

# Best Readings in Cognitive Radio

Best Readings is a collection of Journal/Magazine Special Issues, books, articles, and papers on a featured topic. This Best Readings is on Cognitive Radio (CR) Communications and Networking. The contributors are: Ekram Hossain, Dusit Niyato, Ying-Chang Liang, and Vijay K. Bhargava.

For questions or comment click [here](#). **Issued March 2012**

- [Special Issues](#)
- [Overview Books](#)
- [Topics](#)

## ◆ Special Issues

IEEE Journal on Selected Areas in Communications, Special Issue on “[Cognitive Radio: Theory and Application](#)”, vol. 26, no. 1, January 2008.

Proceedings of the IEEE, Special Issue on “[Cognitive Radio - I](#)”, vol. 97, no. 4, April 2009

Proceedings of the IEEE, Special Issue on “[Cognitive Radio - II](#)”, vol. 97, no. 5, May 2009

IEEE Journal on Selected Areas in Communications, Special Issue on “[Advances in Cognitive Radio Networking and Communications - I](#)”, vol. 29, no. 2, February 2011.

IEEE Journal on Selected Areas in Communications, Special Issue on “[Advances in Cognitive Radio Networking and Communications - II](#)”, vol. 29, no. 4, April 2011.

IEEE Transactions on Vehicular Technology, Special issue on the "[Achievements and the Road Ahead: The First Decade of Cognitive Radio](#)", vol. 59, no. 4, May 2010.

IEEE Journal of Selected Topics in Signal Processing, Special Issue on "[Signal Processing in Cooperative Cognitive Radio Systems](#)", vol. 5, no. 1, January 2011.

IEEE Wireless Communications Magazine, Special Issue on "[Cognitive Radio Networks: A Practical Perspective](#)", August 2012.

IEEE Vehicular Technology Magazine, Special Issue on "[Applications of Cognitive Radio Networks](#)", June 2012.

EURASIP Journal on Wireless Communications and Networking, Special Issue on "[Ten Years of Cognitive Radio: State of the Art and Perspectives](#)", November 2011.

EURASIP Journal on Advances in Signal Processing, Special Issue on "[Dynamic Spectrum Access for Wireless Networking](#)", August 2009.

EURASIP Journal on Advances in Signal Processing, Special Issue on "[Advanced Signal Processing for Cognitive Radio Networks](#)", 2010.

Elsevier Computer Communications, Special Issue on "[Cognitive Radio and Dynamic Spectrum Sharing Systems](#)", vol. 32, no. 18, December 2009.

## ◆ Overview Books and Tutorial/Survey Papers

J. Mitola III and G. Q. Maguire Jr., "[Cognitive radio: Making software radios more personal](#)," *IEEE Personal Communications*, vol. 6, no. 4, pp. 13-18, August 1999.

This is the pioneering paper which introduces the concept of cognitive radio and discusses its relationship with software defined radio – also introduces the idea of using Radio Knowledge Representation Language (RKRL) to implement cognitive and software defined radios.

S. Haykin, "[Cognitive radio: Brain-empowered wireless communications](#)," *IEEE Journal on Selected Areas in Communications*, vol. 23, no. 2, pp. 201-220, February 2005.

This is a seminal paper, which for the first time discusses the basic cognitive radio functionalities from communications, signal processing, and networking point of view and introduces methods for radio scene analysis, channel state and interference-temperature estimation, and power control for cognitive radios.

I. F. Akyildiz, W.-Y. Lee, M. C. Vuran, and S. Mohanty, "[NeXt generation/dynamic spectrum access/cognitive radio wireless networks: A survey](#)," *Computer Networks (Elsevier)*, vol. 50, no. 13, pp. 2127-2159, September 2006.

This is an extensive survey on the architecture and protocol design issues for cognitive radio networks or dynamic spectrum access (DSA) networks, also referred to as NeXt Generation (xG)

networks.

**M. Buddhikot, “[Understanding dynamic spectrum access: Models, taxonomy and challenges](#),” in *Proc. of IEEE DySPAN 2007*, Dublin, Ireland, April 17-21, 2007.**

This paper provides a very comprehensive review and taxonomy of the different spectrum access models. Four broad classes spectrum access models: Command and control, exclusive use, shared-use of primary licensed spectrum, and commons, and their sub-cases are described in detail.

