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E-D2CARP: A joint path and spectrum diversity based routing protocol with an optimized path selection for cognitive radio ad hoc networks (Conference Paper)

Che-Aron, Z.[a], Abdalla, A.H.[a], Hassan, W.H.[b], Abdullah, K.[a], Rahman, M.A.[c]

[a]Department of Electrical and Computer Engineering, International Islamic University Malaysia (IIUM), Jalan Gombak, Kuala Lumpur, Malaysia
[b]Malaysia-Japan International Institute of Technology (MJIIT), Universiti Teknologi Malaysia (UTM), Jalan Semarak, Kuala Lumpur, Malaysia
[c]Department of Biomedical Electronics and Telecommunications Engineering, University of Naples Federico II, Naples, Italy

Abstract

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Cognitive Radio (CR) is a new paradigm which offers a viable solution to deal with the spectrum shortage problem and enhance the spectrum utilization. In Cognitive Radio Ad Hoc Networks (CRAHNs), data routing is one of the most challenging tasks due to frequent topology changes and intermittent connectivity caused by the activity of Primary Users (PUs). This paper proposes a joint path and spectrum diversity based routing protocol with an optimized path selection for CRAHNs, referred to the Enhanced Dual Diversity Cognitive Ad-hoc Routing Protocol (E-D2CARP). The Expected Path Delay (EPD) routing metric used in the protocol for path decision is also introduced. The protocol utilizes the joint path and spectrum diversity and circumvents the PU regions during path establishment phase in order to make the transmission path less vulnerable to the impact of PU activities and provide efficient route recovery in presence of path failures resulting from PU activities. The performance evaluations are conducted through simulations using the NS-2 simulator. Simulation results obviously demonstrate that the E-D2CARP can achieve better performance in terms of average throughput, packet loss, average end-to-end delay, and average jitter as compared to the recently proposed D2CARP protocol in identical scenarios. © 2014 IEEE.

Author keywords

Cognitive radio ad hoc network | Joint path and spectrum diversity | Optimized path selection | PU region avoidance | Routing protocol

Indexed keywords

Engineering controlled terms: Ad hoc networks | Network routing | Routing protocols | Telecommunication networks

Compendex keywords: Ad hoc routing protocol | Average end-to-end delays | Average throughput