Censored Truncated Sequential Spectrum Sensing for Cognitive Radio Networks

Sina Maleki, Geert Leus

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Reliable spectrum sensing is a key functionality of a cognitive radio network. Cooperative spectrum sensing improves the detection reliability of a cognitive radio system but also increases the system energy consumption which is a critical factor particularly for low-power wireless technologies. A censored truncated sequential spectrum sensing technique is considered as an energy-saving approach. To design the underlying sensing parameters, the maximum energy consumption per sensor is minimized subject to a lower bounded global probability of detection and an upper bounded false alarm rate. This way both the interference to the primary user due to miss detection and the network throughput as a result of a low false alarm rate is controlled. We compare the performance of the proposed scheme with a fixed sample size censoring scheme under different scenarios. It is shown that as the sensing cost of the cognitive radios increases, the energy efficiency of the censored truncated sequential approach grows significantly.

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