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Reduce Packet Delay Using Scheduling Algorithm In Manet

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ABSTRACT

***M**OBILE ad hoc network (MANET), a flexible and self-autonomous wireless network architecture. It is very promising to find many important applications in the daily information exchange, disaster relief, military troop communication,etc. It illustrates the study of exact per node throughput capacity of a MANET, where the transmission power of each node can be controlled to adapt to a specified transmission range and a generalized two-hop relay with limited packet redundancy is adopted for packet routing. Based on the concept of automatic feedback control and the Markov chain model, it represents a general theoretical framework to fully depict the complicated packet delivery process in the challenging MANET. With the help of delay scheduling algorithm, the exact per node throughput capacity for a fixed setting of both transmission range and packet redundancy can be derived. Based on the new throughput result, it is explored that the optimal throughput capacity for any packet redundancy but a fixed transmission range is determined and the corresponding optimum setting of packet redundancy to achieve it is also determined. The result helps us to understand how such optimal capacity varies with transmission range to find the maximum possible throughput capacity of such a network for any packet redundancy and transmission range. Results show that increasing the transmission power of the nodes improves the capacity, which is the same as that proved in fixed networks. The proposed delay scheduling algorithm minimizes the packet redundancy that was a concern in the existing methodology.*

Index Terms- *Capacity, Mobile ad hoc netwoks, Power control,Packet redundancy*

1 INTRODUCTION

Wireless networks are generally implemented with remote information transmission system and it associated with a telecommunications network whose interconnections between nodes is implemented without the use of wires.

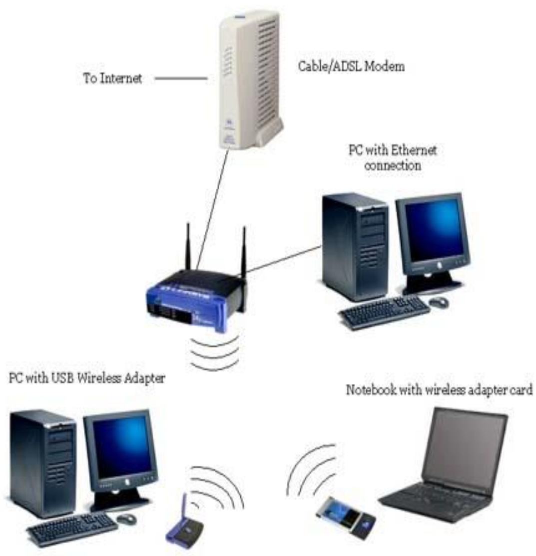

Fig: 1: Wireless Network

The wireless network is broadly classified into two types:

- Infrastructure Networks
- Infrastructureless Networks

Infrastructure network consists of a network with fixed and wired gateways. A mobile host communicates with a bridge in the network within its communication radius. The mobile unit can move geographically while it is communicating. When it goes out of range of one base station, it connects with new base station and start communicating through it. This is called handoff.

In Infrastructure less Networks or Wireless ad hoc networks can be connected dynamically in an network. Nodes in network behave as routers and perform discovery and maintenance of routes to other nodes in the network.

Wired networks also called Ethernet networks are the most common type of local area network (LAN) technology. A wired network is simply a collection of two or more computers, printers, and

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other devices linked by Ethernet cables.Wired networks is also use as other wired and wireless networks. Connect a computer to a network use Ethernet cable, it must have an Ethernet adapter (also NIC). Ethernet adapters installed as internal in computer or external housed. A built-in Ethernet adapter port eliminates the need of separate adapter. Three type of basic network topologies are used mostly.

Wireless networks are use high-frequency radio waves rather than wires to communication between the nodes in the network. Organizations are expand their existing wired network or change to completely wireless networks. Wireless network allows devices to shared without networking cable with increasing of mobility nodes but its range is reduced. Two main types of wireless networking are peer to peer or ad-hoc and infrastructure network. Consists a number of computers with wireless networking interface card in ad-hoc wireless network. Each computer can transmit directly to all other wireless enabled computers. It can share files and printer, but it cannot access wired LAN resources.

An infrastructure wireless network consists of an access point or a base station. Access point acts like a hub and it provides the connection between the wireless computers. It make connection or bridge between the wireless LAN to a wired LAN and allow the wireless computer access to LAN resources.

The main contributions of this paper are summarized as follows:

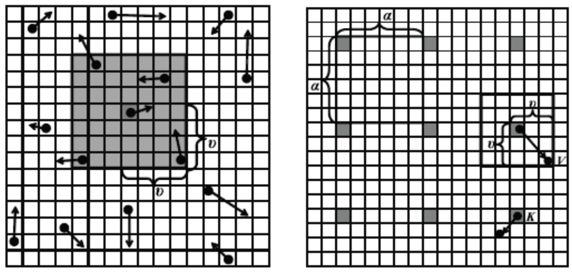
- By modeling the packet dispatching at the source and the packet receiving at the destination as Markov chains and applying the concept of automatic feedback control to characterize the service rate adaptation between the source and the destination,then develop a general theoretical framework to depict the complicated packet delivery process in the challenging MANET.

- With the help of the theoretical framework, we then develop the exact per node throughput capacity for any specified setting of transmission range and packet redundancy limit.

