Contents

Dynamic Spectrum Access/Management

Fractional Low Order Cyclostationary-Based Spectrum Sensing in Cognitive Radio Networks ........................................... 3
   Hadi Hashemi, Sina Mohammadi Fard, Abbas Taherpour, and Tamer Khattab

Achievable Rate of Multi-relay Cognitive Radio MIMO Channel with Space Alignment ...................................................... 17
   Lokman Sboui, Hakim Ghazzai, Zouheir Rezki, and Mohamed-Slim Alouini

Effective Capacity and Delay Optimization in Cognitive Radio Networks ................................................................. 30
   Mai Abdel-Malek, Karim Seddik, Tamer ElBatt, and Yahya Mohasseb

Auction Based Joint Resource Allocation with Flexible User Request in Cognitive Radio Networks ............................. 43
   Wei Zhou, Tao Jing, Yan Huo, Jin Qian, and Zhen Li

Two-Stage Multiuser Access in 5G Cellular Using Massive MIMO and Beamforming ....................................................... 54
   Hussein Seleem, Abdullhameed Alsanie, and Ahmed Iyanda Sulyman

Detection of Temporally Correlated Primary User Signal with Multiple Antennas ............................................................. 66
   Hadi Hashemi, Sina Mohammadi Fard, Abbas Taherpour, Saeid Sedighi, and Tamer Khattab

Non-uniform Quantized Distributed Sensing in Practical Wireless Rayleigh Fading Channel ................................................... 78
   Sina Mohammadi Fard, Hadi Hashemi, Abbas Taherpour, and Tamer Khattab

Downlink Scheduling and Power Allocation in Cognitive Femtocell Networks ........................................................... 92
   Hesham M. Elmaghraby, Dongrun Qin, and Zhi Ding
Networking Protocols for CR

Optimization of Collaborative Spectrum Sensing with Limited Time Resource ................................................................. 109
  Fariba Mohammadyan, Zahra Pourgharehkhan, Abbas Taherpour, and Tamer Khattab

Stability and Delay Analysis for Cooperative Relaying with Multi-access Transmission ......................................................... 123
  Mohamed Salman, Amr El-Keyi, Mohammed Nafie, and Mazen Hasna

An Efficient Switching Threshold-Based Scheduling Protocol for Multiuser Cognitive AF Relay Networks with Primary Users Using Orthogonal Spectrums ............................................................ 135
  Anas M. Salhab, Fawaz Al-Qahtani, Salam A. Zummo, and Hussein Alnuweiri

An Efficient Secondary User Selection Scheme for Cognitive Networks with Imperfect Channel Estimation and Multiple Primary Users .......... 149
  Anas M. Salhab

Implementing a MATLAB-Based Self-configurable Software Defined Radio Transceiver ...................................................... 164
  Benjamin Drozdenko, Ramanathan Subramanian, Kaushik Chowdhury, and Miriam Leeser

Investigation of TCP Protocols in Dynamically Varying Bandwidth Conditions ............................................................... 176
  Fan Zhou, Abdulla Al Ali, and Kaushik Chowdhury

  Yuanyuan Yao, Xiaoshi Song, Changchuan Yin, and Sai Huang

Channel Transition Monitoring Based Spectrum Sensing in Mobile Cognitive Radio Networks ........................................... 199
  Meimei Duan, Zhimin Zeng, Caili Guo, and Fangfang Liu

  Amr Y. Elnakeeb, Hany M. Elsayed, and Mohamed M. Khairy

Modeling and Theory

Cooperative Spectrum Sensing using Improved $p$-norm Detector in Generalized $\kappa$-$\mu$ Fading Channel .................................. 225
  Monika Jain, Vaibhav Kumar, Ranjan Gangopadhyay, and Soumitra Debnath
Kalman Filter Enhanced Parametric Classifiers for Spectrum Sensing Under Flat Fading Channels

Olusegun P. Awe, Syed M. Naqvi, and Sangarapillai Lambotharan

Differential Entropy Driven Goodness-of-Fit Test for Spectrum Sensing

Sanjeev Gurugopinath, Rangarao Muralishankar, and H.N. Shankar

Experimental Results for Generalized Spatial Modulation Scheme with Variable Active Transmit Antennas

Khaled M. Humadi, Ahmed Iyanda Sulyman, and Abdulhameed Alsanie

Low Complexity Multi-mode Signal Detection for DTMB System

Xue Liu, Guido H. Bruck, and Peter Jung

Best Relay Selection for DF Underlay Cognitive Networks with Different Modulation Levels

Ahmed M. ElShaarrany, Mohamed M. Abdallah, Salama Ikki, Mohamed M. Khairy, and Khalid Qaraqe

