
Energy Detection Spectrum Sensing Matlab Code

Communication and Computing Systems

Soft Computing for Problem Solving

Sensing Techniques for Next Generation Cognitive Radio Networks

Digital Communication Systems Engineering with Software-Defined Radio

Mobile Multimedia Communications

Adaptive Weighting of Multi-taper Spectrum Sensing in Cognitive Radio Networks

Innovations in Electronics and Communication Engineering

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Spectrum Sensing Techniques: Comparative Analysis

Proceedings of 2nd International Conference on Communication, Computing and Networking

2018 International Symposium on Electronics and Telecommunications (ISETC)

Cognitive Radio Networking and Security

Hybrid Spectrum Sensing Using Energy Detector and Cyclostationary Feature

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Spectrum Access and Management for Cognitive Radio Networks

Automatic Real-time Spectrum Sensing Using Energy Detection in Software Defined Radio

An Efficient Hardware Implementation of an Energy Detection-based Spectral Estimator for Cognitive Radios

Cognitive Radio - An Enabler for Internet of Things

Proceedings of First International Conference on Information and Communication

Technology for Intelligent Systems: Volume 2

Communications, Signal Processing, and Systems

Proceedings of Sixth International Congress on Information and Communication Technology

Optical And Microwave Technologies

Cognitive Radio Networks Optimization with Spectrum Sensing Algorithms

Intelligent Manufacturing and Energy Sustainability

Proceedings of International Conference on Communication and Computational Technologies

Proceedings of the Mediterranean Conference on Information & Communication Technologies 2015

Trends and Advances in Information Systems and Technologies

The Proceedings of the Second International Conference on Communications, Signal Processing, and Systems

Signal and Information Processing, Networking and Computers
Cognitive Radio Technology Applications for Wireless and Mobile Ad Hoc Networks
Advanced Wireless Sensing Techniques for 5G Networks
Implementation of Spectrum Sensing Techniques for Cognitive Radio Systems
White Space Communication
Innovative Data Communication Technologies and Application
Europe and MENA Cooperation Advances in Information and Communication
Technologies
Implementation of Cognitive Radio Spectrum sensing circuit using TSPRT algorithm

**Energy Detection
Spectrum Sensing
Matlab Code**

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Communication and Computing Systems
Springer Nature

This book written for students of electronics and communication, students of computer science and communications engineers addresses topics such as Introduction of CRN, Advanced spectrum sensing techniques, Cooperative sensing techniques, Distributed sensing techniques, Issues in advanced sensing techniques, and Applications of 5G Networks. It provides new algorithms, explores recent results, and evaluates the performance of technologies in use in this area. It also provides new research topics and sensing techniques related to 5G networks for researchers.

Soft Computing for Problem Solving
Springer

In recent years, a considerable amount of effort has been devoted, both in industry and academia, towards the efficient utilization of the available spectrum under the various propagation models which lead towards the design and dimensioning of the future network Internet of Things (IoT). This book focuses on Television White Space (TVWS) opportunities and regulatory aspects for cognitive radio applications, and

includes case studies for the exploitation of TVWS depending on user's mobility, and the geo-location between user and the Base Station. The book presents recent advances in spectrum sensing, reflecting state of the art technology and research achievements in this area as well as a new insights in spectrum sensing of performance modeling, analysis and worldwide applications. Technical topics discussed include: • Novel Application of TV White Space • Spectrum Sensing in Cognitive Radio • Cooperative Spectrum Sensing • DoA Estimation Algorithms

Sensing Techniques for Next Generation Cognitive Radio Networks IGI Global

ISETC 2018 will bring together members from academia and industry to present their achievements in electronics and telecommunications

Digital Communication Systems Engineering with Software-Defined Radio
Cambridge University Press

This book gathers a collection of papers by international experts presented at the International Conference on NextGen Electronic Technologies (ICNETS2-2016). ICNETS2 encompasses six symposia covering all aspects of the electronics and communications domains, including relevant nano/micro materials and devices. Highlighting the latest research on Optical And Microwave Technologies, the book will benefit all researchers,

professionals, and students working in the core areas of electronics and their applications, especially in signal processing, embedded systems, and networking.

Mobile Multimedia Communications
Springer

The purpose of this graduate project is to design a real-time spectrum sensing system using software defined radio. The uniqueness of software defined radio is the concept of replacing many of the hardware components in a traditional radio communication system with software algorithms and coding. The scope of this project will be on spectrum sensing - to be able to automatically detect active signals in the desired frequency spectrum. The hardware components used in this graduate project are the Universal Software Radio Peripheral and the Agilent function generator. The graphical user interface and algorithm programming are performed in MATLAB. The spectrum sensing system will scan a portion of the frequency spectrum, determine the presence of signals, and display the three highest signal peaks in a given band. This paper will elucidate spectrum sensing's strengths and weaknesses as well as possible future work.

