wireless sensor networks for healthcare applications

#wireless sensor networks #healthcare WSN solutions #remote patient monitoring #medical IoT devices #eHealth technology

Explore how wireless sensor networks (WSN) are revolutionizing healthcare applications, enabling advanced remote patient monitoring, efficient data collection, and personalized care. These WSN healthcare solutions enhance patient safety, facilitate proactive interventions, and improve overall medical efficiency through innovative medical IoT devices, making healthcare more accessible and effective.

Wireless Sensor Networks for Healthcare Applications

This unique reference focuses on methods of application, validation and testing based on real deployments of sensor networks in the clinical and home environments. Key topics include healthcare and wireless sensors, sensor network applications, designs of experiments using sensors, data collection and decision making, clinical deployment of wireless sensor networks, contextual awareness medication prompting field trials in homes, social health monitoring, and the future of wireless sensor networks in healthcare.

Co-operative and Energy Efficient Body Area and Wireless Sensor Networks for Healthcare Applications

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.

Wearable Technologies and Wireless Body Sensor Networks for Healthcare

Continuous advances in wearables, sensors and smart Wireless Body Area Network technologies have precipitated the development of new applications for on-, in- and body-to-body wearable communications for healthcare and sport monitoring. Progress in this cross-disciplinary field is further influenced by developments in radio communication, protocols, synchronization aspects, energy harvesting and storage solutions, and efficient processing techniques for smart antennas. This book covers various scenarios and solutions using sensor devices and systems for activity recognition and their applications, including wearable communication, smart sensing, RF propagation, and measurement. The authors illustrate conceptual aspects and applications, and provide a new vision in characterising wearable technologies and the need for interoperability. Energy harvesting within wearable solutions is a key issue addressed here as it helps increase energy efficiency and reliability in wearable antennas and sensor devices.

Wireless Sensor Networks

The most emerging technology of sensor networks is the use of them in the medical care to save patients lives, create valuable data for medical research, and cut the cost of medical services. Recently, body sensor networks are used for remote health monitoring and patient care. This book, therefore, attempts to provide of unified overview of broader field of Wireless Sensor Networks in healthcare applications. The organization of the book starts with the background of wireless sensor networks, and then completes description of the patient health metrics: heart rate and blood oxygen saturation (SpO2) by using body sensor networks for better treatment. In this book the idea of architecture of wireless sensor networks is presented for the monitoring of patients different health metrics: heart rate and blood oxygen saturation levels for treatment at home. The main focus of book is to examine, monitor and analyze patient heart beat activities and oxygen saturation level in order to meet better treatment and health care. In addition this book provides countermeasures of different security attacks related to data gathering from different sensors.

IoT and WSN Applications for Modern Agricultural Advancements: Emerging Research and Opportunities

Currently, the demand by consumption of agricultural products may be predicted quantitatively; moreover, the variation of harvest and production by the change of a farm's cultivated area, weather change, disease, insect damage, etc. is a challenge that has led to improper control of the supply and demand of agricultural products. Advancements in IoT and wireless sensor networks in precision agriculture and the cloud computing technology needed to deploy them can be used to address and solve these issues. IoT and WSN Applications for Modern Agricultural Advancements: Emerging Research and Opportunities is an essential research book that focuses on the development of effective data-computing operations on agricultural advancements that are fully supported by IoT, cloud computing, and wireless sensor network systems and explores prospective applications of computing, analytics, and networking in various interdisciplinary domains of engineering. Featuring a range of topics such as power monitoring, healthcare, and GIS, this book is ideal for IT practitioners, farmers, network analysts, researchers, professionals, academicians, industry experts, and students.

Sensors for Everyday Life

Sensors were developed to detect and quantify structures and functions of human body as well as to gather information from the environment in order to optimize the efficiency, cost-effectiveness and quality of healthcare services as well as to improve health and quality of life. This book offers an up-to-date overview of the concepts, modeling, technical and technological details and practical applications of different types of sensors. It also discusses the trends for the next generation of sensors and systems for healthcare settings. It is aimed at researchers and graduate students in the field of healthcare technologies, as well as academics and industry professionals involved in developing sensing systems for human body structures and functions, and for monitoring activities and health.

