

Gnuradio As A Digital Signal Processing Environment

Navigation Signal Processing for GNSS Software Receivers
 ICACNI 2015, Volume 1
 14th International Conference, KES 2010, Cardiff, UK, September 8-10, 2010, Proceedings
 8th International Conference, ADHOCNETS 2016, Ottawa, Canada, September 26-27, 2016, Revised Selected Papers
 A Multi-Standard Multi-Mode Approach
 14th IFIP WG 6.2 International Conference, WWIC 2016, Thessaloniki, Greece, May 25-27, 2016, Proceedings
 7th International ICST Conference, SecureComm 2011, London, September 7-9, 2011, Revised Selected Papers
 ABCs of Software Defined Radio
 Security and Privacy in Communication Networks
 High-Speed Digital System Design
 A Multi-standard Multi-mode Approach
 Digital Communication Systems Engineering with Software-Defined Radio
 Art, Science and Experience
 Multimedia over Cognitive Radio Networks
 Algorithms, Protocols, and Experiments
 Why Your Next Radio Will be SDR
 Technological Innovation for Collective Awareness Systems
 Ultrasound Imaging
 BIOMED 2011, 20-23 June 2011, Kuala Lumpur, Malaysia
 New Scientist
 A Guide for the Penetration Tester
 Software-Defined Radio for Engineers
 Internet of Things and Sensors Networks in 5G Wireless Communications
 The Practical Reality
 Wired/Wireless Internet Communications
 Circuits and Signal Processing
 Wireless Communications from the Ground Up
 Proceedings of Fourth International Conference INDIA 2017
 Using Cross-Layer Techniques for Communication Systems
 10th International Conference, CROWNCOM 2015, Doha, Qatar, April 21-23, 2015, Revised Selected Papers
 Software Defined Radio Using MATLAB & Simulink and the RTL-SDR
 Starting Digital Signal Processing in Telecommunication Engineering
 Cognitive Radio
 A Laboratory-based Course
 Concepts for Short Range Millimeter-wave Miniaturized Radar Systems with Built-in Self-Test
 Knowledge-Based and Intelligent Information and Engineering Systems
 Basic Concepts, Mathematical Modeling and Applications
 Signals and Systems using MATLAB
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Navigation Signal Processing for GNSS Software Receivers Artech House

This book constitutes the refereed proceedings of the 14th IFIP WG 6.2 International Conference on Wired/Wireless Internet Communications, WWIC 2016, held in Thessaloniki, Greece, in May 2016. The 27 papers presented in this volume were carefully reviewed and selected from 54 submissions. The topics addressed are: wireless technologies and systems, middleboxes and addressing, energy efficiency, network applications and tools, network protocols, network modeling, wireless sensor networks, and resource management and optimization.

ICACNI 2015, Volume 1 John Wiley & Sons

The availability of the RTL-SDR device for less than \$20 brings software defined radio (SDR) to the home and work desktops of EE students, professional engineers and the maker community. The RTL-SDR can be used to acquire and sample RF (radio frequency) signals transmitted in the

frequency range 25MHz to 1.75GHz, and the MATLAB and Simulink environment can be used to develop receivers using first principles DSP (digital signal processing) algorithms. Signals that the RTL-SDR hardware can receive include: FM radio, UHF band signals, ISM signals, GSM, 3G and LTE mobile radio, GPS and satellite signals, and any that the reader can (legally) transmit of course! In this book we introduce readers to SDR methods by viewing and analysing downconverted RF signals in the time and frequency domains, and then provide extensive DSP enabled SDR design exercises which the reader can learn from. The hands-on SDR design examples begin with simple AM and FM receivers, and move on to the more challenging aspects of PHY layer DSP, where receive filter chains, real-time channelisers, and advanced concepts such as carrier synchronisers, digital PLL designs and QPSK timing and phase synchronisers are implemented. In the book we will also show how the RTL-SDR can be used with SDR transmitters to develop complete communication systems, capable of transmitting payloads such as simple text strings, images and audio across the lab desktop.