Adaptive Weighting of Multi-taper Spectrum Sensing in Cognitive Radio Networks Springer

This book contains a selection of articles from The Europe, Middle East and North Africa Conference on Technology and Security to Support Learning 2016 (EMENA-TSSL'16), held between the 3th and 5th of October at Saidia, Oujda, Morocco. EMENA-TSSL'16 is a global forum for researchers and practitioners to present and discuss recent results and innovations, current trends, professional experiences and challenges in

Information & Communication Technologies, and Security to support Learning. The main topics covered are: A) Online Education; B) Emerging Technologies in Education; C) Artificial Intelligence in Education; D) Gamification and Serious games; E) Network & Web Technologies Applications; F) Online experimentation and Virtual Laboratories; G) Multimedia Systems and Applications; H) Security and Privacy; I) Multimedia, Computer Vision and Image Processing; J) Cloud, Big Data Analytics and Applications; K) Human-Computer Interaction; L) Software Systems, Architectures, Applications and Tools; M) Online Languages and Natural Language Processing N) E-content Development, Assessment and Plagiarism; O) Secure E-Learning Development and Auditing; P) Internet of Things and Wireless Sensor Networks.

Innovations in Electronics and Communication Engineering Artech House

Automatic Real-time Spectrum Sensing Using Energy Detection in Software Defined Radio

Wireless Internet Springer

This book is a collection of accepted papers that were presented at the International Conference on Communication and Computing Systems (ICCCS-2016), Dronacharya College of Engineering, Gurgaon, September 9-11, 2016. The purpose of the conference was to provide a platform for interaction between scientists from industry, academia and other areas of society to discuss the current advancements in the field of communication and computing systems. The papers submitted to the proceedings were peer-reviewed by 2-3 expert referees. This volume contains 5 main subject areas: 1. Signal and Image

Processing, 2. Communication & Computer Networks, 3. Soft Computing, Intelligent System, Machine Vision and Artificial Neural Network, 4. VLSI & Embedded System, 5. Software Engineering and Emerging Technologies. *Spectrum Sensing Techniques: Comparative Analysis* Springer Master's Thesis from the year 2012 in the subject Engineering - Communication Technology, Indian Institute of Technology, Delhi (IIT Delhi), course: M.Tech (Communications), language: English, abstract: To ensure that cognitive radios would not interfere with primary users, spectrum sensing is required to be efficient and accurate by reliably detecting primary user signals. In this work, we implemented a spectrum sensing methodology based on the Truncated Sequential Probability Ratio Test (TSPRT). The TSPRT is a combination of SPRT and Neyman-Pearson. We created and simulated the model and observed the variation of quantization error, noise variance and dynamic range of the signal to achieve the minimum average sample number (ASN) and desired error probabilities of detection and false alarm for sine wave and similar input signals. This report comprises of theoretical analysis and practical implementation of spectrum sensing circuit in Xilinx system generator. Simulations are done to observe the effect of various parameters on ASN and shown.

Proceedings of 2nd International Conference on Communication, Computing and Networking Springer The book provides insights from the 2nd International Conference on Communication, Computing and Networking organized by the Department of Computer Science and Engineering, National Institute of

Technical Teachers Training and Research, Chandigarh, India on March 29-30, 2018. The book includes contributions in which researchers, engineers, and academicians as well as industrial professionals from around the globe presented their research findings and development activities in the field of Computing Technologies, Wireless Networks, Information Security, Image Processing and Data Science. The book provides opportunities for the readers to explore the literature, identify gaps in the existing works and propose new ideas for research.

2018 International Symposium on Electronics and Telecommunications (ISETC) CRC Press

This work presents a method for real-time detection of secondary users at the cognitive wireless technologies base stations. Cognitive radios may hide themselves in between the primary users to avoid being charged for spectrum usage. To deal with such scenarios, a cyclostationary Fast Fourier Transform accumulation method (FAM) has been used to develop a new strategy for recognising channel users under perfect and different noise environment conditions. Channel users are tracked according to the changes in their signal parameters, such as modulation techniques. MATLAB® Simulation tool was used to run various modulation signals on channels, and the obtained spectral correlation density function shows successful recognition between secondary and primary signals. We are unaware of previous efforts to use the FAM characteristics or other detection methods to make a distinction between channel users as presented in this thesis. A novel combination of both cognitive radio technology and ultra wideband technology is interdicted in

