Abstract

Owing to the uprising demands of wireless spectrum, scarcity of spectrum in traditional wireless system has been a common apprehension. In this scenario Cognitive Radio Networks play an important role in solving the scarcity by utilizing the unused licensed spectrum. Emergence of Software Defined Radios(SDR) has contributed towards the development of flexible cognitive radio transceivers which are capable of dynamically changing their transmission parameters in order to efficiently exploit the available wireless resources. In order to opportunistically access the licensed spectrum bands, the Secondary Users (SU) uses the SDR features to self-adapt based on the interaction with the surrounding environment. The PUs are licensed users of the wireless spectrum, they can access the spectrum anytime and anywhere. The SUs access the spectrum only when the PUs are not using it.The SUs scan and identify the unused spectrum and if found idle, data transmission can be done. One important point to note is that during a SU using a channel the PU of that channel becomes active then the SU has to immediately vacant the channel. The SUs must not interfere the transmission of the PUs. In the management of spectrum reuse and efficiency wireless MAC protocol plays an important role. Therefore, various cognitive MAC protocols have been proposed for more flexible and efficient use of spectrum resources. In this research work various cooperative and non-cooperative base MAC protocols for cognitive radio are investigated. A non-cooperative MAC protocol for heterogeneous Cognitive Radio Network is presented. Non-cooperative methods have a simple architecture and low computational complexities than the cooperative methods in designing MAC protocols for Cognitive Radio Networks.Performance analysis is performed to show that it provides promising performance results specially when the network is saturated.

Keywords: Wireless spectrum, SDR, Cognitive Radio Transceiver, Heterogeneous.