

Abstract

In this paper the issue of spectrum sharing in multi-service cognitive wireless network is addressed. The problem is formulated as a revenue maximization problem and a framework is presented that is capable of adequately solving a class of problem where resources are shared in radio environment. Primary users (PUs) exchange channels dynamically and based on the availability of idle channels at neighbors. Secondary users (SUs) of different classes form a mesh network and rent a spectrum from primary users. For such cognitive wireless mesh networks, the main challenge facing a PU is to satisfy the following conflicting objectives: maximizing its total revenue, maintaining its quality of service (QoS) (that degrades due to renting its spectrum to SUs) and reducing secondary user delay times. In this work machine learning paradigm is presented as a means for extracting the optimal control policy for spectrum sharing. To obtain different requirements, the objective function is defined to maximize the total revenue gained by primary users. Value iteration algorithm is applied to find an optimal control policy that maximizes the difference between reward and cost (revenue). Performance evaluation of the proposed spectrum sharing approach shows that the scheme is able to find an efficient trade-off between PUs revenue and SUs delay.