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UNLICENSED FIELD FUSION AND INTERFERENCE COORDINATION FOR LTE SYSTEM

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Abstract:

A common approach to increase wireless network capacity is to use additional spectrum. LTE in the unlicensed spectrum band has been introduced in the release 13 of 3GPP as Licensed Assisted Access (LAA). The LTE technology in the unlicensed band is enabled by Listen Before Talk (LBT) procedure for fair coexistence with other wireless technologies (i.e., Wi-Fi) operating in the same spectrum. LBT based on binary exponential back-off known as LBT category 4 can achieve a fair coexistence in low buffer but presents some limitations under full buffer evaluation. In this paper we propose different LBT mechanisms and evaluate their performances based on 3GPP coexistence scenarios (LAA/Wi-Fi, LAA/LAA). The simulation results show that the LBT category 4 with Optimal Constant Contention Window (OCCW) and the proposed fixed periodic LBT (P-LBT) can achieve better performance under saturation state even better than Wi-Fi only coexistence.

Keywords: LAA, LBT, LTE, Wi-Fi, LBT- OCCW, P-LBT.

1. INTRODUCTION

To satisfy the high demand of traffic service, operators provide a wide range of network possibilities. They focus on two options: one is to offload their traffic to the Wi- Fi networks another alternative is to use the LTE in the unlicensed band. The unlicensed band is a shared spectrum for different technologies a fairness coexistence with other technologies and with other operators in the same spectrum is the key challenge for industries and regulation organizations [1]. Many works have been done for possible coexistence between wireless technologies in the unlicensed spectrum. The performance of TD-LTE with Wi-Fi presented in [6] shows that Wi-Fi performance is less affected during the LTE uplink transmission than the downlink operation. present a coexistence gap approach to enable LTE in the TV white space and possible deployment with ZigBee under 2.4Ghz. In [9] detect and avoid mechanisms are proposed for mitigating interference to enable ultra-wideband (UWB) and WiMAX to operate in the same frequency band. the author proposes a protocol stack, a fusion between LTE and 802.11 to enable LTE decoding Wi-Fi signal for better coexistence. the IEEE 802.11 network the listen before talk is known as Distribution Coordination Function (DCF). DCF is a random access scheme based on CSMA. Before transmitting any data Wi-Fi nodes need to know whether the channel is free or not; two techniques are used for this process. One is the energy detection CCA where the nodes sense the energy level of the channel to determine whether it is busy or free. For Wi-Fi technology the energy level is fixed to -62 dBm at 20MHz. The second

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technique is the preamble CCA, where the network packets are transmitted with a short training field (STF) and a long training field (LTF), a high correlation value means the presence of Wi- Fi signal, the energy level in this approach is fixed to -82 dBm over 20MHz channel bandwidth. LTE in the unlicensed band needs a mechanism that can take in account this principle to avoid interfering to the Wi-Fi network or another LAA network. LTE is not able to decode a preamble Wi-Fi signal; the energy detection approach can be used to reduce the complexity of the implementation. We adopt an energy detection approach at -82dBm, in this way the proposed LBT can detect whether the channel is free or not.

2. RELATED WORK

The free radio spectrum is limited and it is getting compact day by day as there is increase in the number of wireless devices and application. It is found that the allocated radio spectrum is inefficiently utilized because has been statically allocated not dynamically. Also the techniques of radio spectrum management is not flexible, because each user has a license for appropriate spectrum band while the licensed user are not completely utilized the whole band. The main challenges with cognitive radio are that it should not interfere with primary users and should clear the band when required. For this purpose CR should sense the spectrum faster. Fig.1 shows the dynamic spectrum access technique, it is a way to overcome the spectrum management and improve the utilization efficiency.

