision Systems (LIDS), Massachusetts Institute of Technology *Only book to examine wireless sensor network technologies and assess their performance capabilities against possible applications *Enables the engineer to choose the technology that will give the best performance for the intended application *Case studies, based on the authors' direct experience of implementing wireless sensor networks, describe the design methodology and the type of measurements used, together with samples of the performance measurements attained

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 Laurate 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.

This edited book presents a comprehensive taxonomy of the various energy harvesting sources and techniques that can be used by WSN, IoT, and cyberphysical systems. It covers various recently proposed energy harvesting, energy management and energy prediction models that have the potential to maximize the energy harvested. It also identifies major advances for different architectures to develop cost-effective, efficient, and reliable energy harvesting systems for emerging systems. A final chapter discusses future challenges and research opportunities.

"This book provides a central source of reference on visual information processing in wireless sensor network environments and its technology, application, and society issues"--

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.

Emerging Communication Technologies Based on Wireless Sensor Networks: Current Research and Future Applications fills a gap in the existing literature by combining a plethora of WSN-based emerging technologies into a single source so that researchers can form opinions regarding these technologies. It presents different types of emerging communication technologies based on WSNs and describes how wireless sensor networks can be integrated with other communication technologies. It covers many of the new techniques and demonstrates the application of WSNs. The book's 14 chapters are divided into four parts. The first part covers the basics of wireless sensor networks and their principal working methods. The authors then move on to discuss different types of WSNs, characteristics of different types of emerging technologies based on WSNs, renewable energy sources, battery replenishment strategies, and application-specific energy challenges of WSNs. The second part is dedicated to issues related to wireless body area networks (WBANs). It

discusses wearable WSNs and their applications, standards, and research trends. The authors also discuss routing schemes devised for WBANs and thermal-aware routing protocols for WBANs. The third part focuses on different emerging communication technologies based on WSNs, including electromagnetic wireless nanosensor networks, WSNs in the IoT, management of WSNs through satellite networks, WSNs in smart homes, and cognitive radio technology in conjunction with WSNs. The last part of the book covers topics generally related to typical WSNs, including energy-efficient data collection in WSNs, key distribution mechanisms in WSNs, distributed data gathering algorithms for mobile WSNs, and finally, a novel mobility scheme for WSNs that supports IPv6.

Infrastructure for Homeland Security Environments Wireless Sensor Networks helps readers discover the emerging field of low-cost standards-based sensors that promise a high order of spatial and temporal resolution and accuracy in an ever-increasing universe of applications. It shares the latest advances in science and engineering paving the way towards a large plethora of new applications in such areas as infrastructure protection and security, healthcare, energy, food safety, RFID, ZigBee, and processing. Unlike other books on wireless sensor networks that focus on limited topics in the field, this book is a broad introduction that covers all the major technology, standards, and application topics. It contains everything readers need to know to enter this burgeoning field, including current applications and promising research and development; communication and networking protocols; middleware architecture for wireless sensor networks; and security and management. The straightforward and engaging writing style of this book makes even complex concepts and processes easy to follow and understand. In addition, it offers several features that help readers grasp the material and then apply their knowledge in designing their own wireless sensor network systems: * Examples illustrate how concepts are applied to the development and application of * wireless sensor networks * Detailed case studies set forth all the steps of design and implementation needed to solve real-world problems * Chapter conclusions that serve as an excellent review by stressing the chapter's key concepts * References in each chapter guide readers to in-depth discussions of individual topics This book is ideal for networking designers and engineers who want to fully exploit this new technology and for government employees who are concerned about homeland security. With its examples, it is appropriate for use as a coursebook for upper-level undergraduates and graduate students.

This book explores various challenging problems and applications areas of wireless sensor networks (WSNs), and identifies the current issues and future research challenges. Discussing the latest developments and advances, it covers all aspects of in WSNs, from architecture to protocols design, and from algorithm development to synchronization issues. As such the book is an essential reference resource for undergraduate and postgraduate students as well as scholars and academics working in the field.

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.

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