ENERGY EFFICIENCY BASED ON ROUTING PROTOCOL IN WIRELESS SENSOR NETWORKS USING COGNITIVE RADIO NETWORK

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ABSTRACT

In the world of computers, networking is the practice of linking two or more computing devices together for the purpose of sharing data. Networks are built with a mix of computer hardware and software. Networking includes communication with other uses, centralization of software and account maintenance and mobility of uses. Whenever there is more than one computer being used as the same location networking them together makes a lot of sense. Not only can the file transferred between them quickly and easily, but they can also share expensive resources like laser printers, hard disc arrays, backup tape drives, CD and DVD burners, scanners, internet connection and so on.
Sharing of files from source to the destination is often referred as file sharing, in networking. The router is the primary component, which is used to transfer all such files. While transferring the files these routers are compromised by the attackers and hence it becomes malicious in nature. Therefore there arrives a problem in the delivery of files, because of this malicious router. So I am in detecting the existence of compromised routers and isolate them from the routing fabric by using the mobile agents called as Ant Nets. Wireless technology has enabled has enabled the development of increasingly diverse applications and devices resulting in an exponential growth in usage and services. This advancement made the radiofrequency spectrum a scarce resource, and consequently, its efficient use is of the ultimate importance. Cognitive radio can reduce the spectrum shortage problem by enabling unlicensed users equipment with cognitive radio to reuse and share the licensed spectrum bands. Firstly, prediction techniques are evaluated and compared for prediction accuracy. Secondly, routing protocol reliability, efficiency and scalability performance improvements even with moderate accuracy predictors. Results clearly show that hybrid markov CDF prediction performs the best. When compared with no prediction it significantly improves average reliability and efficiency by11% and 8% respectively

Keywords: Markov Chain Implementation, Modified P-Persistent Protocol, Cognitive Spectrum Access, Spectrum Aware Routing

I. INTRODUCTION

During the last decade, Wavelength Division Multiplexing (WDM) Networks have emerged as on attractive architecture for backbone networks [1]. WDM networks provide high band width, on the order of tens of gigabits per second per channel. In, recently two observations are driving the research community to explore the traffic grooming problem in WDM networks. First, the bandwidth requirements of most of the current applications are just a fraction of the band width offered by a single wavelength in WDM networks. Second, the dominant cost factor in WDM networks is not the number of wavelengths but rather the network components, specifically, higher layer equipment, such as SONET Add/Drop multiplexers (ADMs), or MPLS or IP router ports [2].

The cost effectiveness of WDM Networks depends on the amount of the wireless pass-through provided by the network to the given traffic, thus reducing the number and cost of the higher layer equipment [3]. At, the amount of the wireless pass-through depends on the traffic arrangement on the wireless layer. Traffic grooming is therefore defined as an intelligent allocation of the traffic demands, in different networks notes, on to an available set of wavelengths in such a way the reduces the overall cost of the network. In general the traffic grooming problem is recorded to be even harder than the combined virtual topology design and routing and wavelength assignment (RWA) [4].

To make the problem somewhat less difficult, many relaxations have been considered in the literature [5]. For example, most of the studies allow the traffic of each source-destination set to be (vertically) split over multiple wavelengths-a condition known as bifurcation. Due to bifurcation different components of the same traffic dement may traverse different links. This provision provides flexibility in traffic allocation, which may lead to a reduction in the number of wavelengths as he uses number of ADMs [6].

II.PROPOSEDWORK

During the past few years, cognitive radio networks (CRNs) have emerged as a solution for the problems created due to fixed spectrum allocation such as inefficient usage of licensed spectrum. CRNs aim at solving this problem by exploiting the spectrum holes (the spectrum not being used by primary radio nodes at a particular time) and allocation the spectrum dynamically. In this paper, we address the problem of dynamic channel assignment for cognitive radio users in multi-radio multichannel cognitive radio network (MRMC-CRNs). We propose an efficient spectrum-aware dynamic channel assignment (SA-DCA) with two related strategies. Simulation results show that SA-DCA with two related in signification reduced interference to primary radio nodes increased packet delivery ration in MRMC-CRNs.

