

## Energy Detection Based Sensing and Primary User Traffic Classification for Cognitive Radio

**Authors :** Urvee B. Trivedi, U. D. Dalal

**Abstract :** As wireless communication services grow quickly; the seriousness of spectrum utilization has been on the rise gradually. An emerging technology, cognitive radio has come out to solve today's spectrum scarcity problem. To support the spectrum reuse functionality, secondary users are required to sense the radio frequency environment, and once the primary users are found to be active, the secondary users are required to vacate the channel within a certain amount of time. Therefore, spectrum sensing is of significant importance. Once sensing is done, different prediction rules apply to classify the traffic pattern of primary user. Primary user follows two types of traffic patterns: periodic and stochastic ON-OFF patterns. A cognitive radio can learn the patterns in different channels over time. Two types of classification methods are discussed in this paper, by considering edge detection and by using autocorrelation function. Edge detection method has a high accuracy but it cannot tolerate sensing errors. Autocorrelation-based classification is applicable in the real environment as it can tolerate some amount of sensing errors.

**Keywords :** cognitive radio (CR), probability of detection (PD), probability of false alarm (PF), primary user (PU), secondary user (SU), fast Fourier transform (FFT), signal to noise ratio (SNR)

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