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Detach the Intricate Network for Analyse Broadcast Protocols in AD HOC Network Using Random Channel Usability

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ABSTRACT

Cognitive radio (CR) is one of today's up-and-coming technologies. It facilitates communication because it creates greater efficiencies in mobile networks. CR allows unlicensed (secondary) users to exploit, in an opportunistic or ad hoc manner, the radio communications spectrum allocated to licensed (primary) users. CR is a promising potential solution to the problems caused by inflexibility in spectrum allocation policy, with attendant spectrum shortage. Due to facility in cognitive radio (CR) ad hoc networks, many unlicensed users may acquire different available channels depending on the locations and traffic of licensed users for efficient broadcast operation. By this strategy, proposed work enables the novel unified analytical model to estimate the efficiency of several protocols. First step is decompose the intricate network into a few simpler networks so that the successful broadcast ratio of these simpler networks is straightforward and also obtain successful broadcast ratio of the overall network can be acquired. These systematic models efficiently analyze all protocol without considering their design and specification.

Keywords: *Cognitive Radio; Broadcast Protocols; Random Channel Usability; Mobile Adhoc Network.*

1.0 Introduction

Mobile computing is human–computer interaction by which a computer is expected to be transported during normal usage. Mobile computing involves mobile communication, mobile hardware, and mobile software. Communication issues include ad hoc and infrastructure networks as well as communication properties, protocols, data formats and concrete technologies. Hardware includes mobile devices or device components. Mobile software deals with the characteristics and requirements of mobile applications.

Mobile Computing is "taking a computer and all necessary files and software out into the field. Mobile computing is any type of computing which use Internet or intranet and respective communications links, as WAN, LAN, WLAN etc. Mobile computers may form wireless or a pioneer.

Wireless data connections used in mobile computing take three general forms so. Cellular data service uses technologies such as GSM, CDMA or GPRS, 3G networks such saw, EDGE or CDMA2000. And more recently 4G networks such as LTE, LTE-Advanced. These networks are usually available within range of commercial towers. Wi-Fi connections offer higher performance, may be either on a private business network or accessed through public hotspots, and have a typical range of 100 feet indoors and up to 1000 feet outdoors.

Satellite Internet access covers areas where cellular and Wi-Fi are not available and may be set up anywhere the user has a line of sight to the satellite's location, which for satellites in geostationary orbit means having an unobstructed view of the southern sky. Some enterprise deployments combine networks from multiple cellular networks or use a mix of cellular, Wi-Fi and satellite.

When using a mix of networks, a mobile virtual private network (mobile VPN) not only handles the security concerns, but also performs the multiple network logins automatically and keeps the application connections alive to prevent crashes or data loss during network transitions or coverage loss.

A wireless ad hoc network (WANET) is a decentralized type of wireless network. The network

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is ad hoc because it does not rely on a preexisting infrastructure, such as routers in wired networks or access points in managed (infrastructure) wireless networks. Instead, each node participates in routing by forwarding data for other nodes, so the determination of which nodes forward data is made dynamically on the basis of network connectivity. In addition to the classic routing, ad hoc networks can use flooding for forwarding data.

An ad hoc network typically refers to any set of networks where all devices have equal status on a network and are free to associate with any other ad hoc network device in link range. Ad hoc network often refers to a mode of operation of IEEE 802.11 wireless networks.

Mobile Ad-hoc Networks (MANET) are created of composite distributed systems which connect wireless nodes. These nodes can generously and dynamically self in mobile network topologies. Since the nodes are mobile, the network topology may change rapidly and unpredictably over time. The network is decentralized, where all network activity including discovering the topology and delivering messages must be executed by the nodes, i.e., routing functionality will be incorporated into mobile nodes. Factors such as variable wireless link quality, propagation path loss, fading, multiuser interference, power expended, and topological changes, become relevant issues. The network should be able to adaptively alter the routing paths to alleviate any of these effects.

2.0 Related Work

Even though the broadcasting issue has been studied extensively in traditional mobile ad hoc networks mobile ad hoc network (MANETs), research on broadcasting in multi-hop CR ad hoc networks is still in its infant stage. The existing works mainly focus on broadcast protocol designs. The performance analysis of these proposed protocols is simulation-based. Thus, the analytical relationship between these proposals and their performance is not known. More importantly, without analytical analysis, the system parameters in the protocols are not designed to achieve the optimal performance. In fact, analytical analysis is beneficial not only for better understanding the nature of a proposed protocol, but also for better designing the system parameters of a protocol to achieve the optimal performance. It can also provide useful insights to guide the future broadcast protocol designs in CR ad hoc networks.