Spectrum sharing has attention in cognitive radio recently as an efficient of alleviating the spectrum scarcity problem by allowing unlicensed users to coexist with licensed under the condition of protecting the latter from harmful interference. In this paper, few focus kin the condition of protecting the latter from harmful interference. In this paper, we focus on the through put maximization of spectrum sharing cognitive radio networks and propose a novel cognitive radio system that significantly improves their achievable throughput.

More specifically, we introduce a novel receiver and frame structure for spectrum sharing cognitive radio networks and study the problem of deriving the optimal power allocation strategy that maximizes the erotic capacity of the proposed cognitive radio system under average transmit and interference power constraints. In addition, we study the outage capacity of the proposed cognitive radio system under various constraints that include average transmit and interference power constraints, and peak interference power constraints. Finally we provide simulation results, in order to demonstrate the improved erotic and outage throughput achieved by the proposed cognitive radio system compared to conventional spectrum sharing cognitive radio systems.

With the rapid proliferation of new technologies and services in the wireless domain, spectrum scarcity has become a major concern. The allocation of the industrial, Medical and scientific (ISM) band has enabled the explosion of new technologies (e.g. WI-FI) due to its license-exempt characteristic. The widespread adoption of WI-FI technology, combined with the rapid penetration of smart phones running popular user service (e.g. social online networks) has overcrowded substantially the ISM band. On the other hand according to a number of recent reports, several parts of the static allocated licensed bands are under-utilized. This has brought up the idea of the opportunistic use of these bands called cognitive radio and cognitive radio networks. Security threats are mainly related to two fundamental characteristics of cognitive radios: cognitive capability, and configurability. Furthermore, as cognitive wireless networks. The scope of this work is to give an overview face, along with the current state-of-the art to detect the corresponding attacks. In addition, future challenges are addressed.

In this paper, we present an analytical framework to evaluate the latency performance of connection-based spectrum handoffs in cognitive radio (CR) networks. During the transmission period of a secondary connection, multiple interruption from the primary users result in multiple spectrum handoffs. To quantity the effects of channel obsolete issue on the target channel predetermining a set of target channel predetermination, we should consider the three key design features:

1. General service time distribution of the primary and secondary connection;
2. Different operating channels in multiple handoffs; and
3. Queuing delay due to channel contention from multiple secondary connections.

Cognitive radio (CR) is the enabling technology for supporting dynamic spectrum access: the policy that addresses the spectrum scarcity problem that addresses the spectrum scarcity problem that is encountered in many counties. To make radio and wireless networks truly cognitive, however, is by no means a simple task, and it requires collaborative effort from various research communities, including communications theory, networking engineering, signal processing, game theory.

III. PROPOSED MARKOV CHAIN IMPLEMENTATION

We model the channel search and access policy for a CRN containing one SU by on open network. It will be extended to the multiuser case in the next sections. The networking is compressed of several nodes corresponding to different stages of spectrum sensing and packet transmission attempt of pack including channel sensing and packet transmission. In the proposed model, the arrival of a request to the queuing network presents the transmission attempt of a packet including channel sensing and handovers. The request leaves the network after in the service from a subset of nodes. Different handovers are modeled through nodes Hoi, i=1, 2… $, where $ is the maximum number of allowed handovers and will be discussed later. It is worth nothing that the first handover node does not really exist in the process of finding a transmission opportunity, and it appears just for providing symmetry in the model. Let Si denote the sensing process of i^{th} channel. At the beginning of each time slot, an SU's request enters the node HO1, and immediately is routed to the first sensing node, Si. After time units, the channel sensor routes the request to the transmitter nodes (node T*LPI or T*HP1) or to the second handover nod, HO2.

