COLLABORATIVE SPECTRUM SENSING OVER FADING CHANNELS IN COGNITIVE RADIO NETWORK

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Abstract:

The sensible utilization of radio spectrum has become an important challenge in wireless communications. Frequency bands are closely and strictly managed by government authorization and have nearly been used up with the quick increase in the number of subscribers and wireless services recently. A question arises how to improve the efficiency of using allocated bands to avoid wasting radio resource? The establishment of cognitive radio network helped to solve the question partially. In cognitive radio network, the cognitive radio users (CRs) can detect the available spectrum (white-space) of communication channels and perform spectrum sensing by themselves (local spectrum sensing) or collaborating with each other CRs (cooperative spectrum sensing). If the channel is in use, unlicensed user (secondary users or cognitive radio users) is not allowed to access the channel in order to avoid interference and then continue to sense another channels. There are some main cognitive radio functions such as spectrum mobility, spectrum sharing, spectrum sensing.

In this thesis, we illustrate effects of collaborating spectrum sensing on the probability of spectrum sensing detection through simulation and efficiency estimation of the detection over Rayleigh fading channel and Log-normal shadowing channel in cognitive radio network. We will prove that when the number of CRs reaches a certain value, the probability of spectrum detection of collaborating spectrum sensing will get the best result without the requirement of more CRs involved. Furthermore, we will study cooperative spectrum sensing over correlated log-normal shadowing, when each CRs can impact to each other at a close distance.

Keywords: Rayleigh channel, Log-normal Shadowing, Cooperative Spectrum Sensing, Cognitive Radio.