Wifi Wsn Thesis

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SIDNEY QUINTIN

Communication and Localization in UWB Sensor Networks BoD – Books on Demand
In recent years, wireless sensor networks have been used in applications of data gathering and target localization across large geographical areas. In this thesis, we study the issues involved in applying wireless sensor networks to search and rescue of lost hikers in trails and focus on the optimal placement of sensors and access points such that the cost of search and rescue is minimized. Particularly, we address two problems: a) how to identify the lost hiker position as accurately as possible, i.e., obtain a small search region containing the lost hiker; and (b) how to search efficiently in search regions for different trail topologies and search agent capabilities. We study the problem of achieving smaller search regions with different problem attributes. For simpler trail topologies, we propose theoretical models that consider both efficiency and accuracy criteria and present analytical results. For complicated graph topologies, we develop efficient heuristic algorithms with various heuristics. In addition, we analyze the difference of single hiker and multiple hiker scenarios with different hiking dynamics. After access point deployment is decided, the actual cost of search in individual search regions can be computed. We analyze four different types of search and rescue agents, present algorithms to find the optimal search pathes for each one of them, and compute their search costs. The algorithms are developed based on solving Chinese Postman problems. Next, we present extensive experimental results to compare the performances of different methods and examine the accuracy of the mathematical models. A very fast heuristic method, divide-merge, is shown to outperform all others and finds near-optimal solutions. We also shows the effects of the graph topologies and number of access points on the solution qualities. Generally speaking, more access points lead to smaller search regions. Further improvement by moving the access points from vertices to edges is easily achieved when the number of access points is large or/and the average degree of vertices is small. Finally, we extend our results by relaxing the assumption of the uniform distribution of the hiker missing probability. We analyze the problem complexity and present a general solution.
Opportunstic Seamless Localization GRIN Verlag
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.
Congestion Control Mechanism in Wireless Sensor Network - QoS Evaluation and Performance Analysis GRIN Verlag
The vast reduction in size and power consumption of CMOS circuitry has led to a large research effort based around the vision of ubiquitous networks of wireless communication nodes. The wireless devices are usually designed to run on batteries. However, as the networks increase in number and the devices decrease in size, the replacement of depleted batteries is not practical. Furthermore, a battery that is large enough to last the lifetime of the device would dominate the overall system size, and thus is not very attractive. There is clearly a need to explore alternative methods of powering these small communication nodes. This book, therefore, focuses on potential "ambient" sources of power that can be scavenged or harvested and subsequently used to run low power electronics and wireless transceivers. A wide range of potential power sources are briefly explored. Based on a comparison of these many potential sources, commonly occurring vibrations was chosen as an attractive, and little explored, power source. Models for different types of power converters using both electrostatic and piezoelectric conversion mechanisms have been developed. The models have been validated by testing prototypes driven at vibrations similar to those found in many industrial and commercial building environments. Finally, integration of a piezoelectric generator, power circuit, and custom design radio transceiver is demonstrated. Power sources are becoming a bottleneck to the widespread deployment of wireless sensor networks. This work reviews many potential alternative sources of ambient power that can be scavenged. Vibration to electricity converters are explored in great detail, and based on studies and experiments, are shown to be an attractive power source in many applications. Energy Scavenging for Wireless Sensor Networks with Special Focus on Vibrations will be of interest to researchers and professionals in the areas of wireless electronics, smart structures and MEMS as well as power electronics.
Congestion Control for 6LoWPAN Wireless Sensor Networks: Toward the Internet of Things Universitätsverlag der TU Berlin
Boukerche is well-known and established international researcher in the field of wireless mobile networks and distributed systems. This is one of the first publications to focus on wireless ad hoc and sensor networks with a concentration on algorithms and protocols providing you with a comprehensive resource to learn about the continuous advances in wireless and mobile communications.
QoS Aware Routing Protocol for Wireless Multimedia Sensor Networks Springer Science & Business Media
The future lunar sustainable habitation will be resource-intensive. Taking advantage of local resources on the lunar surface is the most effective way to reduce the cost and risk for future lunar missions. Water is one of the most important resources that can provide not only drinking water for crews, but also fuel for rockets and spacecrafts. To date, most of our knowledge of lunar water distribution is from remote sensing, which is vague (kilometer-scale resolution). More in situ measurements are indispensable to acquire meter-scale resolution knowledge of lunar water distribution. The current main force of in situ planetary explorations is a single high-cost rover that can provide merely a series of single-point measurements or a lander without mobility that can only measure surrounding areas. Neither rovers nor landers can work in dangerous areas where data of interest often exists.
Evaluating and Improving Collection Tree Protocol in Mobile Wireless Sensor Network Logos Verlag Berlin GmbH