14th International Conference, KES 2010, Cardiff, UK, September 8-10, 2010,

Proceedings Newnes

In this book, we present a dozen state of the art developments for ultrasound imaging, for example, hardware implementation, transducer, beamforming, signal processing, measurement of elasticity and diagnosis. The editors would like to thank all the chapter authors, who focused on the publication of this book.

8th International Conference, ADHOCNETS 2016, Ottawa, Canada, September 26-27, 2016, Revised Selected Papers KIT Scientific Publishing

The components of radio communication systems used to be implemented in hardware. Software Defined Radio (SDR) is instead changing radio communications by applying software in microprocessors or embedded systems. SDR is making the capabilities of digital electronics more practical, enabling rapid conversion of theory to designed systems. On the major categories of communication protocols, the importance of SDR technology is orthogonal frequency-division multiplexing (OFDM). The OFDM protocol encodes digital data on multiple carrier frequencies. It is widely used in digital communication applications, such as Wireless Local Area Network (802.11

WLAN), 4G (3GPP-LTE) mobile communications, and Digital Video Broadcast (DVB) standards. In this thesis, we utilize a hardware platform for software radio known as the Universal Software Radio Peripheral (USRP) and integrate an open source software radio standard (GNU-Radio). A GNU-Radio software development toolkit was used to develop a packet-based OFDM SDR for voice and data transmission. In addition, the VME bus International Trade Association (VITA-49 Protocol) standard is proposed as the Radio Transport (VRT) standard defining a transport-layer interface to promote interoperability between radio frequency (RF) receivers and signal processing equipment, as well as physical layer (PHY) and medium access control (MAC).

A Multi-Standard Multi-Mode Approach Springer

Details the paradigms of opportunistic spectrum sharing and white space access as effective means to satisfy increasing demand for high-speed wireless communication and for novel wireless communication applications. This book addresses opportunistic spectrum sharing and white space access, being particularly mindful of practical considerations and solutions. In Part I, spectrum sharing implementation issues are considered in terms of hardware platforms and software architectures for realization of flexible and spectrally agile transceivers. Part II addresses practical mechanisms supporting spectrum sharing, including spectrum sensing for opportunistic spectrum access, machine learning and decision-making capabilities, aggregation of spectrum opportunities, and spectrally-agile radio waveforms. Part III presents the ongoing work on policy and regulation for efficient and reliable spectrum sharing, including major recent steps forward in TV White Space (TVWS) regulation and associated geolocation database approaches, policy management aspects, and novel licensing schemes supporting spectrum sharing. In Part IV, business and economic aspects of spectrum sharing are considered, including spectrum value modeling, discussion of issues around disruptive innovation that are pertinent to opportunistic spectrum sharing and white space access, and business benefits assessment of the novel spectrum sharing regulatory proposal Licensed Shared Access. Part V discusses deployments of opportunistic spectrum sharing and white space access solutions in practice, including work on TVWS system implementations, standardization activities, and development and testing of systems according to the standards. Discusses aspects of pioneering standards such as the IEEE 802.22 "Wi-Far" standard, the IEEE 802.11af "White-Fi" standard, the IEEE Dynamic Spectrum Access Networks Standards Committee standards, and the ETSI Reconfiguration Radio Systems standards. Investigates regulatory and regulatory-linked solutions assisting opportunistic spectrum sharing and white space access, including geo-location database approaches and licensing enhancements. Covers the pricing and value of spectrum, the economic effects and potentials of such technologies, and provides detailed business assessments of some particularly innovative regulatory proposals. The flexible and efficient use of radio frequencies is necessary to cater for the increasing data traffic demand worldwide. This book addresses this necessity through its extensive coverage of opportunistic spectrum sharing and white space access solutions. *Opportunistic Spectrum Sharing and White Space Access: The Practical Reality* is a great resource for telecommunication engineers, researchers, and students.

