IPHV2I20014X
International Journal Of Advanced Research and Innovation -Vol.II, Issue .2
ISSN Online: 2319 – 9253
Print: 2319 – 9245

CIVILIZING NETWORK CAPABILITY IN MANET WITH CO-OPERATIVE COMMUNICATIONS

K.Shilpa[1], K.Srinivas[2]

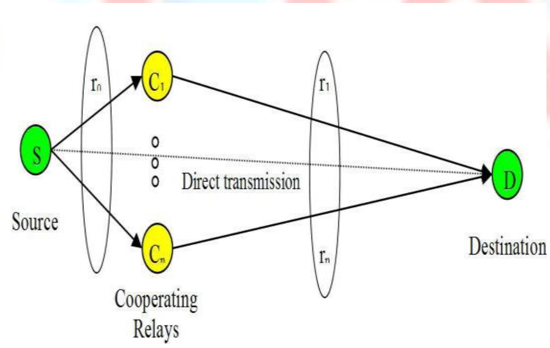
1. M.Tech (CSE) , Dept. of Computer Science & Engineering, SCCE, Karimnagar.
2. Associate Professor (Ph.D), Dept. of Computer Science & Engineering, SCCE, Karimnagar.

ABSTRACT:

Wireless networks are almost saturated in all domains. The wireless networks are create, manage the network on a point-to-point basis. But it has lot of drawbacks are to be eliminated through cooperative communication. This communication method will focuses on physical layer issues. Now we focused on network layer issues like topology, routing , bandwidth etc. we suppose capacity optimized cooperative topology control scheme to achieve network layer issues and to improve communication issues in MANETS. In this mechanism both layers like upper layer called Network layer and physical layer cooperative communication improved effectively.

Keywords: ***Network channel, Cooperative Communication, MANETS, topology, COCO model.***

ARCHITECTURE:



TOPOLOGY

Wireless network that transmits from computer to computer. Instead of using a central base station to which all computers must forward traffic unrelated to its own use, the protocols and their abilities change its links to other devices frequently. Each must forward traffic unrelated to its own use, and therefore be a router. The primary challenge in building a MANET is equipping each device to continuously maintain the information required to properly route traffic. Such networks may operate by themselves or may be connected to the larger Internet.

MANETs are a kind of wireless ad hoc networks that usually has a routable networking environment on top of a Link Layer ad hoc network.

The growth of laptops and 802.11/Wi-Fi wireless networking have made MANETs a popular research topic since the mid 1990s. Many academic papers evaluate protocols and their abilities, assuming varying degrees of mobility within a bounded space, usually with all nodes within a few hops of each other. Different protocols are then evaluated based on measure such as the packet drop rate, the overhead introduced by the routing protocol, end-to-end packet delays, network throughput etc

Types of MANET

Vehicular Ad-hoc Networks (VANETs) are used for communication among vehicles and between vehicles and roadside equipment Internet Based Mobile Ad-hoc Networks (iMANET) are ad-hoc networks that link mobile nodes and fixed Internet-gateway nodes. In such type of networks normal adhoc routing algorithms don't apply directly.

Data Monitoring and Mining Using MANETs

MANETS can be used for facilitating the collection of sensor data for data mining for a variety of applications such as air pollution monitoring and different types of architectures can be used for such applications.[2] It should be noted that a key characteristic of such applications is that nearby sensor nodes monitoring an environmental feature typically register similar values. This kind ofdata redundancy due to the spatial correlation between sensor observations inspires the techniques for in-network data aggregation and mining. By measuring the spatial correlation between data sampled by different sensors, a wide class of specialized algorithms can be developed to develop more efficient spatial data mining algorithms as well as more efficient routing strategies.[3] Also researchers have developed performance models[4] for MANET by applying Queuing Theory.

Security of MANETs

A lot of research was done in the past but the most significant contributions were the PGP (Pretty Good Privacy) and the trust based security but none of the protocols made a decent tradeoff between security and performance. In an attempt to enhance security in MANETs many researchers have suggested and implemented new improvements to the protocols and some of them have suggested new protocols.

Classification of Attacks on MANETs

These attacks on MANETs challenge the mobile infrastructure in which nodes can join and leave easily with dynamics requests without a static path of routing. Schematics of various attacks as described by Al-Shakib Khan [1] on individual layer are as under:

Application Layer: Malicious code, Repudiation, Transport Layer: Session hijacking, Flooding Network Layer: Sybil, Flooding, Black Hole, Grey Hole. Worm Hole, Link Spoofing, Link Withholding, Location disclosure etc.