Due to this problem by considering this problem, make an efficient methodology to analyzing the several protocols. A novel unified analytical model is proposed to analyze the broadcast protocols in CR ad hoc networks with any topology. Specifically, in this work propose to decompose an intricate network into several simple networks which are tractable for analysis. Also propose systematic methodologies for such decomposition.

Current research into cognitive radios hopes to improve spectral utilization by allowing users from crowded bands to bleed off into nearby empty bands. In an ideal scenario a spectrum aware cognitive radio is able to sense the local spectrum usage and adapt its own radio parameters accordingly. As an example, consider a personal Wi-Fi network in a crowded New York apartment complex. The number of co-located networks present can easily fill the 2.4 GHz band, in which personal Wi-Fi devices are designed to operate. Instead of adding an additional device to an over-used band, a cognitive radio would be able to sense the over-use of the allocated Wi-Fi spectrum and the underutilization of other nearby spectrum blocks. Once so determined the cognitive radio would operate in the free spectrum, thus more efficiently utilizing the total available spectrum. Examples of spectrum blocks that may be underutilized may include empty broadcast television/radio stations, radio- astronomy blocks, radio-navigation blocks, and others. The advance of cognitive radio and spectrum sensing radios is a high priority for the FCC. The 802.22 draft standard, which is still under review, is the FCC's first foray into cognitive radio and demonstrates their commitment and active interest in this emerging technology.

Cognitive radio network advantages are the use of a cognitive radio network provides a number of advantages when compared to cognitive radios operating purely autonomously:

- Improved spectrum sensing: By using cognitive radio networks, it is possible to gain significant advantages in terms of spectrum sensing. [see later pages in this tutorial].
- Improved coverage: By setting up cognitive radio network, it is possible to relay data from one node to the next. In this way power levels can be reduced and performance maintained.

Hence this novel technique based on the CR ad hoc networks. By estimating the protocol efficiency without considering the specific protocol design helps to carried out effectively. The main works on this methodology are as follows.

First an algorithm for calculating the successful broadcast ratio (i.e., the probability that all nodes in a network successfully receive a broadcast message) is proposed for CR ad hoc networks. The proposed algorithm is a general methodology that can be applied to any broadcast protocol proposed for multi-hop CR ad hoc networks with any topology. Second an algorithm for calculating the average broadcast delay (i.e., the average duration from the moment a broadcast starts to the moment the last node in the network receives the broadcast message) is proposed for CR ad hoc networks under grid topology. Finally the derivation methods of the single-hop performance metrics that means successful broadcast ratio, average broadcast delay, and broadcast collision rate (i.e., the probability that a single-hop broadcast fails due to broadcast collisions), for three different broadcast protocols in CR ad hoc networks under practical scenarios (e.g., no dedicated common control channel exists and the channel information of any other SUs is not known) are proposed.

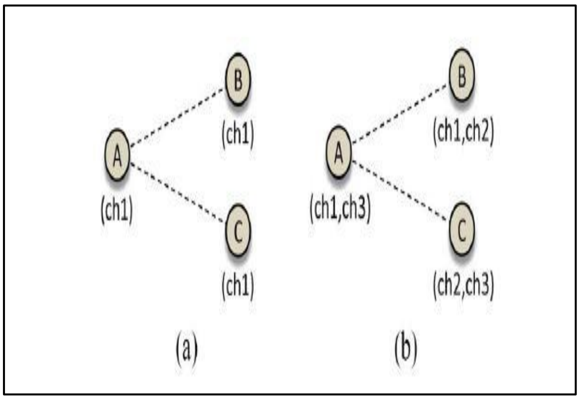
3.0 System Design

In Existing System the Federal Communications Commission (FCC), almost all the radio spectrum for wireless communications has already been allocated. In traditional ad hoc networks, since the spectrum availability is uniform, broadcasts are delivered via a common channel which can be heard by all users in a network. In traditional MANETs exist; there is no analytical work on broadcast protocols in multi hop CR ad hoc networks. The MANET Network, the channel availability is uniform for all nodes. In addition, some exigent data packets such as emergency messages and alarm signals are also delivered as network wide broadcasts. In traditional MANETs, it is always one time slot (i.e.) Sender only needs one time slot to let all its neighboring nodes receive the broadcast message in an error-free environment.

