

As wireless devices and applications increase, it is envisioned that spectrum utilization by licensed users will go from low to medium occupancy state. The CRs will need to sense wider bands to obtain free channels. Therefore development of enhanced wideband sensing algorithms is needed. Enhancing old tools for new applications could be quite useful. The discrete wavelet packet transform (DWPT) is a good mathematical tool that can be enhanced for better application in wireless communications. This paper presents an algorithm to identify spectrum holes in a cognitive radio system. The algorithm is based on the application of discrete wavelet packet transform enhanced with Hilbert transform in spectrum sensing. The enhancement with Hilbert transform has the effect of sharpening the PSD edges for better detection. Using histogram analysis for a discrete wavelet packet decomposed signal, the algorithm which we call DWPT-HiSHIA (Discrete Wavelet Packet Transform – Histogram Spectrum Hole Identification Algorithm) determines if a sub-band channel has a spectrum hole or not. Simulation results show the effectiveness of the algorithm in the identification of spectrum holes in sub-band channels for a discrete wavelet packet decomposed signal.