Remote Sensor Monitoring By Radio With Arduino Detecting Intruders Fires Flammable And Toxic Gases And Other Hazards At A Distance

Geoscience and Remote Sensing
Remote Sensing of Earth Resources
Modified Radio Model for Clustering Wireless Sensor Network
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Backscattering and RF Sensing for Future Wireless Communication
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Contactless Vital Signs Monitoring
Wireless Sensor and Mobile Ad-Hoc Networks
Telecommunications Engineer's Reference Book
A Low-Cost, Real-Time Network for Radiological Monitoring Around Nuclear Facilities
A Remote Monitoring and Diagnosis Method Based on Four-Layer IoT Frame Perception
Unattended Radiation Sensor Systems for Remote Terrestrial Applications and Nuclear Nonproliferation
Three-tier Wireless Sensor Network Infrastructure for Environmental Monitoring
Wireless Sensor Networks
Remote Sensor Monitoring
Remote Monitoring: implantable Devices and Ambulatory ECG
Issues in Analysis, Measurement, Monitoring, Imaging, and Remote Sensing Technology: 2012 Edition
Remote Sensor Monitoring by Radio with Arduino
A Remote Sensor to Monitor Combustion Products Using a Tunable Acousto-optic Filter
Geoscience and Remote Sensing
Wireless Sensor Networks and Ecological Monitoring
Evaluation of a remote sensor for mobile source CO emissions, Environmental Monitoring systems Lab
Automated Remote Monitoring of Toxic Gases with Diode-laser-based Sensor Systems
Simulation and Compiler Support for Communication and Mobility for Environment Sensing
Watershed Sensor Network Non-line-of-sight Data Telemetry System

RILEY DECKER

Geoscience and Remote Sensing Lippincott Williams & Wilkins Written 10 years after the publication of the first edition, this updated edition of Real-Time Environmental Monitoring: Sensors and Systems introduces the fundamentals of environmental monitoring based on electronic sensors, instruments, systems, and software that allow continuous and long-term ecological and environmental data collection. It accomplishes two objectives: explains how to use sensors for building more complex instruments, systems, and databases, and introduces a variety of sensors and systems employed to measure environmental variables in air, water, soils, vegetation canopies, and wildlife observation and tracking. This second edition is thoroughly updated in every aspect of technology and data, and each

theoretical chapter is taught parallel with a hands-on application lab manual. Emphasizes real-time monitoring as an emerging area for environmental assessment and compliance and covers the fundamentals on how to develop sensors and systems Presents several entirely new topics not featured in the first edition, including remote sensing and GIS, machine learning, weather radar and satellites, groundwater monitoring, spatial analysis, and habitat monitoring Includes applications to many environmental and ecological systems Uses a practical, hands-on approach with the addition of an accompanying lab manual, which students can use to deepen their understanding, based on the author's 40 years of academic experience Intended for upper-level undergraduate and graduate students, taking courses in civil and environmental engineering, electrical engineering, mechanical engineering, geosciences, and environmental sciences, as well as professionals working in environmental services, and researchers and academics in engineering.

Remote Sensing of Earth Resources Artech House

This title analyzes distributed Earth observation missions from different perspectives. In particular, the issues arising when the payloads are distributed on different satellites are considered from both the theoretical and practical points of view. Moreover, the problems of designing, measuring, and controlling relative trajectories are thoroughly presented in relation to theory and applicable technologies. Then, the technological challenges to design satellites able to support such missions are tackled. An ample and detailed description of missions and studies complements the book subject.

Modified Radio Model for Clustering Wireless Sensor Network Createspace Independent Publishing Platform