14th IFIP WG 6.2 International Conference, WWIC 2016, Thessaloniki, Greece, May 25-27, 2016, Proceedings Cambridge University Press

Software Defined Radio makes wireless communications easier, more efficient, and more reliable. This book bridges the gap between academic research and practical implementation. When beginning a project, practicing engineers, technical managers, and graduate students can save countless hours by considering the concepts presented in these pages. The author covers the myriad options and trade-offs available when selecting an appropriate hardware architecture. As demonstrated here, the choice between hardware- and software-centric architecture can mean the difference between meeting an aggressive schedule and bogging down in endless design iterations. Because of the author's experience overseeing dozens of failed and successful developments, he is able to present many real-life examples. Some of the key concepts covered are: Choosing the right architecture for the market - laboratory, military, or commercial, Hardware platforms - FPGAs, GPPs, specialized and hybrid devices, Standardization efforts to ensure interoperability and portability, State-of-the-art components for radio frequency, mixed-signal, and baseband processing. The text requires only minimal knowledge of wireless communications; whenever possible, qualitative arguments are used instead of equations. An appendix provides a quick overview of wireless communications and introduces most of the concepts the readers will need to take advantage of the material. An essential introduction to SDR, this book is sure to be an invaluable addition to any technical bookshelf.

7th International ICST Conference, SecureComm 2011, London, September 7-9, 2011, Revised Selected Papers IGI Global

The advancement of software radio technology has provided an opportunity for the design of performance-enhanced GNSS receivers that are more flexible and easier to develop than their FPGA or ASIC based counterparts. Filling a gap in the current literature on the subject, this highly practical resource offers you an in-depth understanding of navigation signal detection and estimation algorithms and their implementation in a software radio. This unique book focuses on high precision applications for GNSS signals and an innovative RTK receiver concept based on difference correlators. You learn how to develop navigation receivers for top performance using basic algorithms, like correlation and tracking, which can be understood on an intuitive level. Additionally, the book provides you with a theoretical framework for signal estimation and detection that gives you the knowledge you need to make performance assessments without building a receiver. The theoretical treatment also gives you hints for choosing optimal algorithms for your projects in the field.

ABCs of Software Defined Radio Using Digital Signal Processors in GNU Radio Software-Defined Radio for Engineers

Modern cars are more computerized than ever. Infotainment and navigation systems, Wi-Fi, automatic software updates, and other innovations aim to make driving more convenient. But vehicle technologies haven't kept pace with today's more hostile security environment, leaving millions vulnerable to attack. The Car Hacker's Handbook will give you a deeper understanding of the computer systems and embedded software in modern vehicles. It begins by examining vulnerabilities and providing detailed explanations of communications over the CAN bus and between devices and systems. Then, once you have an understanding of a vehicle's communication network, you'll learn how to intercept data and perform specific hacks to track vehicles, unlock doors, glitch engines, flood communication, and more. With a focus on low-cost, open source hacking tools such as Metasploit, Wireshark, Kayak, can-utils, and ChipWhisperer, The Car Hacker's Handbook will show you how to: -Build an accurate threat model for your vehicle -Reverse engineer the CAN bus to fake engine signals -Exploit vulnerabilities in diagnostic and data-logging systems -Hack the ECU and other firmware and embedded systems -Feed exploits through infotainment and vehicle-to-vehicle communication systems -Override factory settings with performance-tuning techniques -Build physical and virtual test benches to try out exploits safely If you're curious about automotive security and have the urge to hack a two-ton computer, make The Car Hacker's Handbook your first stop.

Security and Privacy in Communication Networks Springer

This book constitutes the proceedings of the 8th International Conference on Ad Hoc Networks, ADHOCNETS 2016, held in Ottawa, Canada, September 26-17, 2016. The 34 revised full papers presented were carefully reviewed and selected from 46 submissions. The papers provide visions, trends, challenges and opportunities in the area of ad hoc networking and emerging applications. The conference also features two workshops on ad hoc network security and vulnerability, and convergence of wireless directional network systems and software defined networking, respectively.

High-Speed Digital System Design Springer Nature

With nearly 7 billion mobile phone subscriptions worldwide, mobility and computing have become pervasive in our society and business. Moreover, new mobile multimedia communication services are challenging telecommunication operators. To support the significant increase in multimedia traffic—especially video—over wireless networks, new technological infrastructure must be created. Cognitive Radio Networks (CRNs) are widely regarded as one of the most promising technologies for future wireless communications. This book explains how to efficiently deliver video, audio, and other data over CRNs. Covering advanced algorithms, protocols, and hardware-/software-based experiments, this book describes how to encode video in a prioritized way to send to dynamic radio links. It discusses different FEC codes for video reliability and explains how different machine learning algorithms can be used for video quality control. It also explains how to use readily available software tools to build a CRN simulation model. This book explains both theoretical and experimental designs. It describes how universal software radio peripheral (USRP) boards can be used for real-time, high-resolution video transmission. It also discusses how a USRP board can sense the spectrum dynamics and how it can be controlled by GNU Radio software. A separate chapter discusses how the network simulator ns-2 can be used to build a simulated CRN platform.

