Identification and Punishment Policies for Spectrum Sensing Data Falsification Attackers Using Delivery-Based Assessment

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Abstract:
Spectrum sensing data falsification (SSDF) attacks represent a major challenge for cooperative spectrum sensing (CSS) in cognitive radio (CR) networks. In an SSDF attack, a malicious user or many malicious users send false sensing results to the fusion center (FC) to mislead the global decision about spectrum occupancy. Thus, an SSDF attack degrades the achievable detection accuracy, throughput, and energy efficiency of CR networks (CRNs). In this paper, a novel attacker-identification algorithm is proposed that is able to skillfully detect attackers and reject their reported results. Moreover, we provide a novel attacker-punishment algorithm that aims at punishing attackers by lowering their individual energy efficiency, motivating them either to quit sending false results or leave the network. Both algorithms are based on a novel assessment strategy of the sensing performance of each user. The proposed strategy is called delivery-based assessment, which relies on the delivery of the transmitted data to evaluate the made global decision and the individual reports. Mathematical analysis and simulation results show promising performance of both algorithms compared with previous works, particularly when then the number of attackers is very large.

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