A two-tier wireless data communication system was developed to remotely monitor sediment concentration in streams in real time. The system used wireless motes and other devices to form a wireless sensor network to acquire data from multiple sensors. The system also used a Stargate, a single-board computer, as a gateway to manage and control data flow and wireless data transfer. The sensor signals were transmitted from an AirCard on the Stargate to an Internet server through the General Packet Radio Service (GPRS) provided by a commercial GSM cellular carrier. Various types of antennas were used to boost the signal level in a radio-hostile environment. Both short- and long-distance wireless data communications were achieved. Power supplies for the motes, Stargate, and AirCard were improved for reliable and robust field applications. The application software was developed using Java, C, nesC, LabView, and SQL to ensure seamless data transfer and enable both on-site and remote monitoring. Remote field tests were carried out at different locations with different GPRS signal strengths and a variety of landscapes. A three-tier wireless sensor network was then developed and deployed at three military installations around the country--Fort Riley in Kansas, Fort Benning in Georgia, and Aberdeen Proving Ground in Maryland - to remotely monitor sediment concentration and movement in real time. Sensor nodes, gateway stations, repeater stations, and central stations were strategically deployed to insure reliable signal transmissions. Radio signal strength was tested to analyze effects of distance, vegetation, and topographical barriers. Omni- and Yagi-directional antennas with different gains were tested to

achieve robust, long-range communication in a wireless-hostile environment. Sampling times of sensor nodes within a local sensor network were synchronized at the gateway station. Error detection algorithms were developed to detect errors caused by interference and other impairments of the transmission path. GSM and CDMA cellular modems were used at different locations based on cellular coverage. Data were analyzed to verify the effectiveness and reliability of the three-tier WSN.

Real-Time Environmental Monitoring John Wiley & Sons

A non-line-of-sight digital datalink has been developed and tested using a high frequency radio for transmission of water quality monitoring data within a 20 mile range. Features of this design include real-time continuous monitoring of remote sensor measurements, all-weather 30 Mhz transmission (without repeaters), and solar-powered remote telemetry stations. Remote sensor data is transmitted to a central monitoring station from a network of water quality sensor sites for alarms, analysis, and archiving purposes. The data telemetry system has the potential for receiving water quality monitoring data from several watershed locations simultaneously at one data processing point. Lastly, the cost efficiency of this system compared to typical cellular, satellite, or phone landline datalink systems.

Introduction to Remote Sensing Springer Science & Business Media

Remote Sensing is collecting and interpreting information on targets without being in physical contact with the objects. Aircraft, satellites ...etc are the major platforms for remote sensing observations. Unlike electrical, magnetic and gravity surveys that measure force fields, remote sensing technology is commonly referred to methods that employ electromagnetic energy as radio waves, light and heat as the means of detecting and measuring target characteristics. Geoscience is a study of nature world from the core of the earth, to the depths of oceans and to the outer space. This branch of study can help mitigate volcanic eruptions, floods, landslides ... etc terrible human life disaster and help develop ground water, mineral ores, fossil fuels and construction materials. Also, it studies physical, chemical reactions to understand the distribution of the nature resources. Therefore, the geoscience encompass earth, atmospheric, oceanography, pedology, petrology, mineralogy, hydrology and geology. This book covers latest and futuristic developments in remote sensing novel theory and applications by numerous scholars, researchers and experts. It is organized into 26 excellent chapters which include optical and infrared modeling, microwave scattering propagation, forests and vegetation, soils, ocean temperature, geographic information , object classification, data mining, image processing, passive optical sensor, multispectral and hyperspectral sensing, lidar, radiometer instruments, calibration, active microwave and SAR processing. Last but not the least, this book presented chapters that highlight frontier works in remote sensing information processing. I am very pleased to have leaders in the field to prepare and contribute their most current research and development work. Although no attempt is made to cover every topic in remote sensing and geoscience, these entire 26 remote sensing technology chapters shall give readers a good insight. All topics listed are equal important and significant.

