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AD HOC NETWORKS (ELSEVIER) JOURNAL

Special Issue on
COGNITIVE RADIO AD HOC NETWORKS

Cognitive radio is envisaged as an enabling technology to overcome the problem of spectrum scarcity and inefficient usage by opportunistically using portions of the wireless spectrum. These spectrum bands may be occupied by licensed users that have priority in accessing the medium, and whose operation should not be adversely affected due to the transmission by cognitive radio devices. Specifically in cognitive radio ad hoc networks (CRAHNs), the distributed multi-hop architecture, the dynamic network topology, and the time and location varying spectrum availability are some of the key distinguishing factors that raise unique issues in the network design.

Several open protocol-level challenges remain in CRAHNs, such as schemes for fair-sharing of the available spectrum among users that may have similar service demands, adapting the link layer operation specifically to the nature of the observed licensed user activity, finding optimal routes that provide best-effort spectrum availability guarantees, adapting transport layer protocol to respond to sudden spectrum fluctuations, among others. Sound theoretical foundations that provide performance limits and bounds, thereby allowing the network designer to predict their operation in a dynamically changing spectrum environment, must complement the network protocols. Towards this aim, it is necessary to develop new cooperative spectrum sensing schemes that account for location-specific measurements, distributed learning algorithms, and capacity analysis for CRAHNs. Finally, the use and deployment of this technology in commercial, non-profit functions, military scenarios, and emerging markets must also be explored. Feasible models of network management, policy regulation and enforcement, and the economic factors influencing the adoption of CRAHNs are some of the tasks made challenging by the distributed nature of the operation.

This special issue solicits papers on all aspects of CRAHNs, with a primary focus on three key aspects. First, cooperative spectrum sharing and resource allocation techniques, new transport, network and link layer protocols, theoretical and performance bounds on the operation of multihop CRAHNs are of particular interest. Second, original papers examining the application of these techniques and protocols in practical scenarios, such as smart grids, military deployment, first responders, secure and jamming-free communication, sensor networks, and economic models that make a case for real-world adoption are welcome. Third, papers with experimental evaluations and implementations on testbeds are sought, reporting findings on the limitations and challenges faced in the actual deployment of cognitive radio ad hoc networks.

The objective of this special issue is to bring together state-of-the-art research contributions, tutorials, and position papers that address these key aspects of CRAHNs. Original papers describing completed and unpublished work not currently under review by any other journal/magazine/conference are solicited.

Topics of interest include, but are not limited to:

- New architectures including wireless cognitive mesh and sensor networks
- Application scenarios and emerging markets such as environmental monitoring, smart grids, emergency responders, disaster recovery, among others
- Military deployment and homeland security
• Cooperation in CRAHNs
• In-band and out-of-band common control channel design
• Security challenges, jamming-free communication, and trust establishment
• Optimization techniques for licensed user protection
• Joint route and spectrum allocation
• Spectrum-aware medium access control and scheduling
• Spectrum-aware cross-layer design
• Experimental and testbed-based studies
• Network management, policy formulation and regulation
• Standards development for cognitive radio ad hoc networks
• High bandwidth multimedia communication over CRAHNs
• Transport layer design, TCP extensions for CRAHNs
• End-to-end guarantees and quality of service under dynamic spectrum fluctuations
• Capacity analysis and bounds for distributed CRAHNs
• Game theory, economics of deployment, and machine learning
• Enforcing spectrum etiquette and distributed network management

Submission Instructions:
Prospective Authors: Please follow the Ad Hoc Networks (Elsevier) journal manuscript format described at http://www.elsevier.com/locate/adhoc Please select “Special Issue: CRAHNs” when you reach the “Article Type” step in the submission process. Papers must be in single-column format, double-spaced, use at least 11 pt fonts, and should not exceed 25 pages including references.

Important Dates
Submission deadline: July 8th, 2010 (Extended from July 1st)
First round notification date: October 1st, 2010
First round revision date: November 1st, 2010
Second round notification date: December 1st, 2010
Camera-ready due: December 15th, 2010

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