**Q. Zhao and B. M. Sadler, “[A survey of dynamic spectrum access](#),” *IEEE Signal Processing Magazine*, vol. 24, no. 3, pp. 79-89, May 2007.**

This is one of the early tutorial papers on cognitive radio, which provides a summary of technical and regulatory challenges in dynamic spectrum access.

**Y.-C. Liang, K.-C. Chen, G. Y. Li, and P. Mahonen, “[Cognitive radio networking and communications: An overview](#),” *IEEE Transactions on Vehicular Technology*, vol. 60, no. 7, pp. 3386-3407, September 2011.**

Provides a contemporary survey on the current state-of-the-art of research on physical, medium access, and routing layer issues in the design of cognitive radio networks.

**J. Mitola III, [Cognitive Radio Architecture: The Engineering Foundations of Radio XML](#), ISBN: 978-0471742449, Wiley Press, 2006.**

This is the first book dedicated to cognitive radio. Focusing on the computational intelligence aspect of cognitive radio, the book presents a cognitive architecture, which integrates disparate disciplines, including autonomous machine learning, computer vision, and language perception technologies.

**[Cognitive Wireless Communication Networks](#) (Eds. E. Hossain and V. K. Bhargava), ISBN: 978-0-387-68830-5, Springer, 2007.**

This is one of the very early books on cognitive radio, which deals with the advances in theory, design, and analysis of cognitive wireless communication networks. The book covers both the theoretical concepts and system-level implementation issues.

**E. Hossain, D. Niyato, and Z. Han, [Dynamic Spectrum Access and Management in Cognitive Radio Networks](#), Cambridge University Press, 2009.**

This book provides an all-inclusive introduction to this emerging technology, outlining the fundamentals of cognitive radio-based wireless communication and networking, spectrum sharing models, and the requirements for dynamic spectrum access. This is a perfect introduction for graduate students and researchers, as well as a useful self-study guide for practitioners.

**Linda E. Doyle, [Essentials of Cognitive Radio](#), Cambridge University Press, 2009.**

Written in a descriptive style, this book is a primer on cognitive radio which is easy to follow and therefore accessible to general readers.

**Kwang-Cheng Chen and Ramjee Prasad, [Cognitive Radio Networks](#), John Wiley and Sons, 2009**

This is also an introductory level text-book on cognitive radio networks.

**Bruce A. Fette, [Cognitive Radio Technology \(2nd Edition\)](#), Academic Press, ISBN: 978-0123745354, 2009.**

This book provides a comprehensive coverage on the basic concepts, implementation details, standards, policy issues on cognitive radio technology.

**[Cognitive Radio Communications and Networks: Principles and Practice](#) (Alexander M. Wyglinski, Maziar Nekovee, and Y. Thomas Hou, Eds.), Elsevier, December 2009.**

This book gives a comprehensive coverage of the principles of cognitive radio communications, cognitive networks, and also related implementation issues and standards – lecture slides based on the chapters in this book are available.

**[Cognitive Radio Networks](#) (Eds. Yang Xiao and Fei Hu), 978-1-4200-6420-9, CRC Press, 2009.**

Taking a layered approach, this book addresses the physical layer, medium access control, the routing layer, cross-layer considerations in cognitive radio networks.

## ◆ Topics

- - [Information theoretic analysis and fundamental performance limit of dynamic spectrum access](#)
  - [Modulation and waveform design, propagation modeling, and spectrum sensing](#)
  - [Interference analysis, Measurement and statistical modeling of spectrum usage](#)
  - [Spectrum sharing, resource allocation, multiple access, and power control](#)
  - [Machine learning, self-configuration, distributed adaptation, and co-existence](#)
  - [Multi-hop transmission, routing, and cross-layer optimization](#)
  - [Spectrum mobility and handoff](#)
  - [Economics of cognitive radio systems](#)
  - [Robustness, reliability, security](#)
  - [Applications and services](#)
  - [Simulation tools, test-beds, software and hardware prototypes](#)
  - [Standardization](#)

---

**Source URL:** <http://www.comsoc.org/best-readings/cognitive-radio>