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Improved resource allocation and network connectivity in CRSN based smart grid for efficient grid automation

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Abstract

The conventional smart grid (SG) uses static radio resource allocation (RRA) techniques to allocate resources to sensor nodes and communication devices in the SG network. Cognitive radio sensor Networks (CRSNs) based SGs uses dynamic RRA for resource allocation to CRSN nodes. However, the challenges associated with sensor nodes in an SG network are: energy or power constraints; poor quality of service (QoS); interference; delay; and problem of spectrum inefficiency. Thus, improvements in resource allocation criteria, such as energy efficiency, appreciable throughput, QoS guarantee, fairness, priority, interference mitigation, etc., will help in circumventing these problems in CRSN-based SGs. Hence, in this work, a new topology and algorithm for improved RRA and QoS guaranteed network connectivity in CRSN-based SGs are proposed. Bit error probability and latency are the metrics used for the investigation of the improved RRA and guaranteed network. The simulation result confirms that the improved model has a very low latency and low error rate at a given signal-to-noise ratio (SNR) compare to the conventional sensor network which has high latency and high error rate at a given SNR.