

An Event-Driven Spectrum-Aware Routing Protocol Based on Hungarian Algorithm in Cognitive Radio Sensor Networks



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Abstract

The algorithm performs clustering in a distributed and self-organized manner and selects the node with the largest weight as the cluster head. The Hungarian algorithm is used to assign the channels with smaller occupancy probability of primary user, longer idle time and higher throughput to sensor nodes, which reduces the channel competition from SUs to PUs and improves the data transmission success rate. The gateway nodes and packet forwarding nodes are used for relay communication between clusters.

Matching and Routing

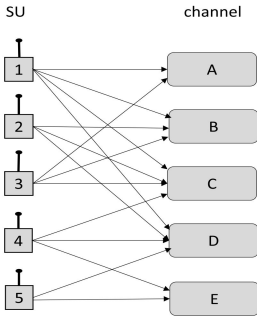


Fig.1. Node-Channel Matching Graph

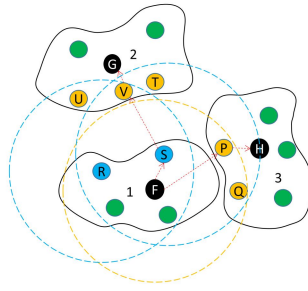


Fig.2. Different routing methods

Performance Evaluation

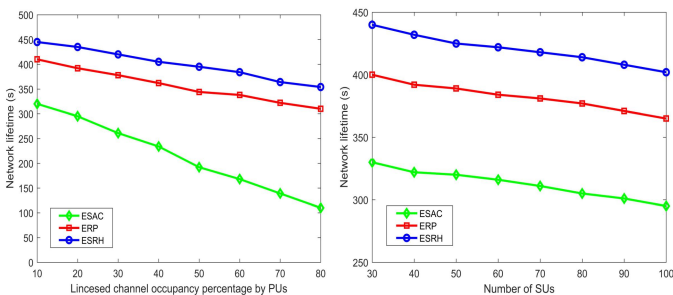


Fig.3 Impacts of percentage occupied by each PU authorization channel and SU number on network lifetime

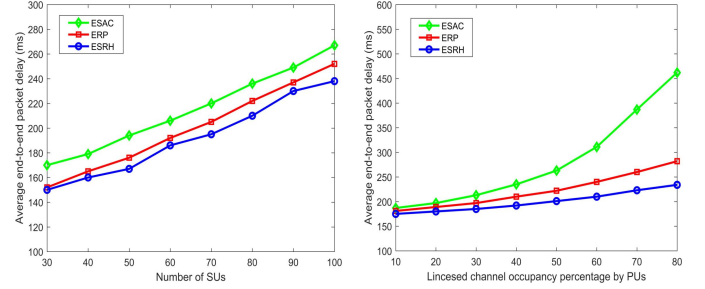


Fig.4 Impact of the percentage occupied by each PU authorization channel and the number of SU on average end-to-end packet delay

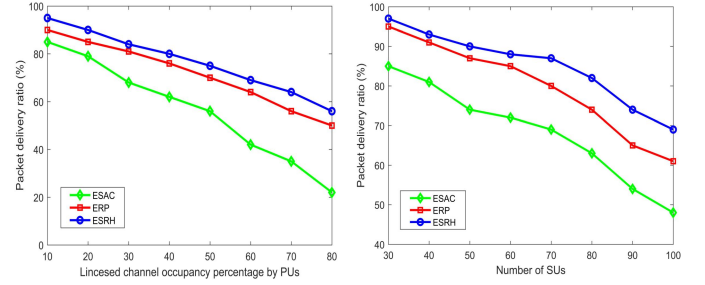


Fig.5 Impact of the percentage occupied by each PU authorization channel and the number of SU on packet delivery ratio

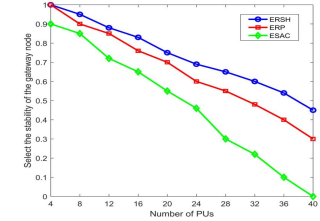


Fig.6 Impact of the number of PU on the stability of gateway node selection.

Conclusions

1. The node channels are paired using the Hungarian algorithm, and the optimal pairing result is calculated by a polynomial mathematical model.
2. Without changing the communication range, the data retransmission is reduced and the routing stability is improved.
3. The algorithm can extend the network lifetime, improve the packet delivery rate, and reduce the average end-to-end packet delay.

Acknowledgements

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