Even though the broadcasting issue has been studied extensively in traditional mobile ad hoc networks (MANETs) research on broadcasting in multi-hop CR ad hoc networks is still in its infant stage. There are a few papers addressing the broadcasting issue in multi-hop CR ad hoc networks. However, these proposals mainly focus on broadcast protocol designs. The performance analysis of these proposed protocols is simulation-based. Thus, the analytical relationship between these proposals and their performance is not known. More importantly, without analytical analysis, the system parameters in these protocols are not designed to achieve the optimal performance. In fact, analytical analysis is beneficial not only for better understanding the nature of a proposed protocol, but also for better designing the system parameters of a protocol to achieve the optimal performance.

It can also provide useful insights to guide the future broadcast protocol designs in CR ad hoc networks. Hence, in this project, to focus on the analytical analysis of broadcast protocols for multi-hop CR ad hoc networks. Although a vast amount of analytical works on broadcast protocols in traditional MANETs exist, currently, there is no analytical work on broadcast protocols in multi-hop CR ad hoc networks. More importantly, all the methods proposed for traditional MANETs cannot be simply applied to multi-hop CR ad hoc networks. This is because that in traditional MANETs, the channel availability is uniform for all nodes. However, in CR ad hoc networks, different secondary users (SUs) may acquire different available channel sets, depending on the locations and traffic of primary users (PUs), as shown in Figure 1. This non-uniform channel availability leads to several significant differences and causes unique challenges when analyzing the performance of broadcast protocols in CR ad hoc networks.

Fig 1: Single-hop broadcast scenario. (a) Traditional ad hoc networks. (b) CR ad hoc networks



3.1 Intrinsic Network and Initial BR Value Setting Phase

For Network formation, each node needs to register their details such as IP address, Location and Available number of channels. After authenticating these details then network is constructed with Specific number of nodes and links and also setting the initial value of Broadcast Ratio for each link.

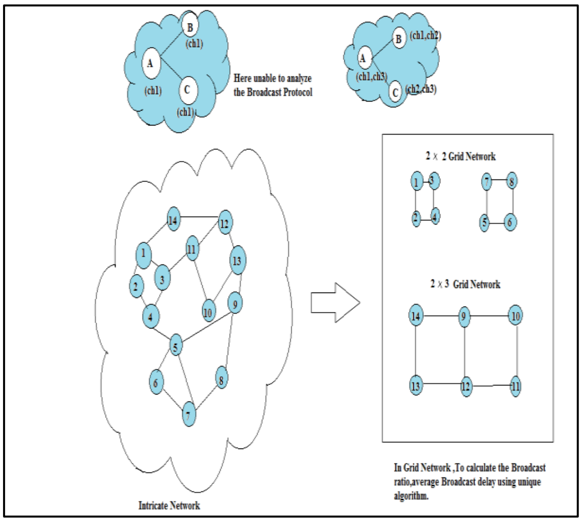
3.2 Updating BR Value for Simple Network

Initially select a link which is one hop distance to server and perform the broadcasting through that link only. Based on the broadcasting result new BR value is calculated. If successful broadcasting occurs then, update BR value otherwise dynamically remove the link.

3.3 Level classification in grid topology

After finding the successful Broadcasting Ratio, then simple Gird network is formed. At this stage, Grid networks are separated in various levels based on hop distance from the server. This helps to find the Broadcast Delay at each level of network.

Fig 2: Architecture Diagram



3.4 Estimate the performance of protocols

By collecting all broadcast delay value at each level, finding the Average Broadcast Delay for the broadcasting protocol. With the help of Broadcast Ratio and Average Broadcast Delay value, evaluate the performance of broadcast protocol.

4.0 Conclusion

A novel unified analytical model is proposed to address the challenges in traditional MANET and analyze the broadcast protocols in CR ad hoc networks with any topology.

Specifically, two algorithms are proposed to calculate the successful broadcast ratio and the average broadcast delay of a broadcast protocol. In our future work analyzing the various broadcast protocol, we provide more approximate value in performance statics.

In this broadcast delay is calculating based on distance from the source and not estimating the delay for the node which is not having path leading. So in future consider that issue, make average delay estimation 99% successful.

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