Incorporating the Internet of Things in Healthcare Applications and Wearable Devices

The internet of things (IoT) has had a major impact on academic and industrial fields. Applying these technologies to healthcare systems reduces medical costs while enriching the patient-centric approach to medicine, allowing for better overall healthcare proficiency. However, usage of IoT in healthcare is still suffering from significant challenges with respect to the cost and accuracy of medical sensors, non-standard IoT system architectures, assorted wearable devices, the huge volume of generated

data, and interoperability issues. Incorporating the Internet of Things in Healthcare Applications and Wearable Devices is an essential publication that examines existing challenges and provides solutions for building smart healthcare systems with the latest IoT-enabled technology and addresses how IoT improves the proficiency of healthcare with respect to wireless sensor networks. While highlighting topics including mobility management, sensor integration, and data analytics, this book is ideally designed for computer scientists, bioinformatics analysts, doctors, nurses, hospital executives, medical students, IT specialists, software developers, computer engineers, industry professionals, academicians, researchers, and students seeking current research on how these emerging wireless technologies improve efficiency within the healthcare domain.

Sensor Technologies

Sensor Technologies: Healthcare, Wellness and Environmental Applications explores the key aspects of sensor technologies, covering wired, wireless, and discrete sensors for the specific application domains of healthcare, wellness and environmental sensing. It discusses the social, regulatory, and design considerations specific to these domains. The book provides an application-based approach using real-world examples to illustrate the application of sensor technologies in a practical and experiential manner. The book guides the reader from the formulation of the research question, through the design and validation process, to the deployment and management phase of sensor applications. The processes and examples used in the book are primarily based on research carried out by Intel or joint academic research programs. “Sensor Technologies: Healthcare, Wellness and Environmental Applications provides an extensive overview of sensing technologies and their applications in healthcare, wellness, and environmental monitoring. From sensor hardware to system applications and case studies, this book gives readers an in-depth understanding of the technologies and how they can be applied. I would highly recommend it to students or researchers who are interested in wireless sensing technologies and the associated applications.” Dr. Benny Lo Lecturer, The Hamlyn Centre, Imperial College of London “This timely addition to the literature on sensors covers the broad complexity of sensing, sensor types, and the vast range of existing and emerging applications in a very clearly written and accessible manner. It is particularly good at capturing the exciting possibilities that will occur as sensor networks merge with cloud-based ‘big data’ analytics to provide a host of new applications that will impact directly on the individual in ways we cannot fully predict at present. It really brings this home through the use of carefully chosen case studies that bring the overwhelming concept of 'big data' down to the personal level of individual life and health.” Dermot Diamond Director, National Centre for Sensor Research, Principal Investigator, CLARITY Centre for Sensor Web Technologies, Dublin City University "Sensor Technologies: Healthcare, Wellness and Environmental Applications takes the reader on an end-to-end journey of sensor technologies, covering the fundamentals from an engineering perspective, introducing how the data gleaned can be both processed and visualized, in addition to offering exemplar case studies in a number of application domains. It is a must-read for those studying any undergraduate course that involves sensor technologies. It also provides a thorough foundation for those involved in the research and development of applied sensor systems. I highly recommend it to any engineer who wishes to broaden their knowledge in this area!" Chris Nugent Professor of Biomedical Engineering, University of Ulster

Technological Breakthroughs in Modern Wireless Sensor Applications

Collecting and processing data is a necessary aspect of living in a technologically advanced society. Whether it's monitoring events, controlling different variables, or using decision-making applications, it is important to have a system that is both inexpensive and capable of coping with high amounts of data. Technological Breakthroughs in Modern Wireless Sensor Applications brings together new ways to process and monitor data, and to put it to work in everything from intelligent transportation systems to healthcare to multimedia applications. This book is an essential reference source for research and development engineers, graduate students, academics, and researchers interested in intelligent engineering, internetworking, routing, and network planning algorithms.