Wireless sensor networks (WSN) and the communication and the security therein have been gaining further prominence in the tech-industry recently, with the emergence of the so called Internet of Things (IoT). The steps from acquiring data and making a reactive decision base on the acquired sensor measurements are complex and requires careful execution of several steps. In many of these steps there are still technological gaps to fill that are due to the fact that several primitives that are desirable in a sensor network environment are bolt on the networks as application layer functionalities, rather than built in them. For several important functionalities that are at the core of IoT architectures we have developed a solution that is analyzed and discussed in the following chapters. The chain of steps from the acquisition of sensor samples until these samples reach a control center or the cloud where the data analytics are performed, starts with the acquisition of the sensor measurements at the correct time and, importantly, synchronously among all sensors deployed. This synchronization has to be network wide, including both the wired core network as well as the wireless edge devices. This thesis studies a decentralized and lightweight solution to synchronize and schedule IoT devices over wireless and wired networks adaptively, with very simple local signaling. Furthermore, measurement results have to be transported and aggregated over the same interface, requiring clever coordination among all nodes, as network resources are shared, keeping scalability and fail-safe operation in mind. Furthermore ensuring the integrity of measurements is a complicated task. On the one hand Cryptography can shield the network from outside attackers and therefore is the first step to take, but due to the volume of sensors must rely on an automated key distribution mechanism. On the other hand cryptography does not protect against exposed keys or inside attackers. One however can exploit statistical properties to detect and identify nodes that send false information and exclude these attacker nodes from the network to avoid data manipulation. Furthermore, if data is supplied by a third party, one can apply automated trust metric for each individual data source to define which data to accept and consider for mentioned statistical tests in the first place. Monitoring the cyber and physical activities of an IoT infrastructure in concert is another topic that is investigated in this thesis.
Modelling and Implementation of Complex Systems Wiley-Interscience
Master's Thesis from the year 2012 in the subject Computer Science - Technical Computer Science, grade: 70%, Griffith College Dublin (Faculty of Computing), course: MSC Computing , language: English, abstract: Modern wireless sensor network can be expanded into large geographical areas via cheap sensor devices which can sustain themselves itself with very a low power usage. The networking capability enables these sensor nodes to incorporate, collaborates, and coordinates with among each other , and this is a fundamental shift in the field of networks which differentiates sensor network nodes form other networks such as IP-datagram, Ad-Hoc and so on. Currently, routing in the wireless sensor network faces multiple challenges, such as new scalability, coverage, packet loss, interference, real-time audio and video real time streaming, harsh weather environments, energy constraints and so forth. Network routing can be called an amalgamation of routing protocol and routing algorithm. The job of the routing protocols is to provide a cohesive view of network nodes topology while routing algorithm provides the intelligence in terms of optimal path calculation. We set out to conduct a detailed study of routing protocols in a IP-datagram, wireless ad-hoc and sensor network, and also accomplished routing protocols comparison against the chosen network performance factor dropped packet ratio. Routing protocols play an important role in modern wireless communication networks. Routing protocols’ performance can be measured by a number of factors such as packet dropped rate and so forth. Rumour and Optimal Spinal Routing algorithms are compared using ShoX simulation and the results and analysis are based upon the simulation experiments.
An Improved and Anonymous Three-factor Authentication Key Exchange Protocol for Wireless Sensor Networks Transcript Verlag, Roswitha Gost, Sigrid Nokel u. Dr. Karin Werner
Doctoral Thesis / Dissertation from the year 2017 in the subject Electrotechnology, grade: PhD, , course: Doctor of Philosophy, language: English, abstract: Wireless Sensor Networks (WSNs) is fast emerging as prominent study area that attracting considerable research attention globally. The field has seen tremendous development in design and development of application related interfaces with sensor networks. Sensor network finds applications in several domains such as medical, military, home networks, space and so on. Many researchers strongly believe that WSNs can become as important as the internet in the near future. Just as the internet allows access to digital information anywhere, WSNs could easily provide remote interaction with the physical world. It is going to be the backbone of Ubiquitous Computing (UBICOMP).Through local collaboration among sensors, elimination of duplicate data, participation of relevant nodes in the given task etc. can produce a significant difference in energy conservation, thereby increasing the life time of the sensor network. As the number of nodes increases, data security becomes the most challenging part of the network. The intruders can hack the data any time during processing, transmission or at the receiver end. So, as a popular approach data encryption is the most commendable approach in today’s network. Asymmetric key encryption consumes more energy in processing and so not recommended for WSNs. Symmetric key encryption gives better performance with respect to asymmetric key encryption in WSN applications. It uses less computational power due to relatively effortless mathematical operations, and eventually spends less power. This thesis also proposes a symmetric data encryption through Tabulation method of Boolean function reductionfor the WSNs for secure data transmission. It also suggests a new secure approach, SEEMd, Security Enabled Energy Efficient Middleware algorithmfor the critical data sensing and gives a second chance to the nodes before it falls into to sleep mode for energy management. WSNs are designed for applications which range from small-size healthcare surveillance systems to large-scale agricultural monitoring or environmental monitoring. Thus, any WSN deployment, data aggregation, processing and communication have to assure minimum Quality of Service (QoS) in the network from application to application. In this circumstances, the proposed algorithms in this thesis proved