Data Link/MAC: Malicious Behavior, Selfish Behavior, Active, Passive, Internal External Physical: Interference, Traffic Jamming, Eavesdropping

CAPACITY-OPTIMIZED

COOPERATIVE (COCO):A Capacity-Optimized Cooperative (COCO) topology control scheme to improve the network capacity in MANETs by jointly optimizing transmission mode selection, relay node selection, and interference control in MANETs with cooperative communications through simulations, we show that physical layer cooperative communications have significant impacts on the network capacity, and the proposed topology control scheme can substantially improve the network capacity in MANETs with cooperative communications.

International Journal Of Advanced Research and Innovation -Vol.II, Issue .2
ISSN Online: 2319 – 9253
Print: 2319 – 9245

List of ad hoc routing protocols

An **ad-hoc routing protocol** is a convention, or standard, that controls how nodes decide which way to route packets between computing devices in a mobile ad hoc network .

In *ad-hoc networks*, nodes are not familiar with the topology of their networks. Instead, they have to discover it. The basic idea is that a new node may announce its presence and should listen for announcements broadcast by its neighbors. Each node learns about nodes nearby and how to reach them, and may announce that it, too, can reach them.

Note that in a wider sense, **ad hoc protocol** can also be used literally, that is, to mean an improvised and often impromptu protocol established for a specific purpose.

The following is a list of some ad hoc network routing protocols.

Table-driven (Pro-active) routing

This type of protocols maintains fresh lists of destinations and their routes by periodically distributing routing tables throughout the network. The main disadvantages of such algorithms are:

1. Respective amount of data for maintenance.
2. Slow reaction on restructuring and failures.

Examples of pro-active algorithms are:

- B.A.T.M.A.N. – Better approach to mobile adhoc networking. RFC Draft: http://tools.ietf.org/html/draft-wunderlich-openmesh-manet-routing-00
- OLSR Optimized Link State Routing Protocol RFC 3626: http://tools.ietf.org/html/rfc3626

Reactive (on-demand) routing

This type of protocols finds a route on demand by flooding the network with Route Request packets. The main disadvantages of such algorithms are:

1. High latency time in route finding.
2. Excessive flooding can lead to network clogging.

Flow-oriented routing

This type of protocols finds a route on demand by following present flows. One option is to unicast consecutively when forwarding data while promoting a new link. The main disadvantages of such algorithms are:

1. Takes long time when exploring new routes without a prior knowledge.
2. May refer to entitative existing traffic to compensate for missing knowledge on routes.

Hybrid (both pro-active and reactive) routing

This type of protocols combines the advantages of proactive and of reactive routing. The routing is initially established with some proactively prospected routes and then serves the demand from additionally activated nodes through reactive flooding. The choice for one or the other method requires predetermination for typical cases. The main disadvantages of such algorithms are:

1. Advantage depends on number of Mathavan nodes activated.

2. Reaction to traffic demand depends on gradient of traffic volume.

Hierarchical Routing Protocols

With this type of protocols the choice of proactive and of reactive routing depends on the hierarchic level where a node resides. The routing is initially established with some proactively prospected routes and then serves the demand from additionally activated nodes through reactive flooding on the lower levels. The choice for one or the other method requires proper attributation for respective levels. The main disadvantages of such algorithms are:

1. Advantage depends on depth of nesting and addressing scheme.
2. Reaction to traffic demand depends on meshing parameters.

EXISTING SYSTEM:

Most existing works are focused on link-level physical layer issues, such as outage probability and outage capacity. Consequently, the impacts of cooperative communications on network-level upper layer issues, such as topology control, routing and network capacity, are largely ignored. Indeed, most of current works on wireless networks attempt to create, adapt, and manage a network on a maze of point-to-point non-cooperative wireless links. Such architectures can be seen as complex networks of simple links.

Disadvantages:

1. Low Network Capacity.
2. Communications are focused on physical layer issues, such as decreasing outage probability and increasing outage capacity, which are only link-wide metrics.

PROPOSED SYSTEM:

We propose a Capacity-Optimized Cooperative (COCO) topology control scheme to improve the network capacity in MANETs by jointly considering both upper layer network capacity and physical layer cooperative communications. Through simulations, we show that physical layer cooperative communications have significant impacts on the network capacity, and the proposed topology control scheme can substantially improve the network capacity in MANETs with cooperative communications.

Advantages:

1. Improve the network capacity in MANETs.
2. Dynamic traffic pattern and dynamic network without a fixed infrastructure.
3. There are a source, a destination and several relay nodes.
4. Cooperation can benefit not only the physical layer, but the whole network in many different aspects.

Approaches

1. Transmission in MANETs
2. Network Constraints
3. Relaying Strategies
4. Cooperative Communications
5. Multi-hop Transmission

1. TRANSMISSION IN MANETS:

With physical layer cooperative communications, there are three transmissions manners in MANETs: direct transmissions, multi-hop transmissions and cooperative transmissions. Direct transmissions and multi-hop transmissions can be regarded as special types of cooperative transmissions. A direct transmission utilizes no relays while a multi-hop transmission does not combine signals at the destination. The cooperative channel is a virtual multiple-input single-output (MISO) channel, where spatially distributed nodes are coordinated to form a virtual antenna to emulate multi antenna transceivers.

