An Adaptive Timeslot Allocation Scheme for Wireless Body Area Networks

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Abstract

With the rapid growth in specialized biomedical sensors, wireless communication and low power integrated circuits; the wireless sensor network has achieved a new milestone. IEEE 802.15.4 standard uses carrier sense multiple access with collision avoidance (CSMA-CA) medium access mechanism and supports star as well as peer-to-peer topologies. By using superframe structure, time slots can be allocated by the Coordinator to devices with time critical data. In IEEE 802.15.4 due to the low SNR (signal to noise ratio) carrier sensing is not reliable in UWB PHY, the “hidden Terminal problem” arises due to the use of CSMA-based random access control, and due to the presence of only one common contention based access period, the CAP part deprives the priority of life critical medical applications.

To overcome these limitations of IEEE 802.15.4, an adaptive timeslot allocation scheme based on precedence is proposed. In proposed scheme, Data traffic is divided into 2 priority classes and CAP is categorizes into 2 access phases. Collision probability and final throughput are influenced by the performance of CAP. CAP is divided into 2 sub-phases: phase-1, and
phase-2. C1 represents first class priority, and C2 represents the second class priority. Second class priority includes both continuous and non continuous data.

References


Index Terms

Computer Science Wireless

Keywords

Superframe, backoff, overhearing.