Let as defined the i^{th} stage of the sensing-transmission process, as the set of nodes Hoi, Si, T*HPi. At the i^{th} stage, the i^{th} channel is sensed free if (a) the i^{th} PU is absence (with the probability of pi ,o) and the SU correctly detects this transmission opportunity, with the probability of Pi,0(1_pfa,i), or (b) the channel is occupied by the PU(with probability of Pi,1=1_pi,0) but the SU mistakenly senses this channel free, with the probability of Pi,1 (1_Pd,i), where Pfa, I and pd, I denote the false alarm and detection probabilities of the sensing process of the i^{th} channel. Please note that similar, in this study, we evaluate the SUs performance while their impacts on the Pus communications are limited, i.e., the admissible false alarm and miss detection probabilities are restricted according to the IEEE 802.22 standard. Hence, the desired Q0s of the Pus is provided. Nodes T*HPi model the first case in which the Su will be able to transmit on the i^{th} channel for the rest of the time slot with the capacity of c0 = log2 (1+s). In the same way, in nodes T*LPi which models the latter case (case b), the SU will be to transmit on the i^{th} channel for the time slot with the capacity.

IV. MODIFIED P-PERSISTENT ACCESS PROTOCOL

We extend the considered sequential approach by modifying the queue network to include the multiuser SRN. In order to provide multiple accesses among the SUs, a modified version of the conventional p-persistent multiple access protocol is utilized in which each Su sense each channel with the probability p and skips the sensing process with the probability (1-p). The channel sensing probability, p, provides a degree of freedom to optimize the performance matrices, namely, throughput of SUs. The channel sensing access policy of the proposed modified p-persistent access protocol (MPPA) used by each SU. More specifically, the requests that enter standby mode (at node SY Ni) wait for time units (sensing period).

The same procedure told in the paper is enhanced for general network switching is so called Handoff/ Handover. When We Exit and Enter from One Network to another Network we are supposed to change the network criteria due to the network where we are going to mo. So in this project we are going to implement the Handoff/ handover technique from one network to the other network.

V.P-PERSISTENT RANDOM ACCESS

The major disadvantage associated with the MPPA algorithm is that a high number of SUs (PnP SUs) intend to sense the first channel through the node s1. Similarly, the c1Np SUs to exploit the spectrum resources in each stage and consequently degrade the performance regarding the average SUs' throughput. In order to mitigate the aforementioned problem, we consider the p-persistent random access (PPRA) scheme, which equally distributes level and raises the throughput of each SU. Demonstrates the sensing-transmission stages of the proposed PPRA method.

VI. SPECTRUM SENSING USING MULTIPLE NODES

When the CR RX is equipped with multiple antennas, Eigen value-based detection (EBD) can be used for spectrum sensing by constructing the sample covariance matrix of the received signals, EBD simultaneously estimates the noise variance and signal power by calculating the minimum and maximum Eigen values of the matrix. When the primary signal is activate and the signal covariance matrix is not a scalar of the identity matrix, the difference between these two Eigen values are supposed to be the same however, when the primary signal is activate ND the signal covariance matrix is not a scalar of the identity matrix, the difference between the two Eigen values expected to larger. Thus the condition number of the sample covariance matrix can be used as the test statistics for signal detection. A closed-form formula for the probability density function of the test statistic can be derived by using a random matrix theory, through which he detection threshold can be determined for a target probability of false alarm.

Because EBD simultaneously estimates the noise variance and signal power, it tends to be noise power uncertainty. In, it is shown that EBD has a theoretical root in generalized likelihood radio testing, from which other versions of sensing algorithms can be developed. For example, the testing statistic can be chosen at the ratio of the arithmetic mean over the geometric mean of the Eigen values of the sample covariance matrix. On the other hand, if the noise variance is known to the CX< RX< the maximum Eigen values can be used as the test statistics.

VII. COGNITIVE SPECTRUM ACCESS

Spectrum-sensing techniques for identifying the spectrum holes have been received from the signal processing perspective. Based on the sensing results, the CR users can perform cognitive spectrum access through the OSA model. Alternatively, the CR TX has obtained the channel-state information involved for primary RX protection, the CSA model can be used for cognitive spectrum access. In particular, transmit signal waveform design is considered do the OSA model, and transmit and resource allocation is studied for the CSA model. The capacity limits of CR channels with genie cognitive capability have been considered from the information-theoretic perspective. The transmit strategies for the CSA model are also reviewed in the convex optimization perspective, as well as, with additional consideration of cooperative communications.