A Combined Optical Current and Temperature Sensor for Remote

Monitoring of Sub-sea Electrical Plant MDPI
There is a growing need for compact sensor systems that provide reliable and automated monitoring of toxic gases and pollutants. Near infrared (NIR) diode lasers, originally developed for the communications industry, have the necessary reliability for use in such automated sensor systems. The authors combine NTR lasers with its patented line-locked absorption techniques to create the DiRTiGAS family of automated sensor systems for continuous remote monitoring of gas concentration. A broad variety of small polyatomic gases can be detected using GaAs-based diode lasers. They report here tests on NO2, O2, NH3, C2H2, and CO2 with two source modules operating at 760 and 1,540 nm, respectively. The DiRTiGAS family of remote sensors uses modular components which can be assembled in two basic configurations for process control and ambient air monitoring. The fiber-optic configuration uses a central control unit linked by a fiberoptic network to remote sensor heads. The long-path configuration uses a similar control unit and a distant retroreflective target to monitor the concentration in the intervening distances. A fieldable prototype longpath unit, and a fiber-optic head has been developed for process water vapor monitoring in exhaust stacks at temperatures up to 650 C. This work describes laboratory tests of both systems, and preliminary field tests of the prototype long-path system. Based on these results, they have made design revisions which will be incorporated in a second stage long-path prototype. This prototype will be ready for site tests in early 1994.
UAV-Based Remote Sensing Volume 1 IntechOpen
With a focus on the growing field of cardiology remote monitoring, this state-of-the-art reference provides must-know clinical and technical information as well as recent advances in application, engineering, and clinical impact from the current literature. Authoritative coverage of implantable devices and ambulatory ECG brings you up to speed on recent practice changes in remote monitoring that have alleviated the volume of in-office patient follow-ups, allowed for physicians to monitor more patients, enabled better patient compliance, and most importantly, provided earlier warning signs of cardiac problems.
Remote Sensing for Monitoring Embankments, Dams, and Slopes John Wiley & Sons
Vital signs, such as heart rate and respiration rate, are useful to health monitoring because they can provide important physiological insights for medical diagnosis and well-being management. Most traditional methods for measuring vital signs require a person to wear biomedical devices, such as a capnometer, a pulse oximeter, or an electrocardiogram sensor. These contact-based technologies are inconvenient, cumbersome, and uncomfortable to use. There is a compelling need for technologies that enable contact-free, easily deployable, and long-term monitoring of vital signs for healthcare. Contactless Vital Signs Monitoring presents a systematic and in-depth review on the principles, methodologies, and opportunities of using different wavelengths of an electromagnetic spectrum to measure vital signs from the human face and body contactlessly. The volume brings together pioneering researchers active in the field to report the latest progress made, in an intensive and structured way. It also presents various healthcare applications using camera and radio frequency-based monitoring, from clinical

care to home care, to sport training and automotive, such as patient/neonatal monitoring in intensive care units, general wards, emergency department triage, MR/CT cardiac and respiratory gating, sleep centers, baby/elderly care, fitness cardio training, driver monitoring in automotive settings, and more. This book will be an important educational source for biomedical researchers, AI healthcare researchers, computer vision researchers, wireless-sensing researchers, doctors/clinicians, physicians/psychologists, and medical equipment manufacturers. Includes various contactless vital signs monitoring techniques, such as optical-based, radar-based, WiFi-based, RFID-based, and acoustic-based methods. Presents a thorough introduction to the measurement principles, methodologies, healthcare applications, hardware set-ups, and systems for contactless measurement of vital signs using camera or RF sensors. Presents the opportunities for the fusion of camera and RF sensors for contactless vital signs monitoring and healthcare.

Backscattering and RF Sensing for Future Wireless Communication ScholarlyEditions

Wireless Sensor Network (WSN) is a new and fast advancing technology, which is opening up many opportunities in the field of remote sensing and data monitoring. In spite of the numerous applications of WSN, issues related to determining a suitable and accurate radio model that will foster energy conservation in the network limit the performance of WSN routing protocols. A number of radio models have been proposed to improve the performance of WSN routing protocols. However, the underlying assumptions and inaccurate configuration of these radio models make them inefficient and often lead to mismanagement of scarce energy and computational resources. This research addresses these challenges by proposing a modified radio model that adapts to the frequent changes in the location of the object that the sensor nodes is tracking and is robust enough to report reliable data to the base station despite fluctuations due to signal interference. The impact of incorporating stepwise energy level and specialized data transmission schemes in the proposed radio model was also investigated in this research. Key design features were identified and selected, thereafter model of proposed radio model for cluster-based routing was analyzed. Thus, proposed radio model for cluster-based routing was developed. The performance of the proposed radio model was evaluated using OMNET++ and MATLAB and the results obtained were benchmarked against Low-Energy Adaptive Clustering Hierarchy (LEACH) and Power-Efficient Gathering in Sensor Information Systems (PEGASIS). The simulation shows that the performances of the proposed Low-Energy Adaptive Clustering Hierarchy-Improved (LEACH-IMP) developed in this research are more efficient when compared to existing clustering routing protocols with respect to energy consumption, number of links faults, number of packets received, signal interference, and network lifetime. LEACH-IMP shows an improvement of 30.72% and 38.10% over LEACH in terms of energy consumption and number of link faults respectively. Moreover, LEACH-IMP shows an improvement of 29.21%, 9.28% and 53.16% over LEACH in terms of number of received packets, signal interference and network lifetime respectively. Similarly, when benchmarked against PEGASIS, LEACH-IMP shows an improvement of 17.93% and 20.24% in terms of energy consumption and number of link faults