to be efficient and reliable in energy saving and life time enhancement.

Wireless sensor networks protocols in IoT. A performance evaluation and comparison Wiley-IEEE Press

While optimal solutions to the classical problem of linear regression have been thoroughly studied, the relatively new problem of shuffled linear regression, or unlabeled sensing, presents an open challenge. The goal of unlabeled sensing is to estimate measurements which have been linearly transformed and permuted. A closely related problem is that of unlabeled detection, which aims to perform global detection of some phenomenon based on local measurements or decisions that have been permuted. In both cases, the permutation of the observations is unknown to the observer. These unlabeled methods have important applications, such as energy-efficient communication techniques within a wireless sensor network, which is the motivating idea behind this work. Hence, this thesis aims to develop new solutions to the problems of unlabeled sensing and detection and provide insights into their effectiveness. First, a novel deep learning approach is explored to provide an efficient and accurate estimation technique for the general unlabeled sensing problem, which is shown to greatly improve computational efficiency with very little deterioration of recovery performance. Next, a heuristic algorithm which combines the ideas of compressive sensing and deep learning is developed to address the unlabeled sensing problem in a heterogeneous wireless sensor network. The performance of this algorithm is then tested and compared to that of the current state-of-the-art approach, demonstrating improved performance. Lastly, the problem of unlabeled detection in a similar network is studied. An analytical detector based on the generalized likelihood ratio test and maximum likelihood estimation is derived, as well as a heuristic detector based on deep learning techniques. These detectors are then simulated and compared, with both demonstrating impressive performance under various conditions.

LunarWSN CRC Press

The Internet of Things (IoT) is the next big challenge for the research community. The IPv6 over low power wireless personal area network (6LoWPAN) protocol stack is considered a key part of the IoT. In 6LoWPAN networks, heavy network traffic causes congestion which significantly degrades network performance and impacts on quality of service aspects. This book presents a concrete, solid and logically ordered work on congestion control for 6LoWPAN networks as a step toward successful implementation of the IoT and supporting the IoT application requirements. The book addresses the congestion control issue in 6LoWPAN networks and presents a comprehensive literature review on congestion control for WSNs and 6LoWPAN networks. An extensive congestion analysis and assessment for 6LoWPAN networks is explored through analytical modelling, simulations and real experiments. A number of congestion control mechanisms and algorithms are proposed to mitigate and solve the congestion problem in 6LoWPAN networks by using and utilizing the non-cooperative game theory, multi-attribute decision making and network utility maximization framework. The proposed algorithms are aware of node priorities and application priorities to support the IoT application requirements and improve network performance in terms of throughput, end-to-end delay, energy consumption, number of lost packets and weighted fairness index.

