



ENERGY-EFFICIENT SPECTRUM AWARE CLUSTERING AND MULTI-HOP ROUTING FOR COGNITIVE RADIO SENSOR NETWORKS

By

Emad Badr El-Deen Abd El-Aziz Helal

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
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in
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ROUTING FOR COGNITIVE RADIO SENSOR NETWORKS

Key Words:

Cognitive radio sensor networks; clustering; Multi-hop Routing.

Summary:

In this thesis, we propose an Energy-Efficient Cluster Head Selection (ECHS) approach for Cognitive Radio Sensor Networks (CRSNs). ECHS achieves energy-efficient clustering while taking into account the dynamic spectrum access nature of CRSN. ECHS is a distributed algorithm in which serving as a cluster head depends on two factors: the channel availability in the node's vicinity and the node's energy. To tackle the hot spot problem caused by the high traffic near the sink, ECHS forms many small clusters near the sink to share the forwarding load of the rest of the network. Dynamic Channel Assignment (DCA) at the cluster heads is used to decrease the co-channel interference. We additionally propose a simple Energy-efficient multi-hop Routing protocol (ER) to evaluate the network performance from end-to-end. Simulation results show that our approaches achieve a remarkable increase in throughput while extending the network lifetime with an energy efficient manner.

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