ZONE-BASED SENSING SCHEDULING APPROACH IN COGNITIVE RADIO SPECTRUM SENSING

by

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Table of Contents

[ABSTRACT iii](#_Toc308907952)

[1. INTRODUCTION 4](#_Toc308907953)

[2. COGNITIVE RADIO SPECTRUM SENSING 4](#_Toc308907954)

[3. GENERAL DESIGN OF THE SOFTWARE 4](#_Toc308907955)

[4. DESIGN OF THE CLASSES 4](#_Toc308907956)

[5. CONCLUSION 4](#_Toc308907957)

[BIBLIOGRAPHY 4](#_Toc308907958)

# ABSTRACT

Project Name : Zone-Based Sensing Scheduling Approach in Cognitive Radio Spectrum Sensing

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Summary :

**Cognitive radio (CR)** improves spectrum efficiency by enabling CR users to opportunistically reuse the idle spectrum bands of licensed users, i.e., primary users. To avoid causing interference to the primary users, spectrum sensing, which detects idle licensed bands, is one of the most important issues.

**Spectrum Sensing**: detecting the unused spectrum and sharing it without harmful interference with other users. It is an important requirement of the Cognitive Radio network to sense spectrum holes. Detecting primary users is the most efficient way to detect spectrum holes. Spectrum sensing techniques can be classified into three categories:

* *Transmitter detection*: cognitive radios must have the capability to determine if a signal from a primary transmitter is locally present in a certain spectrum. There are several approaches proposed:
  + matched filter detection
  + energy detection
  + cyclostationary feature detection
* *Cooperative detection*: refers to spectrum sensing methods where information from multiple Cognitive radio users is incorporated for primary user detection.
* *Interference based detection*.

In this project we will implement a simulator to analyze and optimize the efficiency of ***Zone-Based Sensing Scheduling in Cognitive Radio***. The project will construct a CR cell and zones in this cell. Then it will generate primary and secondary users both trying to communicate in the cell. It will measure the performance of the system with respect to various parameter sets. Here we assume that the secondary users use energy detection method for spectrum sensing.

# 1. INTRODUCTION

In today’s world, wireless technologies are the basic mean of the communication. Obviously these technologies utilize available wireless channel bands which can be divided into two main groups. These groups are licensed bands and unlicensed bands. Most of the available spectrum is already allocated to current wireless technologies to communicate. However, these bands are not well utilized. So, even though there is available bandwidth to communicate for other emerging technologies since the bands are already allocated to previous technologies, these new technologies cannot have their own frequency bands.

Cognitive Radio (CR) has emerged as a solution for this problem. CR does not require its own licensed band instead it uses unutilized available percentage bandwidth of other current technologies. CR’s communication is based on detecting spectrum holes of licensed or unlicensed users’ bandwidths. That is, it uses other technologies’ bandwidths while they are not using it themselves. During the communication of CR if a licensed (primary) user tries to use its own bandwidth, CR user changes its communication parameters, such as communication frequency, medium access protocol, to communicate from another available band. This whole communication cycle of CR contains four phases:

* *Spectrum Sensing:* A CR monitors the available spectrum bands, captures their information, and detects the spectrum holes.

# 2. COGNITIVE RADIO SPECTRUM SENSING

# 3. GENERAL DESIGN OF THE SOFTWARE

# 4. DESIGN OF THE CLASSES

# 5. CONCLUSION

# BIBLIOGRAPHY