respectively. Furthermore, LEACH-IMP shows an improvement of 12.02%, 2.22% and 14.38% over PEGASIS in terms of number of received packets, signal interference and network lifetime respectively. Therefore, the LEACH-IMP developed in this research is assessed to be robust enough to report reliable data to the central monitoring system for the end user despite the fluctuations in signal strength.

Distributed Space Missions for Earth System Monitoring IntechOpen

The guidebook on how to connect sensors and radio transceivers to the Arduino for your home. The book will focus on sensors that detect potentially dangerous or disruptive conditions. These will include intruders, fires, temperature extremes (both hot and cold), flammable gases, toxic gases like pollution, power failures, floods (including minor "floods" like a pipe bursting), and other situations. In the chapters after these five chapters on the basics of the nRF24L01, I discuss attaching and operating various sensors, explaining how to set them up and integrate them into the transmission software. The chapters will be divided by hazards you can monitor, not specific sensors, so one chapter may include several different types of sensors that can be used to detect the same hazard.

Detecting Landfill Leachate Contamination Using Remote Sensors Academic Press

Wireless Sensor Networks presents the latest practical solutions to the design issues presented in wireless-sensor-network-based systems. Novel features of the text, distributed throughout, include workable solutions, demonstration systems and case studies of the design and application of wireless sensor networks (WSNs) based on the first-hand research and development experience of the author, and the chapters on real applications: building fire safety protection; smart home automation; and logistics resource management. Case studies and applications illustrate the practical perspectives of: · sensor node design; · embedded software design; · routing algorithms; · sink node positioning; · co-existence with other wireless systems; · data fusion; · security; · indoor location tracking; · integrating with radio-frequency identification; and · Internet of things Wireless Sensor Networks brings together multiple strands of research in the design of WSNs, mainly from software engineering, electronic engineering, and wireless communication perspectives, into an over-arching examination of the subject, benefiting students, field engineers, system developers and IT professionals. The contents have been well used as the teaching material of a course taught at postgraduate level in several universities making it suitable as an advanced text book and a reference book for final-year undergraduate and postgraduate students.

Wireless Power Transmission for Sustainable Electronics National Academies Press

The guidebook on how to connect sensors and radio transceivers to the Arduino for your home. The book will focus on sensors that detect potentially dangerous or disruptive conditions. These will include intruders, fires, temperature extremes (both hot and cold), flammable gases, toxic gases like pollution, power failures, floods (including minor "floods" like a pipe bursting), and other situations. In the chapters after these five chapters on the basics of the nRF24L01, I discuss attaching and operating various sensors, explaining how to set them up and integrate them into

the transmission software. The chapters will be divided by hazards you can monitor, not specific sensors, so one chapter may include several different types of sensors that can be used to detect the same hazard.

Arduino Monitoring System CRC Press

Wireless Sensor Networks overcome the difficulties of other monitoring systems. However, they require further efficiencies for Outdoor Environment Monitoring (OEM) applications due to their harsh operational conditions, huge targeted areas, limited energy budget, and required 3D setups. A fundamental issue in defeating these practical challenges is deployment planning. The deployment plan is a key factor of many intrinsic properties of OEM networks, summarized in connectivity, lifetime, fault-tolerance, and cost-effectiveness. This book investigates the problem of WSNs deployments that address these properties in order to overcome the unique challenges and circumstances in OEM applications.