this thesis, looking for an efficient and reliable spectrum sensing method to detect the presence of primary transmitters, and a number of spectrum-sensing techniques implemented in ultra wideband and cognitive radio component (UWB-CR) under different AWGN and fading settings environments. The sensing performance of different detectors is compared in conditions of probability of detection and miss detection curves. Simulation results show that the selection of detectors rely on the different fading scenarios, detector requirements and on a priori knowledge. Furthermore, result showed that the matched filter detection method is suitable for detecting signals through UWB-CR system under various fading channels. A general observation is that the matched filter detector outperforms the other detectors in all scenarios by an average of SNR=-20 dB in the level of probability of detection (P_d), and the energy detector slightly outperforms the cyclostationary detector, in the level P_d at SNR=-20 dB. Furthermore, the thesis adapts novel detection models of cooperative and cluster cooperative wideband spectrum sensing in cognitive radio networks. In the proposed schemes, wavelet-based multi-resolution spectrum sensing and a proposed approach scheme are utilized for improving sensing performance of both models. On the other hand, cluster based cooperative spectrum sensing with soft combination Equal Gain Combination (EGC) scheme is proposed. The proposed detection models could achieve improvement of transmitter signal detection in terms of higher probability of detection and lower probability of false alarm. In the cooperative wideband spectrum sensing model, using traditional fusion rule,

existing worst performance of false alarms by measurement is 78% of the sensing bands at an average SNR=5 dB; this compares with the proposed model, which is by measurement 19% false alarms of scanning spectrum at the same SNR for cluster cooperative wideband spectrum sensing. The proposed combining methods shows improvements of results with a high probability of detection (P_d) and low probability of false alarm (P_f) at an average SNR=-16 dB compared with other traditional fusion methods; this is illustrated through numerical results.

Cognitive Radio Networking and Security
Springer Nature

In order to efficiently utilize the spectrum, the role of spectrum sensing is essential in cognitive radio networks. The transmitter detection based techniques: energy detection, cyclostationary feature detection, and matched filter detection, is most commonly used for the spectrum sensing. The Energy detection technique is implemented in the 2-hop cooperative cognitive radio network. OSTBC is used for transmission of data in the 2-hop network. The Energy detection technique is simplest and gives good results at the higher Signal to Noise Ratio (SNR) values. However, at the low SNR values its performance degrades. Moreover, each transmitter detection technique has a SNR threshold, below which it fails to work robustly. This book aims to find the most reliable and accurate spectrum sensing technique in the 2-hop cooperative cognitive radio network. Using Matlab simulations, a comparative analysis of three transmitter detection techniques has been made in terms of higher probability of detection. In order to remove the shortcomings faced by all the three techniques a Fuzzy Combined

Logic sensing approach is implemented and compared with Transmitter detection techniques.

Hybrid Spectrum Sensing Using Energy Detector and Cyclostationary Feature Detection with Wireless Distributed Computing Concept GRIN Verlag

"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. "

Cognitive Radios Springer Nature
Master's Thesis from the year 2019 in the subject Mathematics - Applied Mathematics, grade: Master Degree, , language: English, abstract: This thesis discusses the performance enhancement of multi-taper spectrum sensing as a powerful technique for cognitive radio networks. In multi-taper spectrum sensing, regular detection of unused spectrum holes is performed to make cognitive radio networks aware of users' activities. As a result, more effective spectrum management is expected and unlicensed users could use unused spectrum holes. In this thesis, an

analytical study was proposed in which reliable, simple, and computationally efficient mathematical expressions for the mean and variance of the probability density function (PDF) of the multitaper spectrum sensing techniques were derived. The proposed analytical study was evaluated by intensive simulations using MATLAB. The presence of Additive White Gaussian Noise is assumed. Many important aspects of spectrum sensing in cognitive radio networks are included such as, receiver operating characteristics, detection rate versus signal to noise ratio (SNR), and the minimum required sample points for a specific performance. All simulations were performed to include most factors affecting the efficiency of the proposed sensing methodology such as, number of tapers (K), number of sample points (N), and the probability of false alarm (Pf). A comparison with energy detection method was done. All simulation results and comparisons confirm that the proposed model is reliable and robust under all factors considered in the simulation.

Advances in Intelligent Informatics
Springer Nature

The book contains high quality papers presented in the Fifth International Conference on Innovations in Electronics and Communication Engineering (ICIECE 2016) held at Guru Nanak Institutions, Hyderabad, India during 8 and 9 July 2016. The objective is to provide the latest developments in the field of electronics and communication engineering specially the areas like Image Processing, Wireless Communications, Radar Signal Processing, Embedded Systems and VLSI Design. The book aims to provide an opportunity for researchers, scientists, technocrats, academicians and

engineers to exchange their innovative ideas and research findings in the field of Electronics and Communication Engineering.