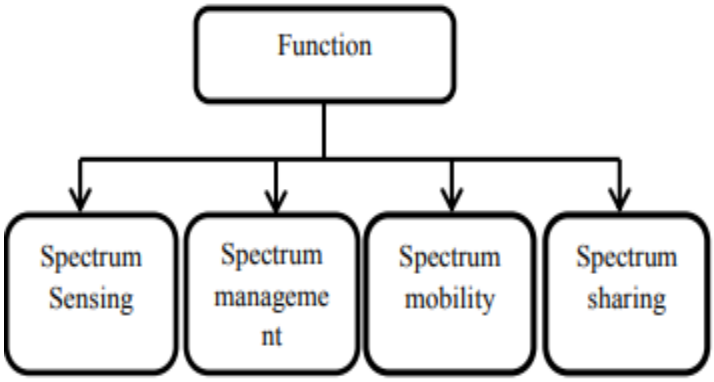

Fig.1.Function

A spectrum hole or white space is band of frequencies assigned to a primary user but at a specific time and particular geographic area, the band is not being utilized By that user. These white spaces can occur in two fashions, in time or in space. When a primary user is not transmitting at a given specific time, then there‟s a temporal spectrum hole, if, a primary user is transmitting in a certain portion of the Spectrum or frequency at a given specific time but it is too far away from the secondary user so that the secondary user or cognitive user can reuse the frequency, then a spatial spectrum hole exists. The main concept of the cognitive radio is to continuously monitor the radio spectrum, detect the occupancy of the spectrum and then opportunistically use spectrum holes with minimum interference with primary user. Fusion center (FC) creates a decision on the presence of PU‟s based on two type of fusion-Hard decision fusion, Softened decision fusion. In softened decision, all CR users transmit their measured parameter to the FC and fusion center make the global decision for all CR network. In hard decision each node takes its own decision and a binary value is transmitting to the FC. Detection of presence of PU based on SDF scheme gives better performance than HDF based scheme

3. PROPOSED SYSTEM

One of the most important elements in the CR network is spectrum sensing [6].when we decreasing the optimal threshold value to decrees the probability of missed detection also increase the probability of false alarm and when increasing the threshold value to probability of false alarm would increase the probability of missed detection. Since both are unwanted and both can‟t be deceased simultaneously. Many different signal detection techniques can be used in spectrum sensing to improve the detection probability. The cognitive radio should describe between used and unused spectrum bands. In spectrum sensing Transmitter detection method is based on the detection of the weak signal from a primary transmitter through the different techniques: ED consists of a band pass filter or pre-filter matched to the bandwidth of the signal is required in the time domain representation.

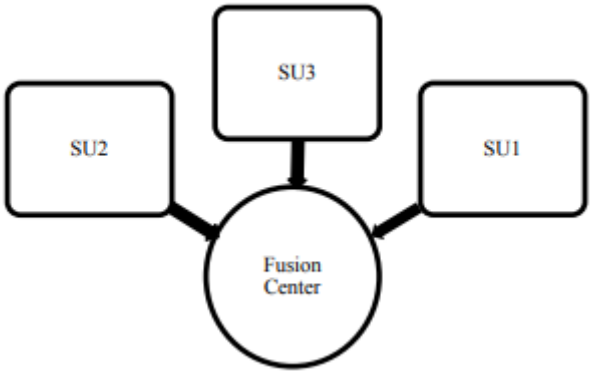

Fig.2.Sensing

Time domain representation is inflexible compare to the other. So it is crucial to use the frequency representation for analyzing received signal. Then the output of BPF is fed to the squaring block this block consisting one squaring device followed by a finite time integrator. Matched filter is designed to maximize the output SNR for a given signal. Matched filter detection required prior knowledge of the primary user. In matched filter detection convolution between unknown signal is done with the filter whose impulse response is time shifted. Cyclo stationary feature detection uses the built in periodic component/feature of the modulated signal (carrier). The periodicity is commonly encapsulated in sinusoidal carrier, pulse train, spreading code, hopping sequence of the primary signal. A wide sense stationary process that shows cyclo stationary has both mean and auto-correlation function in time domain. In the cyclo stationary feature detection requires the prior knowledge of the signal and the synchronization is not necessary in case of cooperative sensing. The main disadvantage of the Cyclo stationary feature detection is its long sensing time and high computational complexity. Thus Cyclo stationary method is more robust to noise and perform better then energy detection in low SNR condition.

4. ANALYSIS

GA characterize a radio in form of a chromosomes and genes the users quality of service needs given as input to the GA procedure. We analyze two parameter, available spectrum resources size which is defined by the GA as a population size and the number of defined chromosome genes in the efficiency of spectrum

allocation. This approach starts with the definition of the structure of a chromosome. The structure of a chromosome is a sets of genes i.e. frequency, modulation, bit error rate (BER) The most reliable evolutionary algorithm is the genetic algorithm which is adaptable to the radio environment. Among the artificial intelligence techniques proposed in the research field of cognitive radio networks, there are expert systems, artificial neural networks, fuzzy logic, hidden markov model and genetic algorithm. These entire decision algorithms adopt different types of reasoning to achieve an optimal solution. But each algorithm has severe limitations that reduced their operational value in real time in cognitive radio network. Fuzzy logic allow approximate solutions to be found in uncertain inputs which do not permits proving that the system has an optimal behavior.