A Strategy for Active Remote Sensing Amid Increased Demand for Radio Spectrum Springer Science & Business Media

This book presents the state of the art technologies and solutions to tackle the critical challenges faced by the building and development of the WSN and ecological monitoring system but also potential impact on society at social, medical and technological level. This book is dedicated to Sensing systems for Sensors, Wireless Sensor Networks and Ecological Monitoring. The book aims at Master and PhD degree students, researchers, practitioners, especially WSN engineers involved with ecological monitoring. The book will provide an opportunity of a dedicated and a deep approach in order to improve their knowledge in this specific field.

Measurement Systems and Sensors, Second Edition Springer Science & Business Media

Telecommunications Engineer's Reference Book maintains a balance between developments and established technology in telecommunications. This book consists of four parts. Part 1 introduces mathematical techniques that are required for the analysis of telecommunication systems. The physical environment of telecommunications and basic principles such as the teletraffic theory, electromagnetic waves, optics and vision, ionosphere and troposphere, and signals and noise are described in Part 2. Part 3 covers the political and regulatory environment of the telecommunications industry, telecommunication standards, open system interconnect reference model, multiple access techniques, and network management. The last part deliberates telecommunication applications that includes synchronous digital hierarchy, asynchronous transfer mode, integrated services digital network, switching systems, centrex, and call management. This publication is intended for practicing engineers, and as a supplementary text for undergraduate courses in telecommunications.

Guidelines for Spaceborne Microwave Remote Sensors John Wiley & Sons

Presents a comprehensive description of the theory and practical implementation of Doppler radar-based physiological monitoring This book includes an overview of current physiological monitoring techniques and explains the fundamental technology used in remote non-contact monitoring methods. Basic radio wave propagation and radar principles are introduced along with

the fundamentals of physiological motion and measurement. Specific design and implementation considerations for physiological monitoring radar systems are then discussed in detail. The authors address current research and commercial development of Doppler radar based physiological monitoring for healthcare and other applications. Explains pros and cons of different Doppler radar architectures, including CW, FMCW, and pulsed Doppler radar Discusses nonlinear demodulation methods, explaining dc offset, dc information, center tracking, and demodulation enabled by dc cancellation Reviews advanced system architectures that address issues of dc offset, spectrum folding, motion interference, and range resolution Covers Doppler radar physiological measurements demonstrated to date, from basic cardiopulmonary rate extractions to more involved volume assessments Doppler Radar Physiological Sensing serves as a fundamental reference for radar, biomedical, and microwave engineers as well as healthcare professionals interested in remote physiological monitoring methods.

Doppler Radar Physiological Sensing Infinite Study

Provides a collection of works produced by COST Action IC1301 with the goal of achieving significant advances in the field of wireless power transmission This book constitutes together information from COST Action IC1301, a group of academic and industry experts seeking to align research efforts in the field of wireless power transmission (WPT). It begins with a discussion of backscatter as a solution for Internet of Things (IoT) devices and goes on to describe ambient backscattering sensors that use FM broadcasting for low cost and low power wireless applications. The book also explores localization of passive RFID tags and augmented tags using nonlinearities of RFID chips. It concludes with a review of methods of electromagnetic characterization of textile materials for the development of wearable antennas. Wireless Power Transmission for Sustainable Electronics: COST WiPE - IC1301 covers textile-supported wireless energy transfer, and reviews methods for the electromagnetic characterization of textile materials for the development of wearable antennas. It also looks at: backscatter RFID sensor systems for remote health monitoring; simultaneous localization (of robots and objects) and mapping (SLAM); autonomous system of wireless power distribution for static and moving nodes of wireless sensor networks; and more. Presents techniques for smart beam-forming for "on demand" wireless power transmission (WPT) Discusses RF and microwave energy harvesting for space applications Describes miniaturized RFID transponders for object identification and sensing Wireless Power Transmission for Sustainable Electronics: COST WiPE - IC1301 is an excellent book for both graduate students and industry engineers involved in wireless communications and power transfer, and sustainable materials for those fields.