Wireless Sensor Networks

A wireless sensor network (WSN) consists of spatially distributed autonomous sensors to co-operatively monitor physical or environmental conditions, such as temperature, sound, vibration, pressure, motion or pollutants. The development of wireless sensor networks was motivated by military applications such as battlefield surveillance. They are now used in many industrial and civilian application

areas, including industrial process monitoring and control, machine health monitoring, environment and habitat monitoring, healthcare applications, home automation, and traffic control. This book gathers and presents topical research data from around the globe in the field of wireless sensor networks.

Pervasive and Mobile Sensing and Computing for Healthcare

The pervasive healthcare system focus towards achieving two specific goals: the availability of eHealth applications and medical information anywhere and anytime and the invisibility of computing. Furthermore, pervasive health system encompasses new types of sensing and communication of health information as well as new type of interactions among health providers and people, among patients, among patients and researchers and patients and corporations. This book aims at promoting the discussion on current trends in technologies and concepts that help integrate health monitoring and healthcare more seamlessly to our everyday lives, regardless of space and time, but also present cutting edge perspectives and visions to highlight future development. The book presents not only the state of the art technologies and solutions to tackle the critical challenges faced by the building and development of the pervasive health system but also potential impact on society at social, medical and technological level.

Wearable/Wireless Body Sensor Networks for Healthcare Applications

The 10 peer-reviewed papers collected here together offer a plenitude of up-to-date information on "Wearable/Wireless Body Sensor Networks for Healthcare Applications". The papers are conveniently arranged into: Chapter 1: Smart Fabrics and Wearables, Chapter 2: Implantable Devices, Chapter 3: Activity Recognition.

Wireless Medical Sensor Networks for IoT-based eHealth

Internet of Things (IoT) enabled technology is evolving healthcare from conventional hub-based systems to more personalized eHealth systems, enabling faster and safer preventive care, lower overall cost, improved patient-centric practice and enhanced sustainability. Efficient IoT-enabled eHealth systems can be realized by providing highly customized access to rich medical information and efficient clinical decisions to each individual with unobtrusive monitoring. Wireless medical sensor networks (WMSNs) are at the heart of this concept, and their development is a key issue if such a concept is to achieve its potential.

Body Sensor Networks

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

Wireless Sensor Networks

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.

Wireless Health

This book provides a candid assessment and practical knowledge about the current technological advancements of the wireless healthcare system. This book presents the competencies of modeling e-health framework, medical wireless body sensor networks, communication technologies for mobile health, nanotechnology innovations in medicine, security issues for medical records, personalized services in healthcare applications, and Big Data for wireless health. This book covers multiple research perspectives in order to address the strong need for interdisciplinary research in the area of wireless health, such as the interactive research among biomedical sensor technology, intelligent textiles and advanced wireless network technology. The interactions involve experts from multidisciplinary fields including medical, information technology and computing fields. Designed as a study tool for graduate students, researchers, and medical professionals, this book is also valuable for business managers, entrepreneurs, and investors within the medical and healthcare industries. It is useful for anyone who cares about the future opportunities in healthcare systems.

5G Impact on Biomedical Engineering

Considering the importance of wireless networks in healthcare, this book is dedicated to studying the innovations and advancements of wireless networks for biomedical application and their impact. This book focuses on a wide range of wireless technologies related to healthcare and biomedical applications which include, among others, body sensor networks, mobile networks, internet of things, mobile cloud computing, pervasive computing and wearable computing. First the authors explain how biomedical applications using wireless technologies are built across networks. The authors also detail 5G spectrum splicing for medical applicatons. They then discuss how wearable computing can be used as activity recognition tools for biomedical applications through remote health monitoring and and remote health risk assessment. Finally the authors provide detailed discussions on security and privacy in wirelessly transmitted medical senor data. This book targets research-oriented and professional readers. It would fit as a recommended supplemental reading for graduate students. It also helps researchers enter the field of wireless biomedical applications.