A Multi-standard Multi-mode Approach Academic Press

This book describes for readers the entire, interconnected complex of theoretical and practical aspects of designing and organizing the production of various electronic devices, the general and main distinguishing feature of which is the high speed of processing and transmitting of digital signals. The authors discuss all the main stages of design - from the upper system level of the hierarchy (telecommunications system, 5G mobile communications) to the lower level of basic semiconductor elements, printed circuit boards. Since the developers of these devices in practice deal with distorted digital signals that are transmitted against a background of interference, the authors not only explain the physical nature of such effects, but also offer specific solutions as to how to avoid such parasitic effects, even at the design stage of high-speed devices.

Digital Communication Systems Engineering with Software-Defined Radio Springer Nature

The book is a collection of high-quality peer-reviewed research papers presented at International Conference on Information System Design and Intelligent Applications (INDIA 2017) held at Duy Tan University, Da Nang, Vietnam during 15-17 June 2017. The book covers a wide range of topics of computer science and information technology discipline ranging from image processing, database application, data mining, grid and cloud computing, bioinformatics and many others. The various intelligent tools like swarm intelligence, artificial intelligence, evolutionary algorithms, bio-inspired algorithms have been well applied in different domains for solving various challenging problems.

Art, Science and Experience MDPI

This two-volume book presents an unusually diverse selection of research papers, covering all major topics in the fields of information and communication technologies and related sciences. It provides a wide-angle snapshot of current themes in information and power engineering, pursuing a cross-disciplinary approach to do so. The book gathers revised contributions that were presented at the 2018 International Conference: Sciences of Electronics, Technologies of Information and Telecommunication (SETIT'18), held on 20-22 December 2018 in Hammamet, Tunisia. This eighth installment of the event attracted a wealth of submissions, and the papers presented here were selected by a committee of experts and underwent additional, painstaking revision. Topics covered include: · Information Processing · Human-Machine Interaction · Computer Science · Telecommunications and Networks · Signal Processing · Electronics · Image and Video This broad-scope approach is becoming increasingly popular in scientific publishing. Its aim is to encourage scholars and professionals to overcome disciplinary barriers, as demanded by current trends in the industry and in the consumer market, which are rapidly leading toward a convergence of data-driven applications, computation, telecommunication, and energy awareness. Given its coverage, the book will benefit graduate students, researchers and practitioners who need to keep up with the latest technological advances.

Multimedia over Cognitive Radio Networks No Starch Press

Globally considered as one of the key technologies in the field of wireless communications, cognitive radio has the capability to solve the issues related to radio spectrum scarcity with the help of dynamic spectrum allocation. It discusses topics including software defined radio architecture, linear predictive coding, variance fractal compression, optimal Codec design for mobile communication system, digital modulation techniques, spectrum sensing in cognitive radio networks and orthogonal frequency division multiplexing in depth. The text is primarily written for senior undergraduate and graduate students, in learning experimental techniques, designing and implementing models in the field wireless communication.

Algorithms, Protocols, and Experiments American Radio Relay League (ARRL)

This hands-on, laboratory driven textbook helps readers understand principles of digital signal processing (DSP) and basics of software-based digital communication, particularly software-defined networks (SDN) and software-defined radio (SDR). In the book only the most important concepts are presented. Each book chapter is an introduction to computer laboratory and is accompanied by complete laboratory exercises and ready-to-go Matlab programs with figures and comments (available at the book webpage and running also in GNU Octave 5.2 with free software packages), showing all or most details of relevant algorithms. Students are tasked to understand programs, modify them, and apply presented concepts to recorded real RF signal or simulated received signals, with modelled transmission condition and hardware imperfections. Teaching is done by showing examples and their modifications to different real-world telecommunication-like applications. The book consists of three parts: introduction to DSP (spectral analysis and digital filtering), introduction to DSP advanced topics (multi-rate, adaptive, model-based and multimedia -

