Resourceful residual energy consumption in TDMA scheduling for IoT-based wireless sensor network

ABSTRACT

Recently, wireless sensor network (WSN) gets more concern due to the robustness in the latest communication technology iteration such as big data, IoT and 5G. Such daily usage of these technologies includes smart home, smart farming, smart traffic control etc. Moreover, WSN becomes the best preference for mobile objects in data accumulating in a wild range area. Routing distance, signal interference and routing computational cost give a significant impact to the WSN nodes lifetime. Unsynchronized node time allocation slot and neighbor discovery are the main factors in the energy consumption issue faced by the WSN. Higher energy consumption reduces the network lifetime and WSN nodes performance. This paper discusses the optimization of energy-topology (E-T) factors for distributed time division multiplexing algorithm (TDMA) slot scheduling for high-speed data link capacity. The E-T factor is based on the influence of residual energy and topology on the time slot allocation. Both node residual energy and topology information have shown a respectable impact on the TDMA node slot allocation. Moreover, the numbers of neighbors and the network residual energy have been proved both nodes execution time and energy utilization can be reduced in the algorithm. The algorithm performance has been evaluated based on the previous experiment parameters with new high-speed data link. The experimental results have shown a significant improvement in residual energy consumption for the proposed optimized TDMA slot allocation.