Wireless Sensor and Mobile Ad-Hoc Networks

Wireless sensor Networks: Vehicle and Space Applications describes the practical perspectives in using wireless sensor networks (WSN) to develop real world applications that can be used for space exploration. These applications include sensor interfaces, remote wireless vehicles, space crew health monitoring and instrumentation. The material discusses how applications of WSN originally developed for space travel and exploration are being applied and used in multiple real world applications, allowing for the development of smart systems that have characteristics such as self healing, self diagnosis, and emergency healthcare notification.

Healthcare Sensor Networks

Healthcare sensor networks (HSNs) now offer the possibility to continuously monitor human activity and physiological signals in a mobile environment. Such sensor networks may be able to reduce the

strain on the present healthcare workforce by providing new autonomous monitoring services ranging from simple user-reminder systems to more advanced mon

Sensors for Health Monitoring

Sensors for Health Monitoring discusses the characteristics of U-Healthcare systems in different domains, providing a foundation for working professionals and undergraduate and postgraduate students. The book provides information and advice on how to choose the best sensors for a U-Healthcare system, advises and guides readers on how to overcome challenges relating to data acquisition and signal processing, and presents comprehensive coverage of up-to-date requirements in hardware, communication and calculation for next-generation uHealth systems. It then compares new technological and technical trends and discusses how they address expected u-Health requirements. In addition, detailed information on system operations is presented and challenges in ubiquitous computing are highlighted. The book not only helps beginners with a holistic approach toward understanding u-Health systems, but also presents researchers with the technological trends and design challenges they may face when designing such systems. Presents an outstanding update on the use of U-Health data analysis and management tools in different applications, highlighting sensor systems Highlights Internet of Things enabled U-Healthcare Covers different data transmission techniques, applications and challenges with extensive case studies for U-Healthcare systems

Sensor Technology: Concepts, Methodologies, Tools, and Applications

Collecting and processing data is a necessary aspect of living in a technologically advanced society. Whether it’s monitoring events, controlling different variables, or using decision-making applications, it is important to have a system that is both inexpensive and capable of coping with high amounts of data. 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. Sensor Technology: Concepts, Methodologies, Tools, and Applications is a vital reference source that brings together new ways to process and monitor data and to put it to work in everything from intelligent transportation systems to healthcare to multimedia applications. It also provides inclusive coverage on the processing and applications of wireless communication, sensor networks, and mobile computing. Highlighting a range of topics such as internet of things, signal processing hardware, and wireless sensor technologies, this multi-volume book is ideally designed for research and development engineers, IT specialists, developers, graduate students, academics, and researchers.

Application and Multidisciplinary Aspects of Wireless Sensor Networks

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.

Wireless Networks and Security

“Wireless Networks and Security” provides a broad coverage of wireless security issues including cryptographic coprocessors, encryption, authentication, key management, attacks and countermeasures, secure routing, secure medium access control, intrusion detection, epidemics, security performance analysis, security issues in applications. The contributions identify various vulnerabilities in the physical layer, MAC layer, network layer, transport layer, and application layer, and focus on ways of strengthening security mechanisms and services throughout the layers. This carefully edited monograph is targeting for researchers, post-graduate students in universities, academics, and industry practitioners or professionals.

Smart Sensor Networks

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

Wireless Sensor Networks for Structural Health Monitoring

This brief covers the emerging area of wireless sensor network (WSN)-based structural health monitoring (SHM) systems, and introduces the authors’ WSN-based platform called SenetSHM. It helps the reader differentiate specific requirements of SHM applications from other traditional WSN applications, and demonstrates how these requirements are addressed by using a series of systematic approaches. The brief serves as a practical guide, explaining both the state-of-the-art technologies in domain-specific applications of WSNs, as well as the methodologies used to address the specific requirements for a WSN application. In particular, the brief offers instruction for problem formulation and problem solving based on the authors’ own experiences implementing SenetSHM. Seven concise chapters cover the development of hardware and software design of SenetSHM, as well as in-field experiments conducted while testing the platform. The brief’s exploration of the SenetSHM platform is a valuable feature for civil engineers designing their own similar SHM products, and the various concrete examples of problem formulation and algorithm design will make this an essential read for practitioners, researchers and students alike.

