Resource allocation in heterogeneous cognitive radio sensor networks

ABSTRACT

Cognitive radio sensor networks offer a promising means of meeting rapidly expanding demand for wireless sensor network applications in new monitoring and objects tracking fields. Several challenges, particularly in terms of quality of service provisioning, arise because of the inherited capability-limitation of end-sensor nodes. In this article, an efficient resource allocation scheme, improved Pliable Cognitive Medium Access Protocol, is proposed to tackle multilevel of heterogeneity in cognitive radio sensor networks. The first level is the network's application heterogeneity, and the second level is the heterogeneity of the radio environment. The proposed scheme addresses scheduling and radio channel allocation issues. Allocation-decision making is centralized, whereas spectrum sensing is distributed, thereby increasing efficiency and limiting interference. Despite the limited capabilities of the sensor's networks, the effectiveness of the proposed scheme also includes increasing the opportunity to utilize a wider range of the radio spectrum. improved Pliable Cognitive Medium Access protocol is quite appropriate for critical communications that gain attention in the next 5G of wireless networks. Simulation results and the comparison of the proposed protocol with other protocols indicate the robust performance of the proposed scheme. The results reveal the significant effectiveness, with only a slight trade-off in terms of complexity.

Keyword: Heterogeneous network; Quality of service; Resource allocation; Scheduling; Critical communications