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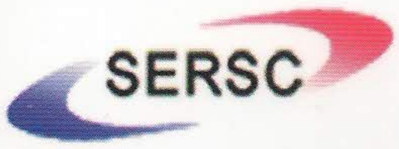




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Abstract: Multi-Channel MAC Protocol with Two Transceivers for Cognitive Radio Ad Hoc Networks

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Abstract

The electromagnetic spectrum is a limited resource of high needs. It is a key resource to enlarge the radio and broadcasting industry that helps develop other industries. The demand of the spectrum is increasing daily with the innovation of new technologies and businesses. Current spectrum licensing system is not efficient and this system waste spectrum bandwidths. Cognitive radio came up with an idea to use the unutilized spectrums in the license bands. In addition to other responsibilities, MAC protocol for cognitive radio networks has one more responsibility, i.e. it has to protect incumbent license users. In this paper, we study the performance of the multi-channel MAC protocol with two transceivers for cognitive radio ad hoc networks. This protocol utilizes licensed spectrum white spaces by ensuring incumbent licensees' rights. We simulate and compare our protocol with the single transceiver based protocol. Simulations show the proposed protocol outperforms existing single transceiver based protocol in terms of goodput and delay.

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Abstract: An Analysis of Channel Access Delay in Synchronized MAC Protocol for Cognitive Radio Networks

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Abstract

The spectrum scarcity issue due to the fixed radio spectrum allocation system has become an obstacle for future wireless communication. Cognitive radio devised the idea of an open spectrum that allows unlicensed users to utilize these underutilized licensed spectrum bands opportunistically. There are several synchronization-based medium access control protocols for cognitive radio networks in the literature. In this paper, we analyze how the synchronization-based medium access control protocols for cognitive radio networks suffer from common control channel bottleneck problem in a dense network. The analysis result shows, the control messages exchange in fixed channel negotiation window in control channel is not efficient in a dense cognitive radio networks. This increases the channel access delay and limits the performance of the network. We develop an analytical model to calculate expected channel access delay and analyze the impact of number of nodes on channel access. We verify our analysis results with the simulation.

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Abstract: Trust Estimation Guidelines for Wireless Sensor Networks

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Abstract

Trust is an important phenomenon in Wireless Sensor Networks in terms of security enhancement and successful collaboration. Trust estimation is highly challenging issue due to unique features and security vulnerabilities of Wireless Sensor Networks. These factors require careful design and customization of trust estimation methods suited for other networks. In this paper, we present and discuss important trust estimation modeling factors and secure trust aggregation method. In order to clarify the concept of trust in Wireless Sensor Networks, we provide definitions and properties of trust. Considering properties of trust and features of Wireless Sensor Networks, essential design factors and important trust estimation components are introduced and discussed. Moreover, robust trust aggregation mechanism is proposed to aggregate trust values securely. Trust aggregation is an important part of trust estimation and it is performed to obtain final trust value and attain faster system convergence. Since malicious nodes provide dishonest trust values to decrease/boost trust values of legitimate node/malicious node, finding and excluding these kinds of dishonest trust values is essential for trust aggregation.

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