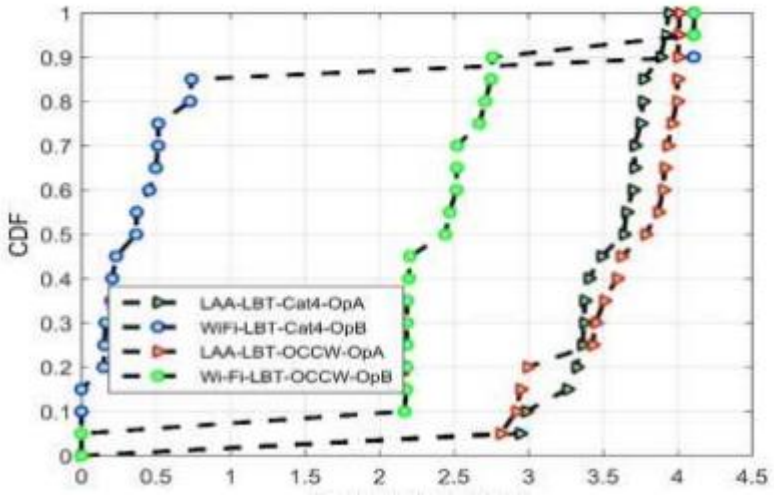

Fig.3.Analysis

Neural networks are most applicable in this field but their computational complexity is higher than other methods. Genetic algorithm is more popular for their rapidity to cover a large space of possible configuration, and thus find the most suitable solution. Firefly is a metaheuristic algorithm that is inspired by the Behavior of fireflies. There are about two thousand firefly species, and most fireflies produce short and rhythmic flashes. The primary purpose for a firefly‟s flash is to act as a signal system to attract other fireflies. The pattern of flashes is often unique for a particular category. Females respond to a male‟s unique pattern of flashing in the same category. We know that the light intensity at a particular distance „r‟ from the light source obeys the inverse square law. The air absorbs light becomes weaker and weaker as the distance increases. Here, the attractiveness is proportional to the brightness. The flashing light can be formulated in such a way that it is associated with the objective function.

CONCLUSION

The allotment of spectrum as per the QOS of the applications is a major research filed in cognitive radio application. CR is an adaptive intelligence radio and network technology that can automatically detect available channels in wireless spectrum and improve the spectral efficiency of the spectrum. In the cognitive radio network several appearance of spectrum sharing and spectrum sensing problem are studied. Most of the application of cognitive radio suffers from primary hidden terminal problem due to different fading

channel present in environment. The use of cooperative spectrum sensing can overcome this problem in most application.

REFERENCES

[1] Yue Wang, Chunyan Feng, Caili Guo and Fangfang Liu, "optimization of Parameters for Spectrum Sensing in cognitive radios (Conference style)," IEEE, 2009

[2] Wei Zhang, Ranjan K. Mallik,and Khaled Ben Letaief, "Optimization of Cooperative Spectrum Sensing with Energy Detection in Cognitive Radio Networks(Translation Journals style)," IEEE TRANSACTIONS ON WIRELESS COMMUNICATIONS, vol. 8, no. 12, Dec. 2009

[3]Wenjie Zhang, Yiqun Yang, and Chai Kiat Yeo, "Cluster-Based Cooperative Spectrum Sensing(Translation Journals style)," IEEE TRANSACTIONS ON VEHICULAR TECHNOLOGY, vol. 64, no. 6, June 2015

[4]Y. Zhao, L. Morales, J. Gaeddert, K. K. Bae, J.-S. Um, and J. H. Reed, "Applying radio environment maps to cognitive wireless regional area Networks (Conference style),"IEEE Int. Symposium on New Frontiers in DynamicSpectrum Access Networks, Dublin, Ireland, Apr. 2007, pp. 115– 118.

[5]Ayman A. El-Saleh, MahamodIsmail,MohsenAkbari, Mohsen RiahiManesh, Seyed Ahmad RafieiTabaZavareh, "Minimizing the Detection Error of Cognitive Radio Networks Using Particle Swarm Optimization (Conference style)," International Conference On Computer and Communication Engineering (ICCCE 2012), Kuala Lumpur, Malaysia, July 2012,pp 3-5

[6]Shimin Gong, Ping Wang, and Jianwei Huang, "Robust Performance of Spectrum Sensing in Cognitive Radio Networks(Translation Journalsstyle)," IEEE TRANSACTIONS ON WIRELESS COMMUNICATIONS, vol. 12, no. 5, May 2013