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Performance Enhancement of DCA Using CRN

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Abstract: ***Resource allocation is one of the most important issue in network planning especially in wireless communication, Cognitive radio system is a technology where secondary user looks for a free band to use when primary user is not in use of its licensed band. A function of cognitive radio is called Spectrum sensing which enables to search for the free bands and it helps to detect the spectrum hole (frequency band which is free enough to be used) which can be utilized by secondary user with high spectral resolution capability. This paper aim to enhance dynamic channel allocation through cognitive radio technology MATLAB has been used to evaluate the performance of cognitive radio network to get optimal dynamic channel allocation.***

Keywords: Cognitive Radio, Spectrum Sensing, hole, secondary user, primary user, DCA, MATLAB

1. Introduction

Spectrum utilization is the most important issue in spectrum management it happen through create opportunities for Dynamic channel allocation (DCA). By using "Cognitive Radio" technology which is a radio or system, it has the ability to sense and is fully aware of its functioning condition and can regulate its operating parameters. By analyzing, observing and learning, the Cognitive radio adapts to the environment conditions and makes use of this analysis for future decisions. There are mainly two tiers of users in the cognitive radio model. Primary Users (PU) are licensed users, have the rights of priority in using certain stable frequency band for communications, Secondary Users (SU) are allowed to use the frequency spectra momentarily only if they do not interfere with the PU. So the ability of sensing an idle spectrum and the ability to temporarily utilize a spectrum without interfering with Primary Users.

In this paper, Section2 shows Methodology for Implementation of Cognitive Radio System, Results are shown in section 3 and section 4concludes the paper.

2. Method

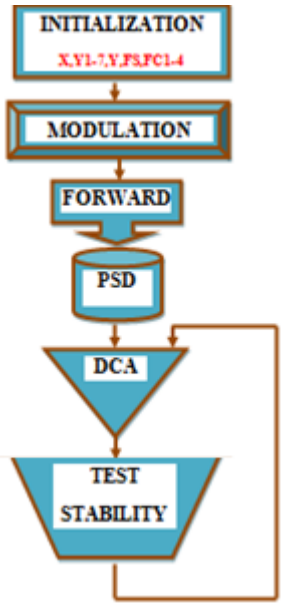

Figure 1: Proposed model for DCA using CRN

1) **Iniyalization:**4Carrier Frequency Bands for Users, Message Frequency and the Sampling Frequency are initialized
2) **Modulation:** Modulates user data over the respective frequency band.
3) **FORWARD:** Addition of all the modulated signals to produce a transmitting signal
4) **PSD:** To estimate the power spectral density of received signal.
5) **DCA:**
6) **ADD Slot Allocation:** New User is allotted to the first spectral hole when he arrives.
7) **Emptying a slot:** Asked user to empty a specific slot if all the slots are engaged.

Test Stability
It happen through

- Addition of noise- Amount of Noise to be added
- Attenuation- Percentage of Attenuation is introduced

3. Result and Discussion

The cognitive radio system continuously searches the spectrum hole where primary user is not present and is determined by the method of energy detection. When it finds out the spectrum hole, immediately it allots to the Secondary User (SU) and whenever Primary User (PU) wants to occupy the slot, Secondary User immediately leaves it

For 4(Four) signals, the carrier frequencies are 1MHz, 2MHz, 3MHz and 4MHz and sampling frequency is 12MHz used for simulation. Power Spectrum Density (PSD) of signal is calculated, compared with the predefined threshold value and determined the presence of primary user signal.In this paper, it has assumed that 1st, 3rd primary users are present and 2nd and 4th primary users are not present. Then, the following results are obtained which are shown below:

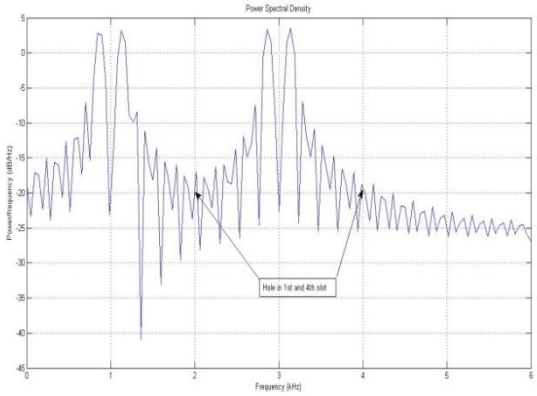

Figure 2:2nd and 4th primary user are not present

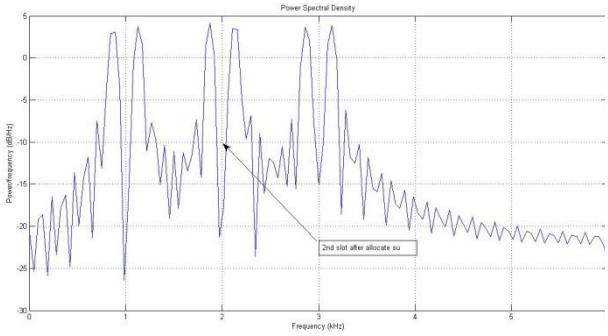

Figure 3: Allocate 1st secondary user in the 1st hole

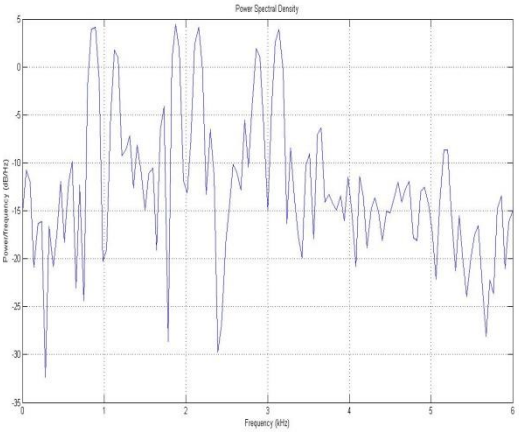

Figure 4: Add noise after 1st secondary user allocation

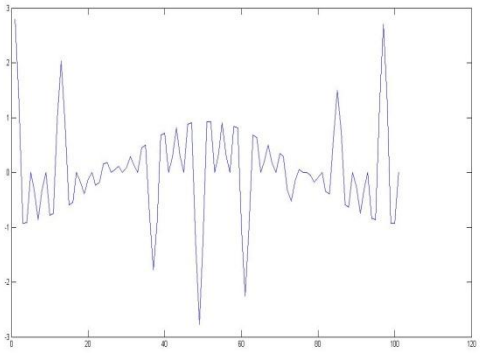

Figure 5: Add attenuation after 1st secondary user allocation

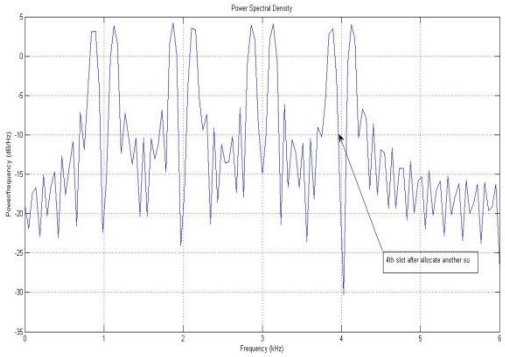

Figure 6: Allocate 2nd secondary user in the 2nd hole

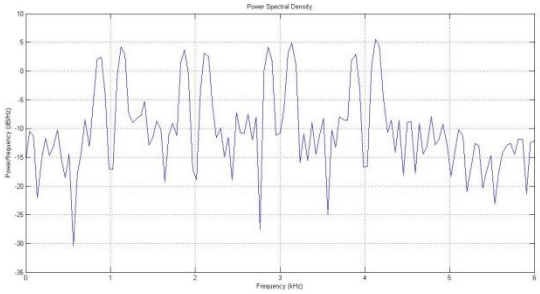

Figure 7: Add noise after 2nd secondary user allocation

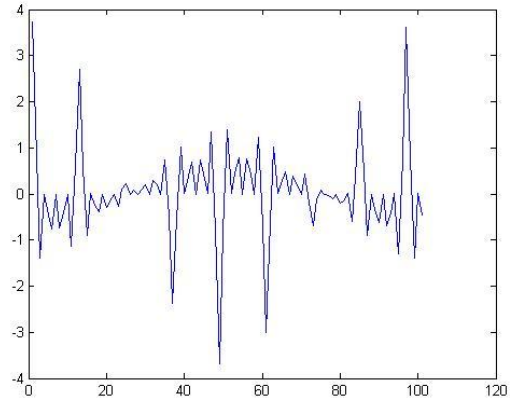

Figure 8: Add attenuation after 2nd secondary user allocation

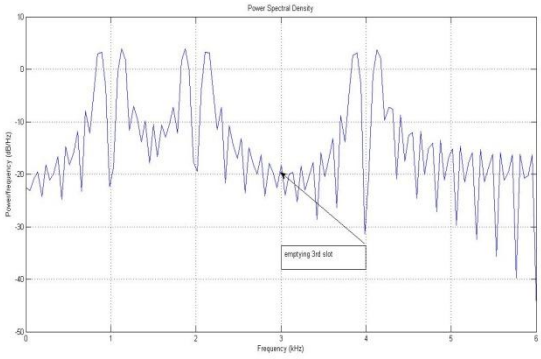

Figure 9: Emptying 3rd slot to allocate new secondary user

4. Conclusion

The approach was to take the decisions in this paper on the basis of power spectral density of the channel which can be used cognitively to search the available spectral holes those can be used to new incoming users (SU) thus improving the

overall channel's throughput. In this work the energy detection spectrum sensing. It has been shown that how the cognitive radio works dynamically with changing the frequency band from one to another and successfully demonstrated in simulation result. The stability of system it done through adding noise and attenuation that's lead to the Spectrum Access in Cognitive Radio demonstrated successfully without interfering with the other frequency bands used by the primary user (PU).

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