In OSA, multicarrier modulation techniques become natural candidates for CR transmission mainly due to flexibility in spectrum usage. As the most popular multicarrier technique, OFDM, with its own advantages of combating fading and interface, has been proposed for the PHY layer of CR. OFDM- based spectrum pooling has extensively been discussed in, where several potential identified, among which the mutual interference between the CR uses and the Pus is critical for CR users to work on a noninterference basis. Windowing and active subcarrier cancelation techniques have been proposed to reduce the power leakage in the side lobes of OFDM subcarriers to limit the interference level.

VIII. SPECTRUM-AWARE ROUTING

The stability aware routing protocol (STRAP) has been developed for multichip DSA networks and can utilize unused frequency bands without compromising the stability of the network. Another proposal is the spectrum aware routing protocol (SPEAR), which can establish robust paths even in the diverse spectrum environment with rather stringent latency condition spectrum aware on demand routing for CRNs. Where the routing and spectrum allocation algorithm is one of the recent proposals for enabling throughput maximization in this context, taking care of the interference minimization and maximizing the weighted sum of differential backlogs so that system stays stable.

IX. RESULTS AND DISCUSSION

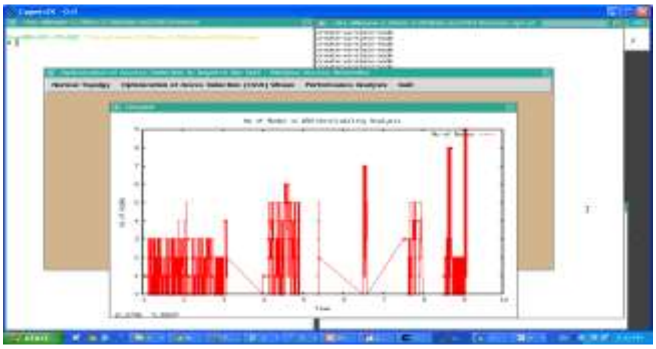

Figure 1: Number of Nodes in WSN

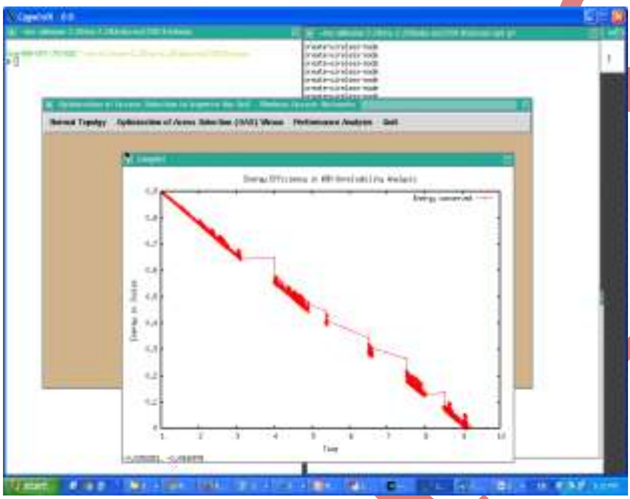

Figure 2: Energy Effiiency in WSN

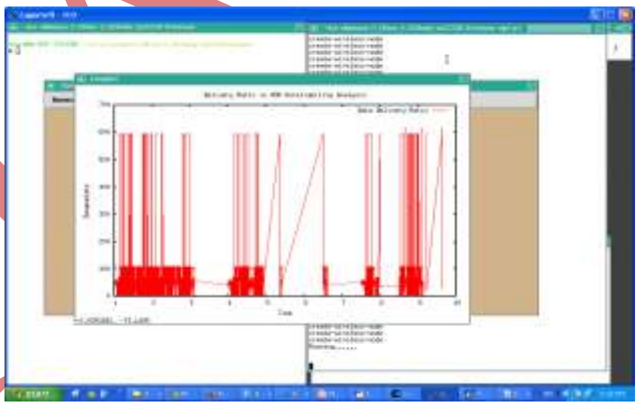

Figure 3: Delivery Ratio in WSN

X. CONCLUSION

The main result in this paper is that, under tight collision constraints, optimal cognitive access of multiple continuous tiles on off morkovien channels can be achieved by deterministic periodic sensing randomized transmission policies designing, modeling and systematic performance evaluating of channel sensing schemes in a multichannel cognitive radio networks (CRNs) have been investigated. Modified p-persistent access (MPPA) has been introduced and its performance in terms of the average SUs' throughput and the average number of handovers has been evaluated. In order to appropriately mitigate the problem associated with the MPPA scheme, a distributed sensing access policy, called p-persistent random access (PPRA), has been proposed, which statistically distributes the SUs' load among the channels and offers higher average throughput.

