



Community Experience Distilled

Building Wireless Sensor Networks Using Arduino

Leverage the powerful Arduino and XBee platforms to monitor and control your surroundings

Matthijs Kooijman

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Building Wireless Sensor Networks Using Arduino

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Building Wireless Sensor Networks Using Arduino:

Building Wireless Sensor Networks Using Arduino Matthijs Kooijman, 2015-10-19 Leverage the powerful Arduino and XBee platforms to monitor and control your surroundings About This Book Build your own low power wireless network using ready made Arduino and XBee hardware Create a complex project using the Arduino prototyping platform A guide that explains the concepts and builds upon them with the help of examples to form projects Who This Book Is For This book is targeted at embedded system developers and hobbyists who have some working knowledge of Arduino and who wish to extend their projects using wireless connectivity What You Will Learn Interact with XBee boards using the XCTU program on Windows OS X or Linux Make your Arduino boards communicate wirelessly using XBee modules in the advanced API mode Centrally collect and store measured sensor data in the cloud or your own database Connect the coordinator Arduino to the Internet and send data to web services Control your environment automatically based on sensor input from your network Interact with off the shelf ZigBee Home Automation devices Make your devices battery powered and let them sleep to get months or even years of battery life In Detail Arduino has been established as the de facto standard microcontroller programming platform being used for one off do it yourself projects as well as prototypes for actual products By providing a myriad of libraries the Arduino community has made it very easy to interact with pretty much any piece of hardware out there XBee offers a great range of low power wireless solutions that are easy to work with by taking all of the complexity of wireless mesh networking out of your hands and letting you focus on what to send without worrying about the how Building wireless sensor networks is cost effective as well as efficient as it will be done with Arduino support The book starts with a brief introduction to various wireless protocols concepts and the XBee hardware that enables their use Then the book expands to explain the Arduino boards to you letting them read and send sensor data collect that data centrally and then even control your home from the Internet Moving further more advanced topics such as interacting through the standard Zigbee Home Automation protocol or making your application power efficient are covered By the end of the book you will have all the tools needed to build complete real world solutions Style and approach A hands on guide featuring a single home automation project that can be built as described or with endless variations Every step is illustrated with complete examples and screenshots allowing you to build the examples swiftly

Building Wireless Sensor Networks with ESP32 LoRa Agus Kurniawan, This is a practical book how to implement a simple Wireless Sensor Networks WSN with ESP32 over LoRa network The following is a list of highlight topics in this book Preparing Development Environment Set up ESP32 LoRa Sending and Receiving Data over ESP32 LoRa Handling LoRa Receiver Interrupt Broadcast Messages over LoRa Network Building WSN Application Based ESP32 LoRa

Building Wireless Sensor Networks Robert Faludi, 2010-12-14 Get ready to create distributed sensor systems and intelligent interactive devices using the ZigBee wireless networking protocol and Series 2 XBee radios By the time you re halfway through this fast paced hands on guide you ll have built a series of useful

projects including a complete ZigBee wireless network that delivers remotely sensed data Radio networking is creating revolutions in volcano monitoring performance art clean energy and consumer electronics As you follow the examples in each chapter you ll learn how to tackle inspiring projects of your own This practical guide is ideal for inventors hackers crafters students hobbyists and scientists Investigate an assortment of practical and intriguing project ideas Prep your ZigBee toolbox with an extensive shopping list of parts and programs Create a simple working ZigBee network with XBee radios in less than two hours for under 100 Use the Arduino open source electronics prototyping platform to build a series of increasingly complex projects Get familiar with XBee s API mode for creating sensor networks Build fully scalable sensing and actuation systems with inexpensive components Learn about power management source routing and other XBee technical nuances Make gateways that connect with neighboring networks including the Internet

Beginning Sensor Networks with Arduino and Raspberry Pi Charles Bell,2014-01-23 Beginning Sensor Networks with Arduino and Raspberry Pi teaches you how to build sensor networks with Arduino Raspberry Pi and XBee radio modules and even shows you how to turn your Raspberry Pi into a MySQL database server to store your sensor data First you ll learn about the different types of sensors and sensor networks including how to build a simple XBee network Then you ll walk through building an Arduino based temperature sensor and data collector followed by building a Raspberry Pi based sensor node Next you ll learn different ways to store sensor data including writing to an SD card sending data to the cloud and setting up a Raspberry Pi MySQL server to host your data You even learn how to connect to and interact with a MySQL database server directly from an Arduino Finally you ll learn how to put it all together by connecting your Arduino sensor node to your new Raspberry Pi database server If you want to see how well Arduino and Raspberry Pi can get along especially to create a sensor network then Beginning Sensor Networks with Arduino and Raspberry Pi is just the book you need

Beginning Sensor Networks with XBee, Raspberry Pi, and Arduino Charles Bell,2020-06-25 Build sensor networks with Python and MicroPython using XBee radio modules Raspberry Pi and Arduino boards This revised and updated edition will put all of these together to form a sensor network and show you how to turn your Raspberry Pi into a MySQL database server to store your sensor data You ll review the different types of sensors and sensor networks along with new technology including how to build a simple XBee network You ll then walk through building an sensor nodes on the XBee Raspberry Pi and Arduino and also learn how to collect data from multiple sensor nodes The book also explores different ways to store sensor data including writing to an SD card sending data to the cloud and setting up a Raspberry Pi MySQL server to host your data You ll even learn how to connect to and interact with a MySQL database server directly from an Arduino Finally you ll see how to put it all together by connecting your sensor nodes to your new Raspberry Pi database server If you want to see how well XBee Raspberry Pi and Arduino can get along especially to create a sensor network then Beginning Sensor Networks with XBee Raspberry Pi and Arduino is just the book you need What You ll Learn Code your sensor nodes with Python and MicroPython Work with new

