Context aware medium access control for buffer-aided multichannel cognitive networks

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Abstract

In this paper, a novel context aware medium access control (MAC) scheme is proposed for multichannel buffer-aided cognitive networks. The proposed scheme allows management of the delay of the primary network (PN) and secondary network (SN) more efficiently by exploiting the packets' context. In the proposed multiple access policy, two different context aware approaches for packet prioritization are presented. In the first method, more delay sensitive packets in the PN and SN are given a higher priority compared to delay tolerant packets. In other words, the best channel with the minimum service time is assigned to the urgent packets, and hence, such urgent packets are transmitted with a lower delay. On the other hand, in the second proposed prioritization method, shorter packets in the PN and SN are given a higher priority compared to longer packets and are transmitted over channels with lower service time. Thus, based on the slow truck effect, the primary and secondary throughput is maximized. The average waiting time of the packets and the primary and secondary throughput are derived for the first and second proposed schemes, respectively. Simulation results show that the proposed schemes improve the primary and secondary average waiting time of packets and average throughput compared to other existing MAC policies in cognitive networks.

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