Shaping the Future of ICT Springer

With the rapid growth of new wireless devices and applications over the past decade, the demand for wireless radio spectrum is increasing relentlessly. The development of cognitive radio networking provides a framework for making the best possible use of limited spectrum resources, and it is revolutionising the telecommunications industry. This book presents the fundamentals of designing, implementing, and deploying cognitive radio communication and networking systems. Uniquely, it focuses on game theory and its applications to various aspects of cognitive networking. It covers in detail the core aspects of cognitive radio, including cooperation, situational awareness, learning, and security mechanisms and strategies. In addition, it provides novel, state-of-the-art concepts and recent results. This is an ideal reference for researchers, students and professionals in industry who need to learn the applications of game theory to cognitive networking.

Artificial Intelligence for Communications and Networks CRC Press

This two-volume book presents outcomes of the 7th International Conference on Soft Computing for Problem Solving, SocProS 2017. This conference is a joint technical collaboration between the Soft Computing Research Society, Liverpool Hope University (UK), the Indian Institute of Technology Roorkee, the South Asian University New Delhi and the National Institute of Technology Silchar, and brings together researchers, engineers and practitioners to discuss thought-

provoking developments and challenges in order to select potential future directions. The book presents the latest advances and innovations in the interdisciplinary areas of soft computing, including original research papers in the areas including, but not limited to, algorithms (artificial immune systems, artificial neural networks, genetic algorithms, genetic programming, and particle swarm optimization) and applications (control systems, data mining and clustering, finance, weather forecasting, game theory, business and forecasting applications). It is a valuable resource for both young and experienced researchers dealing with complex and intricate real-world problems for which finding a solution by traditional methods is a difficult task.

Spectrum Access and Management for Cognitive Radio Networks Springer

Internet of Things (IoT) deals with the interconnection of devices that can communicate with each other over the internet. Currently, several smart systems have evolved with the evolution in IoT. Cognitive Radio - an enabler for Internet of Things is a research level subject for all communication engineering students at undergraduate, post graduate and research levels. The contents of the book are designed to cover the prescribed syllabus for one semester course on the subject prescribed by universities. Concepts have been explained thoroughly in simple and lucid language. Mathematical analysis has been used wherever necessary followed by clear and lucid explanation of the findings and their implication. Key technologies presented include dynamic spectrum access, spectrum sensing techniques, IEEE 802.22 and different radio network architectures. Their role and use in the

context of mobile broadband access in general is explained, giving both a high level overview and a detailed step by step explanation. The book includes a large number of diagrams, MATLAB examples, thereby enabling the readers to have a sound grasp of the concepts presented and their applications. This book is a must have resource for engineers and other professionals in the telecommunication industry working with cellular or wireless broadband technologies, helping comprehension of the process of utilization of the updated technology to enable being ahead competition.

Automatic Real-time Spectrum Sensing Using Energy Detection in Software Defined Radio CRC Press

This book constitutes the thoroughly refereed post-conference proceedings of the 7th International ICST Conference on Mobile Multimedia Communications (MOBIMEDIA 2011) held in Cagliari, Italy, in September 2011. The 26 revised full papers presented were carefully selected from numerous submissions and focus topics such as quality of experience, dynamic spectrum access wireless networks in the TV white spaces, media streaming, mobile visual search, image processing and transmission, and mobile applications. *An Efficient Hardware Implementation of an Energy Detection-based Spectral Estimator for Cognitive Radios* Springer

With the rapid growth in the field of wireless communication, effective spectrum utilization techniques are required. In the urban areas, which are rich with wireless communication devices, we will find some frequency

bands that are only partially occupied and some other bands that are essentially unused. To avoid the underutilization of scarce radio spectrum, cognitive radio (CR) has been proposed as one effective solution to enhance the utilization of the radio spectrum. A CR system detects radio frequency (RF) channels that are vacant and switches into these unoccupied channels to enhance frequency spectrum utilization. The ability of CR systems to sense the availability of RF communication channels is governed by the use of the spectrum sensing technique. Therefore, spectrum sensing is a fundamental requirement in CR systems. In this thesis, we explore various techniques for spectrum sensing. We investigate the energy detection-based spectrum sensing for efficient hardware implementation. We utilize signal processing expertise such as window selection, window overlap, window size, transform size, averaging, and thresholding to develop a robust spectrum sensing module. We then model the energy detection-based spectrum sensing in Matlab. Its synthesizable model is developed in Verilog hardware description language. The architecture of the designed spectrum sensing module is implemented on a Xilinx Virtex-7 field-programmable gate array (FPGA) and its cycle-accurate bit-true hardware simulation results are verified against its fixed-point simulation results. An ASIC architecture of the designed spectrum sensing module is developed using a standard 45-nm CMOS technology.