Wireless Sensor Networks

Over the past decade, there has been a prolific increase in the research, development and commercialisation of Wireless Sensor Networks (WSNs) and their associated technologies. WSNs have found application in a vast range of different domains, scenarios and disciplines. These have included healthcare, defence and security, environmental monitoring and building/structural health monitoring. However, as a result of the broad array of pertinent applications, WSN researchers have also realised the application specificity of the domain; it is incredibly difficult, if not impossible, to find an application-independent solution to most WSN problems. Hence, research into WSNs dictates the adoption of an application-centric design process. This book is not intended to be a comprehensive review of all WSN applications and deployments to date. Instead, it is a collection of state-of-the-art research papers discussing current applications and deployment experiences, but also the communication and data processing technologies that are fundamental in further developing solutions to applications. Whilst a common foundation is retained through all chapters, this book contains a broad array of often differing interpretations, configurations and limitations of WSNs, and this highlights the diversity of this ever-changing research area. The chapters have been categorised into three distinct sections:

applications and case studies, communication and networking, and information and data processing. The readership of this book is intended to be postgraduate/postdoctoral researchers and professional engineers, though some of the chapters may be of relevance to interested masters level students.

Wireless Medical Systems and Algorithms

Wireless Medical Systems and Algorithms: Design and Applications provides a state-of-the-art overview of the key steps in the development of wireless medical systems, from biochips to brain–computer interfaces and beyond. The book also examines some of the most advanced algorithms and data processing in the field. Addressing the latest challenges and solutions related to the medical needs, electronic design, advanced materials chemistry, wireless body sensor networks, and technologies suitable for wireless medical devices, the text: Investigates the technological and manufacturing issues associated with the development of wireless medical devices Introduces the techniques and strategies that can optimize the performances of algorithms for medical applications and provide robust results in terms of data reliability Includes a variety of practical examples and case studies relevant to engineers, medical doctors, chemists, and biologists Wireless Medical Systems and Algorithms: Design and Applications not only highlights new technologies for the continuous surveillance of patient health conditions, but also shows how disciplines such as chemistry, biology, engineering, and medicine are merging to produce a new class of smart devices capable of managing and monitoring a wide range of cognitive and physical disabilities.

En-Route Filtering Using MIHA Scheme in Wireless Sensor Networks

Recently, Wireless Sensor Networks (WSNs) are being used in various civilian application domains, such as traffic control, healthcare applications, environment and habitat monitoring and home automation. In fact, many WSNs are employed in security-critical applications where information has to be confidential so, security in WSNs should be investigated. Actually, injected attack may happen at any layer of a sensor network. Two existing scheme, multi-path interleaved hop-by-hop authentication (MIHA) and STEF, are well known in preventing false data injection and en-route filtering of injected false data respectively. This project is to combine these two schemes to come out with a hybrid scheme called Q-MIHA. Several analysis and comparisons with MIHA and STEF in terms of energy saving and memory requirements were conducted. In case of memory requirement, it is shown that the Q-MIHA scheme only takes 43.75 Bytes more than MIHA scheme which is very small in comparison with the total memory capacity and its achievement on energy saving. Based on the results of these two considered aspects it is shown that the new Q-MIHA scheme outperforms MIHA.

Wireless Sensor Networks

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.

Sensor Networks for Sustainable Development

Recent advances in technology and manufacturing have made it possible to create small, powerful, energy-efficient, cost-effective sensor nodes for specialized telecommunication applications—nodes "smart" enough to be capable of adaptation, self-awareness, and self-organization. Sensor Networks for Sustainable Development examines sensor network technologies that increase the quality of human life and encourage societal progress with minimal effect on the earth’s natural resources and

environment. Organized as a collection of articles authored by leading experts in the field, this valuable reference captures the current state of the art and explores applications where sensor networks are used for sustainable development in: Agriculture Environment Energy Healthcare Transportation Disaster management Beneficial to designers and planners of emerging telecommunication networks, researchers in related industries, and students and academia seeking to learn about the impact of sensor networks on sustainable development, Sensor Networks for Sustainable Development provides scientific tutorials and technical information about smart sensor networks and their use in everything from remote patient monitoring to improving safety on the roadways and beyond.