Certain Power Management Algorithms for Wireless Sensor Networks by Energy Efficient Data Transmission, Security and Node Deployment LAP Lambert Academic Publishing

INTRODUCTION This chapter presents a brief description of important terms and key concepts used in our research. Section 1.1 introduces the basic concept of wireless sensor networks. Section 1.2 and 1.3 introduces the basic components of wireless sensor networks and their applications. Section1.4 discuss the energy issues in wireless sensor networks. Section 1.5 and 1.6 describes a few important energy-efficient data acquisition and data reduction techniques used in wireless sensor networks. Sections 1.7, 1.8 and 1.9 introduce the necessary background, problem statement, and proposed solution respectively. Finally, section 1.10 presents the thesis organization.

Unlabeled Sensing and Detection for Improved Energy Efficiency in Wireless Sensor Networks GRIN Verlag

There is a remarkable growth in the field of Information Communication Technology (ICT) in Developing Countries. Telecommunication is one of the areas where ICT is recording an ongoing rapid change. Mobile phones are becoming more and more pervasive in daily scenario; and among the beneficiaries of this are farmers. Farmers are using mobile phones to execute their farming business and access market information. At the same time, Wireless Sensor Networks (WSNs) are also showing a result in developed part of our world. WSNs potential in sensing various environmental condition, their affordability and applicability motivated conducting of this master thesis. Hence, the objective of thesis work is to investigate and identify how the use of mobile phones in conjunction with WSN enable farmers monitor and control their farm field in the region of Oromia, Meki area, Ethiopia.

Industrial Wireless Sensor Networks Lulu.com

Master's Thesis from the year 2018 in the subject Engineering - Computer Engineering, grade: 3.71, Cyprus International University, language: English, abstract: In this thesis, three Wireless Sensor Networks – Ad-hoc On-Demand Distance Vector, Dynamic Source routing protocol and Optimized Link State routing protocol have been simulated and compared in typical IoT scenarios. Their performance was evaluated using three performance metrics and then they were compared; the performance metrics are Routing Overhead, Average End to End Delay and Throughput. Different number of nodes with different percentages of mobile nodes were analyzed. Specifically, number of nodes analyzed were 20, 40, 60 and 70 with the number of mobile nodes 10, 15 and 20 using OPNET while with NS 3 20, 60 and 100 nodes were analyzed. For each of the number of nodes, all the number of mobile nodes were evaluated. The routing protocols were analyzed using the OPNET Simulation Software and NS-3and the environment size for the simulation was 1000m by 1000m. IoT has continue to grow bigger since from its inception. Many mobile devices are now available, the internet and its application have only grown bigger and better. As IoT is continually growing, so also is the complexity, as a result issues pertaining routing have also increased. Many researches have been made in attempt to proffer solutions that will either minimize or eliminate these routing issues. Different routing protocols have been designed with different specifications for different applications of the IoT. Also, attempts have been made to implement routing protocols of other types of networks in the IoT.