Spectrum-Sculpting-Aided PU-Claiming in OFDMA Cognitive Radio Networks

Yi Ren, Chao Wang, Dong Liu, Fuqiang Liu, and Erwu Liu

Sensing-Throughput Tradeoff for Cognitive Radio Systems with Unknown Received Power

Ankit Kaushik, Shree Krishna Sharma, Symeon Chatzinotas, Björn Ottersten, and Friedrich Jondral

Cooperative Spectrum Sensing for Heterogeneous Sensor Networks Using Multiple Decision Statistics

Shree Krishna Sharma, Symeon Chatzinotas, and Björn Ottersten

A Cognitive Subcarriers Sharing Scheme for OFDM Based Decode and Forward Relaying System

Naveen Gupta and Vivek Ashok Bohara

Efficient Performance Evaluation for EGC, MRC and SC Receivers over Weibull Multipath Fading Channel

Faissal El Bouanani and Hussain Ben-Azza

Power Control in Cognitive Radio Networks Using Cooperative Modulation and Coding Classification

Anestis Tsakmalis, Symeon Chatzinotas, and Björn Ottersten

Symbol Based Precoding in the Downlink of Cognitive MISO Channel

Maha Alodeh, Symeon Chatzinotas, and Björn Ottersten
A Discrete-Time Multi-server Model for Opportunistic Spectrum Access

Islam A. Abdul Maksoud and Sherif I. Rabia

HW Architecture and Implementations

A Hardware Prototype of a Flexible Spectrum Sensing Node for Smart Sensing Networks

Ahmed Elsokary, Peter Lohmiller, Václav Valenta, and Hermann Schumacher

Development of TV White-Space LTE Devices Complying with Regulation in UK Digital Terrestrial TV Band

Takeshi Matsumura, Kazuo Ibuka, Kentaro Ishizu, Homare Murakami, Fumihide Kojima, Hiroyuki Yano, and Hiroshi Harada

Feasibility Assessment of License-Shared Access in 600 ~ 700 MHz and 2.3 ~ 2.4GHz Bands: A Case Study

Yao-Chia Chan, Ding-Bing Lin, and Chun-Ting Chou

Dynamic Cognitive Radios on the Xilinx Zynq Hybrid FPGA

Shanker Shreejith, Bhaskar Banarjee, Kizheppatt Vipin, and Suhaib A. Fahmy

Next Generation of Cognitive Networks

A Novel Algorithm for Blind Detection of the Number of Transmit Antenna

Mostafa Mohammadkarimi, Ebrahim Karami, and Octavia A. Dobre

Localization of Primary Users by Exploiting Distance Separation Between Secondary Users

Audri Biswas, Sam Reisenfeld, Mark Hedley, Zhuo Chen, and Peng Cheng

Mitigation of Primary User Emulation Attacks in Cognitive Radio Networks Using Belief Propagation

Sasa Maric and Sam Reisenfeld

Femtocell Collaborative Outage Detection (FCOD) with Built-in Sleeping Mode Recovery (SMR) Technique

Dalia Abouelmaati, Arsalan Saeed, Oluwakayode Onireti, Muhammad Ali Imran, and Kamran Arshad

Resource Allocation for Cognitive Satellite Uplink and Fixed-Service Terrestrial Coexistence in Ka-Band

Eva Lagunas, Shree Krishna Sharma, Sina Maleki, Symeon Chatzinotas, Joel Grotz, Jens Krause, and Björn Ottersten
SHARF: A Single Beacon Hybrid Acoustic and RF Indoor Localization Scheme .................................................. 499
Ahmed Zubair, Zaid Bin Tariq, Ijaz Haider Naqvi, and Momin Uppal

Massive MIMO and Femto Cells for Energy Efficient Cognitive Radio Networks .................................................. 511
S.D. Barnes, S. Joshi, B.T. Maharaj, and A.S. Alfa

Hybrid Cognitive Satellite Terrestrial Coverage: A Case Study for 5G Deployment Strategies ............................................ 523
Theodoros Spathopoulos, Oluwakayode Onireti, Ammar H. Khan,
Muhammad A. Imran, and Kamran Arshad

Energy-Efficient Resource Allocation Based on Interference Alignment in MIMO-OFDM Cognitive Radio Networks ......................... 534
Mohammed El-Abdi, Ali Ali, Mohamed El-Hadidy, and Thomas Kaiser

Standards and Business Models

Receiving More than Data - A Signal Model and Theory of a Cognitive IEEE 802.15.4 Receiver .................................................. 549
Tim Esemann and Horst Hellbrück

Prototype of Smart Phone Supporting TV White-Spaces LTE System .......... 562
Takeshi Matsumura, Kazuo Ibuka, Kentaro Ishizu, Homare Murakami,
Fumihide Kojima, Hiroyuki Yano, and Hiroshi Harada