2. NETWORK CONSTRAINTS:

Two constraint conditions need to be taken into consideration in the proposed COCO topology control scheme. One *is network connectivity*, which is the basic requirement in topology control. The *end-to-end network connectivity* is guaranteed via a hop-by-hop manner in the objective function. Every node is in charge of the connections to all its neighbors. If all the neighbor connections are guaranteed, the end-to-end connectivity in the whole network can be preserved. The other aspect that determines network capacity is the path length. An end-to-end transmission that traverses more hops will import more data packets into the network. Although path length is mainly determined by routing, COCO limits dividing a long link into too many hops locally. The limitation is two hops due to the fact that only two-hop relaying are adopted.

3. RELAYING STRATEGIES:

- **Amplify-and-forward**
- **Decode-and-forward**

In amplify-and-forward, the relay nodes simply boost the energy of the signal received from the sender and retransmit it to the receiver. In decode-and forward, the relay nodes will perform physical-layer decoding and then forward the decoding result to the destinations. If multiple nodes are available for cooperation, their antennas can employ a space-time code in transmitting the relay signals. It is shown that cooperation at the physical layer can achieve full levels of diversity similar to a MIMO system, and hence can reduce the interference and increase the connectivity of wireless networks.

4. COOPERATIVE COMMUNICATION

Cooperative transmissions via a cooperative diversity occupying two consecutive slots the destination combines the two signals from the source and the relay to decode the information. Cooperative communications are due to the increased understanding of the benefits of multiple antenna systems. Although multiple-input multiple-output (MIMO) systems have been widely acknowledged, it is difficult for some wireless mobile devices to support multiple antennas due to the size and cost constraints. Recent studies show that cooperative communications allow single antenna devices to work together to exploit the spatial diversity and reap the benefits of MIMO systems such as resistance to fading, high throughput, low transmitted power, and resilient networks.

5. MULTI-HOP TRANSMISSION:

Multi-hop transmission can be illustrated using two-hop transmission. When two-hop transmission is used, two time slots are consumed. In the first slot, messages are transmitted from the source to the relay, and the messages will be forwarded to the destination in the second slot. The outage capacity of this two-hop transmission can be derived considering the outage of each hop transmission.

CONCLUSION

The existing communication issues of cooperative communication improved mechanism through COCO topology with upper layer enhancements like network communication; topology and routing system are improved.

The physical layer significance issues are considered and network layer enhancements are adapted to the proposed model. By this Coco model improves network capacity and performance in mobile Ad hoc networks.

REFERENCES

[1] J. Laneman, D. Tse, and G. Wornell, "Cooperative Diversityin Wireless Networks: Efficient protocols and Outage Behavior," *IEEE Trans. Info. Theory*, vol. 50, no. 12, 2004, pp. 3062–80.

[2] P. H. J. Chong *et al.*, "Technologies in Multihop Cellular Network," *IEEE Commun. Mag.*, vol. 45, Sept. 2007, pp. 64–65.

[3] K. Woradit *et al.*, "Outage Behavior of Selective Relaying Schemes," *IEEE Trans. Wireless Commun.*, vol. 8, no. 8, 2009, pp. 3890–95.

[4] Y. Wei, F. R. Yu, and M. Song, "Distributed OptimalRelay Selection in Wireless Cooperative Networks with Finite-State Markov Channels," *IEEE Trans. Vehic. Tech.*, vol. 59, June 2010, pp. 2149–58.

[5] Q. Guan *et al.*, "Capacity-Optimized Topology Control for MANETs with Cooperative Communications," *IEEE Trans. Wireless Commun.*, vol. 10, July 2011, pp 2162–70.

[6] P. Santi, "Topology Control in Wireless Ad Hoc and Sensor Networks," *ACM Computing Surveys*, vol. 37, no. 2, 2005, pp. 164–94.

[7] T. Cover and A. E. Gamal, "Capacity Theorems for the Relay Channel," *IEEE Trans. Info. Theory*, vol. 25, Sept. 1979, pp. 572–84.

[8] Q. Guan *et al.*, "Impact of Topology Control on Capacity of Wireless Ad Hoc Networks," *Proc. IEEE ICCS*, Guangzhou, P. R. China, Nov. 2008.

[9] P. Gupta and P. Kumar, "The Capacity of Wireless Networks," *IEEE Trans. Info. Theory*, vol. 46, no. 2, 2000, pp. 388–404.

[10] M. Burkhart *et al.*, "Does Topology Control Reduce Interference?," *Proc. 5th ACM Int'l. Symp. Mobile Ad Hoc Networking and Computing*, Tokyo, Japan, May 2004, pp. 9–19.