WirelessHARTTM LAP Lambert Academic Publishing

Wireless sensor networks (WSN) are typically formed ad hoc and utilize mesh topologies which enable the individual nodes to form the infrastructure allowing senders and receivers outside of RF range to pass messages through intermediate nodes. The individual nodes themselves are typically smaller devices, which run on a battery and utilize a microcontroller for processing. The primary function of a WSN is to sense various attributes of the environment and relay that data back to an end point for further exploitation. In most WSN, that end point is fixed, hardwired to a power source, and connected directly to pre-existing network infrastructure. A subset of WSN, which we call peer-to-peer WSN, perform all the functions of a typical WSN, but the end points are not fixed. The individual nodes in these scenarios must rely on their onboard capacity for computation to transform the raw sensor data into usable information while simultaneously optimizing the flow of information and the longevity of the network.This peer-to-peer WSN is the focus of our use case for this thesis in which we develop, with the help of a specific form of machine learning known as reinforcement learning, routing algorithms that can utilize the peer-to-peer WSN structure to efficiently forward and transform data into usable information for utilization at the end point embedded within the network. We will utilize deep reinforcement learning and graph neural networks to develop algorithms that will allow peer-to-peer WSN to learn functions for determining ideal policies within a given state of the network. We will demonstrate, using both simulation and testing on live wireless networks, improvement over the currently deployed WSN routing algorithms that rely on flooding and shortest path algorithms to determine their actions.

ENHANCEMENT OF NETWORK SECURITY IN WIRELESS SENSOR NETWORKS USING GAME THEORY Springer Nature

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.

Designing Power Aware Wireless Sensor Networks Leveraging Software Modeling Techniques Artech House Mems and Sensors

Wireless sensor networks (WSN) are predicted to play a key role in future technological developments like the internet of things. Already they are beginning to be used in many applications not only in the scientific and industrial domains. One of the biggest challenges, when using WSN, is to fuse and evaluate data from different sensor nodes. Synchronizing the data acquisition of the nodes is a key enabling factor for this. So far research has been focused on synchronizing the clocks of the nodes, largely neglecting the implications for the actual measurement results. This thesis investigates the relation between synchronization accuracy and quality of measurement results. Two different classes of time synchronous data acquisition are investigated: event detection and waveform sampling. A model is developed that describes a WSN as a generic multi-channel data acquisition system, thus enabling direct comparison to other existing systems. With the help of this model it is shown, that synchronization accuracy should best be expressed as uncertainty of the acquired timing information. This way, not only the contribution of the synchronization to the overall measurement uncertainty can be assessed, but also the synchronization accuracy required for an application can be estimated. The insights from the uncertainty analysis are used to develop two distinct approaches to synchronous data acquisition: a proactive and a reactive one. It is shown that the reactive approach can also be used to efficiently implement synchronous angular sampling, i.e. data acquisition synchronous to the rotation of a machine's shaft. Furthermore, testing methods are suggested, that evaluate the synchronized data acquisition of an existing WSN as a whole. These methods can be applied to other data acquisition systems without changes, thus enabling direct comparisons. The practical realization of a WSN is described, on which the developed data acquisition methods have been implemented. All implementations were thoroughly tested in experiments, using the suggested testing methods. This way it was revealed, that a system's interrupt handling procedures may have a strong influence on the data acquisition. Furthermore, it was shown that the effective use of fixed-point arithmetic enables synchronous angular sampling in real-time during a streaming measurement. Finally, two application examples are used to illustrate the utility of the implemented data acquisition: the acoustic localization of two sensor nodes on a straight line and a simple order tracking at an induction motor test bench. Diese Dissertation untersucht die Zusammenhänge zwischen Synchronisationsgenauigkeit und Qualität der Messergebnisse. Zwei Klassen von zeitsynchroner Datenerfassung werden dabei betrachtet: die Detektion von Ereignissen und die Aufnahme von Kurvenformen. Es wird ein Modell entwickelt, welches ein WSN als ein allgemeines mehrkanaliges Datenerfassungssystem beschreibt. Dies ermöglicht den direkten Vergleich zwischen WSN und anderen Messsystemen. Weiter wird mit Hilfe des Modells gezeigt, dass die Synchronisationsgenauigkeit vorzugsweise als Unsicherheit der Zeitinformation angegeben werden sollte. Hierdurch kann nicht nur der Beitrag der Synchronisation zur gesamten Messunsicherheit bestimmt sondern auch die von einer Anwendung tatsächlich benötigte Synchronisationsgenauigkeit abgeschätzt werden. Ausgehend von den durch die Unsicherheitsbetrachtung gewonnenen Erkenntnissen werden ein proaktiver und ein reaktiver Ansatz zur synchronen Datenaufnahme entwickelt. Mit dem reaktiven Ansatz können Messdaten auch effizient drehwinkelsynchron, d. h. synchron zur Drehbewegung einer Maschinenwelle, aufgenommen werden. Es werden Testverfahren vorgeschlagen, mit denen sich die Synchronizität der Datenerfassung für ein WSN als Ganzes überprüfen lässt. Diese Verfahren lassen sich unverändert auf andere Messsysteme anwenden und ermöglichen somit direkte Vergleiche. Es wird die praktische Umsetzung eines WSN beschrieben, auf dem die entwickelten Methoden zur Datenerfassung implementiert wurden. Alle Implementierungen wurden mit den vorgeschlagenen Testverfahren untersucht. Hierdurch konnte gezeigt werden, dass die Interrupt-Bearbeitung der Sensorknoten entscheidenden Einfluss auf die Messdatenerfassung hat. Weiter konnte durch den Einsatz von Fixed-Punkt-Arithmetik die drehwinkelsynchrone Datenerfassung in Echtzeit realisiert werden. Schließlich wird die Nützlichkeit der implementierten Datenerfassung an zwei Anwendungen gezeigt: der akustischen Ortung zweier Sensorknoten sowie einer einfachen Ordnungsanalyse.