Strategic Choices for Mobile Network Operators in Future Flexible UHF Spectrum Concepts? .................................................. 573
Seppo Yrjölä, Petri Ahokangas, Jarkko Paavola, and Pekka Talmola

Spatial Spectrum Holes in TV Band: A Measurement in Beijing ............. 585
Sai Huang, Yajian Huang, Hao Zhou, Zhiyong Feng, Yifan Zhang,
and Ping Zhang

TV White Space Availability in Libya .................................................. 593
Anas Abognah and Otman Basir

Emerging Applications for Cognitive Networks

Cognitive Aware Interference Mitigation Scheme for LTE Femtocells .......... 607
Ismail AlQerm and Basem Shihada

Packet Loss Rate Analysis of Wireless Sensor Transmission with RF Energy Harvesting .................................................. 620
Tian-Qing Wu and Hong-Chuan Yang
Distributed Fair Spectrum Assignment for Large-Scale Wireless DSA Networks ................................................................. 631  
*Bassem Khalfi, Mahdi Ben Ghorbel, Bechir Hamdaoui, and Mohsen Guizani*

Multiple Description Video Coding for Underlay Cognitive Radio Network . . . 643  
*Hezerul Abdul Karim, Hafizal Mohamad, Nordin Ramli, and Aduwati Sali*

Device-Relaying in Cellular D2D Networks: A Fairness Perspective ........... 653  
*Anas Chaaban and Aydin Sezgin*

Interference Mitigation and Coexistence Strategies in IEEE 802.15.6 Based Wearable Body-to-Body Networks ............................. 665  
*Muhammad Mahtab Alam and Elyes Ben Hamida*

**Workshop Cognitive Radio for 5G Networks**

Distributed Power Control for Carrier Aggregation in Cognitive Heterogeneous 5G Cellular Networks ............................................ 681  
*Fotis Foukalas and Tamer Khattab*

Design of Probabilistic Random Access in Cognitive Radio Networks . . . . 696  
*Rana Abbas, Mahyar Shirvanimoghaddam, Yonghui Li, and Branka Vucetic*

*Konstantinos Chatzikokolakis, Alexandros Kaloxylos, Panagiotis Spapis, Nancy Alonistioti, Chan Zhou, Josef Eichinger, and Ömer Bulakci*

An Evolutionary Approach to Resource Allocation in Wireless Small Cell Networks .............................................................. 718  
*Shahriar Etemadi Tajbakhsh, Tapabrata Ray, and Mark C. Reed*

Coexistence of LTE and WLAN in Unlicensed Bands: Full-Duplex Spectrum Sensing ............................................................. 725  
*Ville Syrjälä and Mikko Valkama*

Research Trends in Multi-standard Device-to-Device Communication in Wearable Wireless Networks ............................................. 735  
*Muhammad Mahtab Alam, Dhafer Ben Arbia, and Elyes Ben Hamida*

Implementation Aspects of a DSP-Based LTE Cognitive Radio Testbed . . . . 747  
*Ammar Kabbani, Ali Ramadan Ali, Hanwen Cao, Asim Burak Güven, Yuan Gao, Sundar Peethala, and Thomas Kaiser*
Construction of a Robust Clustering Algorithm for Cognitive Radio Ad-Hoc Network ................................................................. 759
Nafees Mansoor, A.K.M. Muzahidul Islam, Mahdi Zareei,
Sabariah Baharun, and Shozo Komaki

On the Effective Capacity of Delay Constrained Cognitive Radio Networks with Relaying Capability ............................................. 767
Ahmed H. Anwar, Karim G. Seddik, Tamer ElBatt,
and Ahmed H. Zahran

Cooperative Spectrum Sharing Using Transmit Antenna Selection for Cognitive Radio Systems .................................................. 780
Neha Jain, Shubha Sharma, Ankush Vashistha, Vivek Ashok Bohara,
and Naveen Gupta

A Survey of Machine Learning Algorithms and Their Applications in Cognitive Radio ................................................................. 790
Mustafa Alshawaqfeh, Xu Wang, Ali Riza Ekti,
Muhammad Zeeshan Shakir, Khalid Qaraqe, and Erchin Serpedin

Author Index .................................................................................. 803
Cognitive Radio Oriented Wireless Networks
10th International Conference, CROWNCOM 2015, Doha, Qatar, April 21-23, 2015, Revised Selected Papers
Weichold, M.; Hamdi, M.; Shakir, M.Z.; Abdallah, M.; Karagiannidis, G.K.; Ismail, M. (Eds.)
2015, XV, 805 p. 341 illus. in color., Softcover
ISBN: 978-3-319-24539-3