Wireless Technologies for Ambient Assisted Living and Healthcare: Systems and Applications

"This book provides explanations of concepts, processes and acronyms related to different areas, issues and trends in various areas of wireless technologies for ambient assisted living and healthcare, focusing on emerging wireless technologies and innovative wireless solutions for smart home environments"--Provided by publisher.

Deep Learning Strategies for Security Enhancement in Wireless Sensor Networks

Wireless sensor networks have gained significant attention industrially and academically due to their wide range of uses in various fields. Because of their vast amount of applications, wireless sensor networks are vulnerable to a variety of security attacks. The protection of wireless sensor networks remains a challenge due to their resource-constrained nature, which is why researchers have begun applying several branches of artificial intelligence to advance the security of these networks. Research is needed on the development of security practices in wireless sensor networks by using smart technologies. Deep Learning Strategies for Security Enhancement in Wireless Sensor Networks provides emerging research exploring the theoretical and practical advancements of security protocols in wireless sensor networks using artificial intelligence-based techniques. Featuring coverage on a broad range of topics such as clustering protocols, intrusion detection, and energy harvesting, this book is ideally designed for researchers, developers, IT professionals, educators, policymakers, practitioners, scientists, theorists, engineers, academicians, and students seeking current research on integrating intelligent techniques into sensor networks for more reliable security practices.

Handbook of Research on Advanced Wireless Sensor Network Applications, Protocols, and Architectures

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.

Wireless Sensor Networks

Over the past decade, there has been a prolific increase in the research, development and commercialisation of Wireless Sensor Networks (WSNs) and their associated technologies. WSNs have found application in a vast range of different domains, scenarios and disciplines. These have included healthcare, defence and security, environmental monitoring and building/structural health monitoring. However, as a result of the broad array of pertinent applications, WSN researchers have also realised the application specificity of the domain; it is incredibly difficult, if not impossible, to find an application-independent solution to most WSN problems. Hence, research into WSNs dictates the adoption of an application-centric design process. This book is not intended to be a comprehensive review of all WSN applications and deployments to date. Instead, it is a collection of state-of-the-art research papers discussing current applications and deployment experiences, but also the communication and data processing technologies that are fundamental in further developing solutions to applications. Whilst a common foundation is retained through all chapters, this book contains a broad array of often differing interpretations, configurations and limitations of WSNs, and this highlights the diversity of this ever-changing research area. The chapters have been categorised into three distinct sections: applications and case studies, communication and networking, and information and data processing.

The readership of this book is intended to be postgraduate/postdoctoral researchers and professional engineers, though some of the chapters may be of relevance to interested masters level students.

Data Analytics and Applications of the Wearable Sensors in Healthcare

This book provides a collection of comprehensive research articles on data analytics and applications of wearable devices in healthcare. This Special Issue presents 28 research studies from 137 authors representing 37 institutions from 19 countries. To facilitate the understanding of the research articles, we have organized the book to show various aspects covered in this field, such as eHealth, technology-integrated research, prediction models, rehabilitation studies, prototype systems, community health studies, ergonomics design systems, technology acceptance model evaluation studies, telemonitoring systems, warning systems, application of sensors in sports studies, clinical systems, feasibility studies, geographical location based systems, tracking systems, observational studies, risk assessment studies, human activity recognition systems, impact measurement systems, and a systematic review. We would like to take this opportunity to invite high quality research articles for our next Special Issue entitled “Digital Health and Smart Sensors for Better Management of Cancer and Chronic Diseases” as a part of Sensors journal.