Digital Science GRIN Verlag

"Providing security for wireless sensor networks in hostile environments has a significant importance. Resilience against malicious attacks during the process of location discovery has an increasing need. There are many applications that rely on sensor nodes' locations to be accurate in order to function correctly. The need to provide secure, attack resistant location discovery schemes has become a challenging research topic. In this thesis, location discovery techniques are discussed and the security threats and attacks are explained. I also present current secure location discovery schemes which are developed for range-based location discovery. The thesis goal is to develop a secure range-

free location discovery scheme. This is accomplished by enhancing [a] voting-based scheme [...] to be used as the bases for developing a secure range-free location discovery scheme. Both the enhancement voting-based and the secure range-free schemes are implemented on Sun SPOT wireless sensors and subjected to various levels of location discovery attacks and tested under different sensor network scales using a simulation program developed for testing purposes. "--Abstract.

Energy Scavenging for Wireless Sensor Networks Springer

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

Energy-Efficient Wireless Sensor Networks Infotech Publishers

Wireless Sensor networks (WSN) has emerged as the effective tool for gathering the information from the remote environment. The sensor node communicates with the base station simultaneously when the data is available. This results in the packet loss at the receiving node. Since the nodes operated in the WSN are battery operated, retransmission of the data packets due to the congestion results in the failure of the system. Thus avoiding the congestion in the nodes has emerged as important research topic. In this book work utilizes a congestion threshold for determining the congested node in the WSN. Since the data packets have its own priority, the low priority data packets are dropped during the transmission to reduce the congestion. The presence of the congestion in the node can be lowered by making the share rate of the child nodes less than the service rate of the parent node. In this thesis, the congestion avoidance is done by choosing the optimal share rate with three proposed works. The proposed work included in this thesis is ACSRO, EACSRO, and NNRA algorithm. The proposed ACSRO algorithm modifies the existing CS algorithm and uses a proposed fitness function for finding the optimal share rate. The proposed ACSRO algorithm uses the adaptive step size for modifying the existing CS algorithm. The proposed EACSRO algorithm modifies the ACSRO algorithm with the use of the epsilon constraint. The proposed NNRA algorithm uses the NARX based neural network of the optimization process.

Wireless Sensor Data Transport, Aggregation and Security Springer Science & Business Media

Wireless Sensor Network has gained the research interest due to the significance of the field of applications and the advances in the sensor technologies. The main challenges faced in wireless multimedia sensor network are quality of service and energy constraints. So this book will be presents various issues involved in that and also target solution to overcome those issues are highlighted. This books is highly intended for the target research scholars those who are working in multimedia sensor domain. In this book, we have covered detailed literature review of various existing routing protocols as well as detailed framework for the support of multimedia in wireless sensor network which will help under graduate as well as post graduate students in their thesis work.