speech, audio, video - signal analysis and processing) and introduction to software-defined modern telecommunication systems (SDR technology, analog and digital modulations, single- and multi-carrier systems, channel estimation and correction as well as synchronization issues). Many real signals are processed in the book, in the first part - mainly speech and audio, while in the second part - mainly RF recordings taken from RTL-SDR USB stick and ADALM-PLUTO module, for example captured IQ data of VOR avionics signal, classical FM radio with RDS, digital DAB/DAB+ radio and 4G-LTE digital telephony. Additionally, modelling and simulation of some transmission scenarios are tested in software in the book, in particular TETRA, ADSL and 5G signals. Provides an introduction to digital signal processing and software-based digital communication; Presents a transition from digital signal processing to software-defined telecommunication; Features a suite of pedagogical materials including a laboratory test-bed and computer exercises/experiments.

Why Your Next Radio Will be SDR Springer

This new textbook in signals and systems provides a pedagogically rich approach to what can commonly be a mathematically dry subject. With features like historical notes, highlighted common mistakes, and applications in controls, communications, and signal processing, Chaparro helps students appreciate the usefulness of the techniques described in the book. Each chapter contains a section with MatLab applications. Pedagogically rich introduction to signals and systems using historical notes, pointing out "common mistakes", and relating concepts to realistic examples throughout to motivate learning the material Introduces both continuous and discrete systems early, then studies each (separately) in more depth later Extensive set of worked examples and

homework assignments, with applications to controls, communications, and signal processing throughout Provides review of all the background math necessary to study the subject MatLab applications in every chapter

Technological Innovation for Collective Awareness Systems Springer

This book discusses the security issues in a wide range of wireless devices and systems, such as RFID, Bluetooth, ZigBee, GSM, LTE, and GPS. It collects the findings of recent research by the UnicornTeam at 360 Technology, and reviews the state-of-the-art literature on wireless security. The book also offers detailed case studies and theoretical treatments - specifically it lists numerous laboratory procedures, results, plots, commands and screenshots from real-world experiments. It is a valuable reference guide for practitioners and researchers who want to learn more about the advanced research findings and use the off-the-shelf tools to explore the wireless world.

Ultrasound Imaging Createspace Independent Publishing Platform

"This unique resource provides you with a practical approach to quickly learning the software-defined radio concepts you need to know for your work in the field. By prototyping and evaluating actual digital communication systems capable of performing "over-the-air" wireless data transmission and reception, this volume helps you attain a first-hand understanding of critical design trade-offs and issues. Moreover you gain a sense of the actual "real-world" operational behavior of these systems. With the purchase of the book, you gain access to several ready-made Simulink experiments at the publisher's website. This collection of laboratory experiments, along with several examples, enables you to successfully implement the designs discussed the book in a

short period of time. These files can be executed using MATLAB version R2011b or later. "

BIOMED 2011, 20-23 June 2011, Kuala Lumpur, Malaysia Springer

This volume presents the refereed proceedings of the 7th International ICST Conference on Security and Privacy in Communication Networks, SecureComm 2011, held in London, UK, in September 2011. The 35 revised papers included in the volume were carefully reviewed and selected from numerous submissions. Topics covered include network intrusion detection; anonymity and privacy; wireless security; system security; DNS and routing security; and key management.

New Scientist Artech House

The lack of clear communication, especially internationally, plagues the modern world in a variety of fields. Researchers and practitioners within the modern networking and communication industries strive to discover new and innovative ways for humans to better contact one another. Strategic Innovations and Interdisciplinary Perspectives in Telecommunications and Networking provides emerging research exploring the theoretical and practical aspects of network management and security, as well as applications within computer science, mobile and wireless computing, and multimedia technology. Featuring coverage on a broad range of topics such as coding theory, mobile devices, and contextual advertising, this book is ideal for students, researchers, social media marketers, brand managers, networking professionals, and engineers seeking current research on cross-disciplinary applications of electrical engineering, computer science, and information technology.

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