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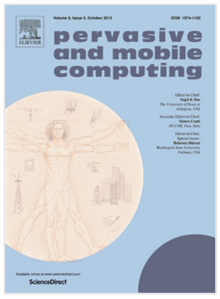

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ICSSSS: an Intelligent Channel Selection Scheme for Cognitive Radio Ad Hoc Networks using a Self Organized Map Followed by Simple Segregation

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Abstract

In Cognitive Radio Ad Hoc Networks (CRAHNS), several spectrum bands with different channel characteristics may be available over a large frequency range. It is essential to identify the most appropriate spectrum band correctly which allow the Secondary Users (SUs) to exploit the band without disturbing the Primary Users (PUs). Many channel selection solutions, based on cooperative spectrum sensing, have been employed for this purpose depending on their prediction models for primary users' activities. In practice, cooperative spectrum sensing cannot completely solve the sensing problems which are false alarm and miss detection, especially in heavily shadowed or fading environment. This paper presents, ICSSSS, as an **I**ntelligent **C**hannel **S**election **S**cheme for cognitive radio ad hoc network using **S**elf organized map followed by simple **S**egregation. The contribution of the proposed scheme is twofold: using an unsupervised learnable Self Organizing Map (SOM) method to efficiently minimize the probability of the sensing errors (false alarm and miss detection), in addition to segregated channel selection strategy to speed up the search for the available best channel. Simulation results based on NS2 simulations show that the proposed scheme can be used with the advantage of better performance than other existing channel selection strategies.

Keywords: Cognitive Radio; Ad hoc networks; Spectrum Selection; Self Organizing Map; Segregated Channel Selection Strategy.

Introduction

In cognitive radio networks, secondary users (SUs) have the capability to recognize unexploited available band from heterogeneous spectrum bands, (such as 3G/4G cellular system, ISM, GSM, and TV bands), by utilizing the unused spectrum opportunistically [1]. Primary users (PUs) are the owner of the spectrum and can use the spectrum at any time, whereas SUs can use the spectrum only just while the PU is in OFF state.