

# COOPERATIVE SPECTRUM SENSING IN COGNITIVE RADIO

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## **Abstract**

Nowaday, Spectrum scarcity is becoming a major issue for service providers interested in either deploying new services or enhancing the capacity for existing applications. On the other hand, recent measurements suggest that many portions of the licensed (primary) spectrum remain unused. This has led the regulatory bodies to consider opening up underutilized licensed frequency bands for opportunistic access by unlicensed (secondary) users. Therefore Cognitive Radio was used to decide this problem. In this thesis, we investigate the effect of user collaboration on the performance of sensing based secondary access in fading channels such as Rayleigh Fading, Lognormal Shadowing, Rayleigh-Lognormal. We saw that collaboration of Cognitive Radios was necessary to improve performance of spectrum sensing in fading channels. Having two important principles which were used in collaboration of Cognitive Radios were Linear Soft-decision Combining and Hard-decision Combining.

**Keywords:**—Spectrum sensing, cognitive radio, collaborative sensing, hard-decision, soft-decision.