XBee 3 modules Host your data on Raspberry Pi Get started with MySQL Create sophisticated sensor networks Who This Book Is For Those interested in building or experimenting with sensor networks and IoT solutions including those with little or no programming experience A secondary target includes readers interested in using XBee modules with Raspberry Pi and Arduino those interested in controlling XBee modules with MicroPython **Data Science and Internet of Things**

Giancarlo Fortino, Antonio Liotta, Raffaele Gravina, Alessandro Longheu, 2021-02-18 This book focuses on the combination of IoT and data science in particular how methods algorithms and tools from data science can effectively support IoT The authors show how data science methodologies techniques and tools can translate data into information enabling the effectiveness and usefulness of new services offered by IoT stakeholders The authors posit that if IoT is indeed the infrastructure of the future data structure is the key that can lead to a significant improvement of human life The book aims to present innovative IoT applications as well as ongoing research that exploit modern data science approaches Readers are offered issues and challenges in a cross disciplinary scenario that involves both IoT and data science fields The book features contributions from academics researchers and professionals from both fields *Making Things Talk* Tom Igoe, 2011-09-08

Make microcontrollers PCs servers and smartphones talk to each other Building electronic projects that interact with the physical world is good fun But when the devices you ve built start to talk to each other things really get interesting With 33 easy to build projects *Making Things Talk* shows you how to get your gadgets to communicate with you and your environment It s perfect for people with little technical training but a lot of interest Maybe you re a science teacher who wants to show students how to monitor the weather in several locations at once Or a sculptor looking to stage a room of choreographed mechanical sculptures In this expanded edition you ll learn how to form networks of smart devices that share data and respond to commands Call your home thermostat with a smartphone and change the temperature Create your own game controllers that communicate over a network Use ZigBee Bluetooth Infrared and plain old radio to transmit sensor data wirelessly Work with Arduino 1 0 Processing and PHP three easy to use open source environments Write programs to send data across the Internet based on physical activity in your home office or backyard Whether you want to connect simple home sensors to the Internet or create a device that can interact wirelessly with other gadgets this book explains exactly what you need **Using Geodata and Geolocation in the Social Sciences** David Abernathy, 2016-10-19 Abernathy

provides a truly accessible and interdisciplinary introduction to geodata and geolocation covering both the conceptual and the practical It is a must read for students or researchers looking to make the most of the spatial elements of their data Luke Sloan Senior Lecturer in Quantitative Methods Cardiff University *Using Geodata and Geolocation in the Social Sciences* Mapping our Connected World provides an engaging and accessible introduction to the Geoweb with clear step by step guides for Capturing Geodata from sources including GPS sensor networks and Twitter Visualizing Geodata using programmes including QGIS GRASS and R Featuring colour images practical exercises walking you through using data

sources and a companion website packed with resources this book is the perfect guide for students and teachers looking to incorporate location based data into their social science research

Cloud Computing and Security Xingming Sun,Zhaoqing Pan,Elisa Bertino,2018-09-25 This six volume set LNCS 11063 11068 constitutes the thoroughly refereed conference proceedings of the 4th International Conference on Cloud Computing and Security ICCCS 2018 held in Haikou China in June 2018 The 386 full papers of these six volumes were carefully reviewed and selected from 1743 submissions The papers cover ideas and achievements in the theory and practice of all areas of inventive systems which includes control artificial intelligence automation systems computing systems electrical and informative systems The six volumes are arranged according to the subject areas as follows cloud computing cloud security encryption information hiding IoT security multimedia forensics

Wireless Sensor Networks Damodar Reddy Edla,Mahesh Chowdary Kongara,Amruta Lipare,VenkataNareshbabu Kuppili,Kannadasan K,2020-11-23 Wireless Sensor Networks Evolutionary Algorithms for Optimizing Performance provides an integrative overview of bio inspired algorithms and their applications in the area of Wireless Sensor Networks WSN Along with the usage of the WSN the number of risks and challenges occurs while deploying any WSN Therefore to defeat these challenges some of the bio inspired algorithms are applied and discussed in this book Discussion includes a broad integrated perspective on various challenges and issues in WSN and also impact of bio inspired algorithms on the lifetime of the WSN It creates interdisciplinary theory concepts definitions models and findings involved in WSN and Bio inspired algorithms making it an essential guide and reference It includes various WSN examples making the book accessible to a broader interdisciplinary readership The book offers comprehensive coverage of the most essential topics including Evolutionary algorithms Swarm intelligence Hybrid algorithms Energy efficiency in WSN Load balancing of gateways Localization Clustering and routing Designing fitness functions according to the issues in WSN The book explains about practices of shuffled complex evolution algorithm shuffled frog leaping algorithm particle swarm optimization and dolphin swarm optimization to defeat various challenges in WSN The author elucidates how we must transform our thinking illuminating the benefits and opportunities offered by bio inspired approaches to innovation and learning in the area of WSN This book serves as a reference book for scientific investigators who shows an interest in evolutionary computation and swarm intelligence as well as issues and challenges in WSN

Building Wireless Sensor Networks Using Arduino Book Review: Unveiling the Power of Words

In some sort of driven by information and connectivity, the energy of words has become more evident than ever. They have the capacity to inspire, provoke, and ignite change. Such is the essence of the book **Building Wireless Sensor Networks Using Arduino**, a literary masterpiece that delves deep in to the significance of words and their affect our lives. Published by a renowned author, this captivating work takes readers on a transformative journey, unraveling the secrets and potential behind every word. In this review, we will explore the book is key themes, examine its writing style, and analyze its overall affect readers.

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Building Wireless Sensor Networks Using Arduino Introduction

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