Wireless Sensor Networks Butterworth-Heinemann

Backscattering and RF Sensing for Future Wireless Communication Discover what lies ahead in wireless communication networks with this insightful and forward-thinking book written by experts in the field Backscattering and RF Sensing for Future Wireless Communication delivers a concise and insightful picture of emerging and future trends in increasing the efficiency and performance of wireless communication networks. The book shows how the immense challenge of

frequency saturation could be met via the deployment of intelligent planar electromagnetic structures. It provides an in-depth coverage of the fundamental physics behind these structures and assesses the enhancement of the performance of a communication network in challenging environments, like densely populated urban centers. The distinguished editors have included resources from a variety of leading voices in the field who discuss topics such as the engineering of metasurfaces at a large scale, the electromagnetic analysis of planar metasurfaces, and low-cost and reliable backscatter communication. All of the included works focus on the facilitation of the development of intelligent systems designed to enhance communication network performance. Readers will also benefit from the inclusion of: A thorough introduction to the evolution of wireless communication networks over the last thirty years, including the imminent saturation of the frequency spectrum An exploration of state-of-the-art techniques that next-generation wireless networks will likely incorporate, including software-controlled frameworks involving artificial intelligence An examination of the scattering of electromagnetic waves by metasurfaces, including how wave propagation differs from traditional bulk materials A treatment of the evolution of artificial intelligence in wireless communications Perfect for researchers in wireless communications, electromagnetics, and urban planning, Backscattering and RF Sensing for Future Wireless Communication will also earn a place in the libraries of government policy makers, technologists, and telecom industry stakeholders who wish to get a head start on understanding the technologies that will enable tomorrow’s wireless communications.

Ultra-Low Power RFIC Solutions for Wireless Sensor Networks Springer

Sponsored by the Embankments, Dams, and Slopes Technical Committee of the Geo-Institute of ASCE Remote Sensing for Monitoring Embankments, Dams, and Slopes: Recent Advances, GSP 322, provides information on selecting and deploying a monitoring network to assess the behavior, geometry, total and differential EDS movement, and potential risks of the EDS movement on people and infrastructure. Topics include general technologies used for EDS monitoring, selection and installation of networked sensors for predictive analytics and image recognition, application of monitoring techniques in the design of early warning systems, case studies, and support for decision-makers in implementing early warning systems. Information on a broad range of technologies, such as radio detection and ranging (radar), synthetic aperture radar (SAR), interferometric synthetic aperture radar (InSAR), light detection and ranging (LiDAR), digital photogrammetry and image processing, microelectromechanical systems (MEMS), automatic motorized total stations (AMTS), and unmanned aircraft systems (UAS) to deploy the remote sensing technologies is also included. This Geotechnical Special Publication will be useful to both practitioners and researchers to understand and utilize currently available remote sensing technology and to advance and refine the monitoring of embankments, dams, and slopes.

Development of an Automatic Remote Radiation Monitoring (arrm) System CRC Press

Remote Sensing is collecting and interpreting information on targets without being in physical contact with the objects.

Aircraft, satellites ...etc are the major platforms for remote sensing observations. Unlike electrical, magnetic and gravity surveys that measure force fields, remote sensing technology is commonly referred to methods that employ electromagnetic energy as radio waves, light and heat as the means of detecting and measuring target characteristics. Geoscience is a study of nature world from the core of the earth, to the depths of oceans and to the outer space. This branch of study can help mitigate volcanic eruptions, floods, landslides ... etc terrible human life disaster and help develop ground water, mineral ores, fossil fuels and construction materials. Also, it studies physical, chemical reactions to understand the distribution of the nature resources. Therefore, the geoscience encompass earth, atmospheric, oceanography, pedology, petrology, mineralogy, hydrology and geology. This book covers latest and futuristic developments in remote sensing novel theory and applications by numerous scholars, researchers and experts. It is organized into 26 excellent chapters which include optical and infrared modeling, microwave scattering propagation, forests and vegetation, soils, ocean temperature, geographic information , object classification, data mining, image processing, passive optical sensor, multispectral and hyperspectral sensing, lidar, radiometer instruments, calibration, active microwave and SAR processing. Last but not the least, this book presented chapters that highlight frontier works in remote sensing information processing. I am very pleased to have leaders in the field to prepare and contribute their most current research and development work. Although no attempt is made to cover every topic in remote sensing and geoscience, these entire 26 remote sensing technology chapters shall give readers a good insight. All topics listed are equal important and significant.