An Energy Efficient and Dynamic Security Protocol for Wireless Sensor Networks

Master's Thesis from the year 2013 in the subject Computer Science - Internet, New Technologies, grade: 8.12, , course: M. Tech, language: English, abstract: Wireless sensor network (WSN) is an emerging imperious leading technology of the current century that presents great promise for various pioneering applications. The use of sensor networks should keep developing, mainly in the fields of scientific, logistic, healthcare and military applications. Sensor networks interact and collect sensitive data and operate in unattended hostile environments, thus it is imperative to pay attention to the security of wireless sensor networks as they are highly prone to threats. For successful operation of the nodes, it is important to maintain the security and privacy of the transmitted data as well as the data stored at nodes. The different security protocols and models used in the wired and other wireless networks such as ad-hoc networks cannot be used in WSNs because the sensor size poses significant restrictions, mainly in terms of energy autonomy and node lifetime, as the batteries have to be too tiny. Also, the existing security protocols in these constrained networks are not sufficiently energy efficient, which is the real motivation behind this work. In this thesis, a light-weight dynamic security algorithm titled “An Energy Efficient and Dynamic Security Protocol (EEDSP)” for wireless sensor networks has been proposed and implemented at nodal level. We also implement an existing algorithm and then carry out the performance analysis of both the algorithms in terms of energy consumptions, node lifetime and memory requirements at source and intermediate nodes to verify the improvement in our protocol’s results.

Sensor Applications, Experimentation, and Logistics

Wireless sensor networks (WSNs) are envisioned to enable a variety of applications including environmental monitoring, building and plant automation, homeland se- rity and healthcare. It has been argued that one of the key characteristics of sensor networks is that they are tightly coupled with the applications running on top of them. Although WSNs have been an active area of research for over a decade, real world sensor network deployments have not yet found their way to widespread adoption. The experience gained and lessons learned during the initial attempts to deploy WSNs and implement various sensor network applications are very valuable for the - vancement of this technology. Recognizing the need of a conference dedicated to practical aspects of WSN p- taining to their employment in a plethora of applications, ICST launched SENSAPPEAL as a yearly event whose first edition took place in September 2009 at the Athens Information Technology campus in the outskirts of Athens, Greece.

4th International Workshop on Wearable and Implantable Body Sensor Networks (BSN 2007)

This book contains papers from the International Workshop on Wearable and Implantable Body Sensor Networks, BSN 2007, held in March 2007 at the University Hospital Aachen, Germany. Topics covered in the volume include new medical measurements, smart bio-sensing textiles, low-power wireless networking, system integration, medical signal processing, multi-sensor data fusion, and on-going standardization activities.

Smart Medical Data Sensing and IoT Systems Design in Healthcare

"This book examines the use of the Internet of Things systems in the healthcare system"--Provided by publisher.

Intelligent Pervasive Computing Systems for Smarter Healthcare

A guide to intelligent decision and pervasive computing paradigms for healthcare analytics systems with a focus on the use of bio-sensors Intelligent Pervasive Computing Systems for Smarter Healthcare describes the innovations in healthcare made possible by computing through bio-sensors. The pervasive computing paradigm offers tremendous advantages in diversified areas of healthcare research and technology. The authors—noted experts in the field—provide the state-of-the-art intelligence paradigm that enables optimization of medical assessment for a healthy, authentic, safer, and more productive environment. Today's computers are integrated through bio-sensors and generate a huge amount of information that can enhance our ability to process enormous bio-informatics data that can be transformed into meaningful medical knowledge and help with diagnosis, monitoring and tracking health issues, clinical decision making, early detection of infectious disease prevention, and rapid analysis of health hazards. The text examines a wealth of topics such as the design and development of pervasive healthcare technologies, data modeling and information management, wearable biosensors and their systems, and more. This important resource: Explores the recent trends and developments in computing through bio-sensors and its technological applications Contains a review of biosensors and sensor systems and networks for mobile health monitoring Offers an opportunity for readers to examine the concepts and future outlook of intelligence on healthcare systems incorporating biosensor applications Includes information on privacy and security issues on wireless body area network for remote healthcare monitoring Written for scientists and application developers and professionals in related fields, Intelligent Pervasive Computing Systems for Smarter Healthcare is a guide to the most recent developments in intelligent computer systems that are applicable to the healthcare industry.