**Primary User-aware Optimal Discovery Routing for Cognitive Radio Networks**

**Abstract:**

Routing protocols in multi-hop cognitive radio networks (CRNs) can be classiﬁed into two main categories: local and global routing. Local routing protocols aim at decreasing the overhead of the routing process while exploring the route by choosing, in a greedy manner, one of the direct neighbors. On the contrary, global routing protocols choose the optimal route by exploring the whole network to the destination paying the ﬂooding overhead cost. In this paper, we propose a primary useraware k-hop routing scheme where k is the discovery radius. This scheme can be plugged into any CRN routing protocol to adapt, in real time, to network dynamics like the number and activity of primary users. The aim of this scheme is to cover the gap between local and global routing protocols for CRNs. It is based on balancing the routing overhead and the route optimality, in terms of primary users avoidance, according to a user-deﬁned utility function. We analytically derive the optimal discovery radius (k) that achieves this target. Evaluations on NS2 with a side-by-side comparison with traditional CRNs protocols show that our scheme can achieve the user-deﬁned balance between the route optimality, which in turn reﬂected on throughput and packet delivery ratio, and the routing overhead in real time.

**SYSTEM REQUIREMENTS:**

**HARDWARE REQUIREMENTS:**

* System : Pentium Dual Core.
* Hard Disk : 120 GB.
* Monitor : 15’’ LED
* Input Devices : Keyboard, Mouse
* Ram : 1 GB

**SOFTWARE REQUIREMENTS:**

* Operating system : Windows XP/UBUNTU.
* Implementation : NS2
* NS2 Version : 2.28
* Front End : OTCL (Object Oriented Tool Command  Language)
* Tool : Cygwin (To simulate in Windows OS)