SPECTRUM MONITORING FOR OFDM-BASED COGNITIVE RADIO NETWORKS

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ALIGO INNOVATION

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BACKGROUND

Nowadays, static spectrum access is the main policy for wireless communications. Under this policy, fixed channels are assigned to licensed users or primary users (PUs) for exclusive use while unlicensed users or secondary users (SUs) are prohibited from accessing those channels even when they are available. The idea of cognitive radios (CRs) was proposed in order to have efficient utilization for the RF spectrum.

TECHNOLOGY

A spectrum monitoring algorithm named “energy ratio” for Orthogonal Frequency Division Multiplexing (OFDM) based cognitive radios by which the primary user reappearance can be detected during the secondary user transmission. The proposed technique reduces the frequency with which spectrum sensing must be performed and greatly decreases the elapsed time between the start of a primary transmission and its detection by the secondary network. This is done by sensing the change in signal strength over a number of reserved OFDM sub-carriers so that the reappearance of the primary user is quickly detected. Moreover, the OFDM challenges such as power leakage, Narrow Band Interference (NBI), and Inter-Carrier Interference (ICI) are investigated and their effects are studied for the proposed technique. Both analysis and simulation show that the energy ratio algorithm can effectively and accurately detect the appearance of the primary user.

COMPETITIVE ADVANTAGES

- Improved efficiency of OFDM-based cognitive radio (polling frequency and primary user reappearance detection latency).
- High immunity to frequency-selective fading channels for both single and multiple receive antenna systems.
- Simulation results indicate that the detection performance is superior than the receiver statistics method, however, with increased complexity.

APPLICATIONS

- Spectrum sharing in wireless communications.

TECHNOLOGY DEVELOPMENTAL STAGE

Simulation results. Currently implementing the algorithm on an FPGA.

PATENT STATUS

Provisional patent pending for the US.

BUSINESS OPPORTUNITY

Co-development and licensing.

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