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Spectral Access in Cooperative Cognitive Radio Networks

Cooperative Communication in Cognitive Radio Network (CRN) is emerging Communication prototype that provides enhanced capacity and improved reachability. Such cooperation can generally be achieved using Secondary Users (SUs) as intermediate relays in order to provide benefit to Primary Users (PUs) in exchange of sharing spectrum in either time domain or frequency domain. This arrangement is commonly referred as Overlay CRN. Furthermore, Cooperative communications can be employed to resolve fairness constraints by supplying optimal average transmission rate to the users or through other resource optimization techniques. Such schemes result in an increased transmission rate of PUs and an access of spectrum to SUs. Furthermore, for fair spectral access, it is necessary to adopt a scheme that maximizes the average rate of transmission of both PUs and SUs. Various schemes exist in the literature which have focused on resolving fairness issues in CRNs. However, in such schemes the PUs improved performance does not necessarily translate into a satisfactory performance for the SUs. Existing cooperative distribution algorithms such as Conventional Distribution Algorithms (CDA) and Pragmatic Distribution Algorithms (PDA) cannot improve the transmission rate of both PUs and SUs simultaneously and thus should be revised to address the fairness issues in the assignment algorithms.

Primary author: SHAH, Syed Muhammad Tayyab (National Disaster Management Authority, Prime Minister's Office)

Presenter: SHAH, Syed Muhammad Tayyab (National Disaster Management Authority, Prime Minister's Office)

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