XI. FUTURE WORK

In future work improving efficiency in band width and reduce the delay latency.

REFERENCES

[1] A survey on security threats and detection techniques in cognitive radio networks (2013) fragkiadakis.A.G, tragos.E.Z, Askoxyylakis.I.G.

[2] Enhancing the capacity of spectrum sharing cognitive radio networks stotas., Nallanathan.A.

[3] Impact of mobility prediction on the performance of Cognitive Radio networks (2010) Butun. I Cagatay Talay. A, Altilar.D.T, Khalid.Murad, Sankar. Ravi.

[4] Modeling and analysis for spectrum handoffs in cognitive radio network (2014) L.C.Wang, C.W.Wang, and C.J.Chang

[5] Cognitive radio networking and communications: an overview (2011) Y,-c. Liang. K.C. Chen, Y, Li, and P.Mahonen.

[6] I.F.Akyildiz,W.Su,Y.Sankarasubramaniam,E.Cayirci,"Wireless sensor Networks: A Survey",Computer Networks (Elseveir) 393–422,2002

[7] Chris Karlof, David Wagner, "Secure routing in wireless sensor networks: Attacks and Countermeasures", Special issue on sensor network application protocols, 2003

[8] P.Papadimitratos and Z.J.Haas, "Secure routing for mobile ad hoc networks", In Proceedings of the SCS Communication Networks and Distributed Systems Modeling and Simulation Conference (CNDS 2002), January, 2002

[9] Majid meghdadi, Suat ozdemir, Inan giller, "A Survey on wormhole based attacks and their countermeasures in wireless sensor networks", IETE Technical Review, VOL 28, ISSUE 2, 2011

[10] Y. C. Hu, A. Perrig, and D.B. Johnson, "Packet leashes: a defense against wormhole attacks in wireless networks", Conference of the IEEE Computer and Communications Societies (INFOCOM),pp. 1976-1986, 2003.

[11] R. Poovendran and L. Lazos, "A graph theoretic framework for preventing the wormhole attack in wireless ad hoc networks", ACM Journal of Wireless Networks(WINET), 2005.

[12] Maheshwari R, Gao Jie, Das S R. "Detecting wormhole attacks in wireless networks using connectivity information", IEEE International Conference on Computer Communications, 2007:107-115.

[13] Hu Y C, Perrig A, Johnson D. "Wormhole attacks in wireless networks", IEEE J. Sel. Areas Communication, 2006.

[14] S.Capkun,L. Buttyán, and J.-P. Hubaux, "SECTOR: Secure Tracking of Node Encounters in Multi-hop Wireless Networks", ACM workshop on Security of adhoc and sensor networks (SASN 03), pp.21-32, 2003.

[15] Hu Lingxuan, Evans D, "Using directional antennas to prevent wormhole attacks", In Network and distributed network security symposium, 2004

[16] Alzaid, Hani and Abanmi, Suhail and Kanhere, Salil and Chou, Chun Tung "Detecting Wormhole Attacks in Wireless Sensor Networks". Technical Report,2006

[17] Khalil I, Bagchi S, Shroff N B, "Liteworp: Detection and isolation of the wormhole attack in static multihop wireless networks", Computer Networks 2007,**51**(13):3750-3772.

[18] Khalil I, Bagchi S, Shroff N B. "Mobiworp: Mitigation of the wormhole attack in mobile multihop wireless networks", Ad Hoc Networks 2008, **6**(3): 344-362.

[19] Wang Weichao, Bhargava B. "Visualization of wormholes in sensor networks", ACM Workshop on Wireless Security (WiSe), 2004: 51-60.

[20] Chiu, H.S., Lui, K.S.: DelPHI: "Wormhole detection mechanism for ad hoc wireless networks", International Symposium on Wireless Pervasive Computing,

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