2 SYSTEM ASSUMPTIONS AND DEFINITIONS

2.1 Network Model

It consider a two-dimensional cell-partitioned with n independent mobile nodes.Time is slotted in network and impact of transmission range on per node throughput capacity.Assume a limited channel bandwidth such that total number of bits that can transmitted per time slot.During each time slot each node has knowledge about the location information of node.The motivations of network model are establish a mapping from the node behavior(like node movements and data transmissions) in a network. Such mapping can enable a flexible control of both node moving velocity and transmission range by accordingly adjusting the cell size.It also enables closed-form expressions to be derived for various performance metrics and is very helpful for network performance modeling and analysis.



(a) Cell-partitioned network. (b) An illustration of transmission-group with $\alpha = 6$.

2.2 Mobility Model

In mobility model,node uniformly placed in one of the n cells,at beginning of time slot t=1.The node independently and random select s a cell among n cells with equal propability of 1/n.Node movement are also independent from time slot to time slot,the node position are reshuffled at each time slot.Node takes time to move from one cell to another cell depends on distance between teo cell and node moving velocity.Deriving closed-form expression for per node throughput capacity under general setting of transmission range and packet redundancy.

2.3 Communication Model

To account for the interference among simultaneous transmissions,the protocol model introduced to denote the position of the transmitter and receiver.To explore the impact of power control on per node throughput capacity with vertical and horizontal distances.

2.4 Traffic Model

The packet arrival process at each node is independent of the mobility process and packet arrive at the beginning of time slot.Purpose of throughput capacity analysis, it assume that no lifetime is associated with each packet and buffer size at each node is large enough such that the packet loss due to buffer overflow will never happen.

3 TRANSMISSION SCHEDULING AND ROUTING

3.1 Transmission –Group Based Scheduling

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In Transmission group based scheduling use protocol interference model to perform multiple links simultaneously transmit packets. A transmission group is a subset of cells, it have a vertical and horizontal distance of some multiple cells.

3.2 2HR-f Routing Scheme

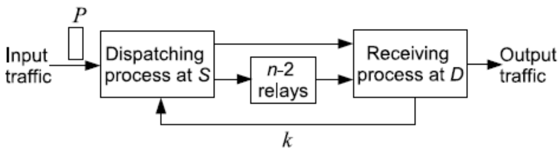
In two hop routing scheme with f-cast consider each packet waiting at source is delivered to at most f distinct relay nodes and packet should be received in order at destination. The designing of relay algorithm with packet redundancy is complication and there may be exist residual packets(copies).Residual packets create exess congestion, waste network buffer. For this issue, some approaches have been proposed such as Time-To-Live(TTL) based mechanism and broadcasting based feedback mechanism. Sequence based mechanism use source S labels each packet P of tagged flow with sequence number SN(P),destination D maintains a request number RN(D) to indicate sequence number of packet. It efficiently update buffer by deleting all packets with sequence number less than the current request number.

4 EXISTING SYSTEM

4.1 Per Node Throughput capacity

Calculating per node throughput capacity for the tagged flow, if current packet P is head-of-line packet at local queue of S,D receives the last packet before P and k copies of P in network. The two cases are used:

- If $E\{XS(k)\} \leq E\{XD(k)\}$, the copy dispatching of *P* at *S* is faster than the packet receiving at *D* and it have $k\_ \geq k$ for packet *P_* in the average case.
- If $E\{XS(k)\} \geq E\{XD(k)\}$, the packet receiving of *P* at *D* is faster than the copy dispatching at *S* and it have $k\_ \leq k$ for packet *P_* in the average case.



4.2 Model Validation

To validate the per node throughput capacity,implement the simulator in two types of model.

4.3 Random Walk Model

At the beginning of each time slot, each node independently makes a decision regarding its mobility action, either staying inside its current cell or moving to one of its eight adjacent cells. Each action happens with the same probability of 1/9.

4.4 Random Waypoint Model:

At the beginning of each time slot, each node independently and randomly generates a two dimensional vector $v = [vx, vy]$, where the values of vx and vy are uniformly drawn from $[1/\sqrt{n}, 3/\sqrt{n}]$. The node then moves a distance of vx along the horizontal direction and a distance of vy along the vertical direction. The pause time is zero.

5 PROPOSED SYSTEM

5.1 Methodology

1) Each node turns on its radio during its own wakeup slot and sleeps during all the other wakeup slots.

2) Each sender randomly picks up a data slot and announces the data slot number along with the receiver's node identifier via a "WAKEUP" message in the receiver's wakeup slot.

3) Upon reception of a "WAKEUP" message, a node checks the embedded node identifier in the "WAKEUP" message. If it is the intended receiver, then the node turns on its radio for the incoming data packet in the specified data slot; otherwise, it just sleeps. If a broadcast address is included in the "WAKEUP" message, then all nodes receiving this message should wake up in the specified data slot simultaneously.

4) If any collision occurs in a node's wakeup slot, then the node turns on its radio for a duration long enough to receive an RTS packet at the beginning of each data slot for a possible incoming data packet. If the node learns that it is the intended receiver from the received RTS message, then it keeps the radio on to receive the data packet; otherwise, it returns to sleep in the remaining period of the data slot. This way, a node can minimize the extra energy cost under such a situation.

5) In each data slot, unicast data transmission must follow the well-known RTS/CTS/DATA/ACK scheme in IEEE802.11 to avoid the "hidden terminal problem," since two senders may choose the same data slot to send data to their receivers at the same time, and the transmissions happen to be in a common interference range.

1. HMAC also provides support for one-hop broadcast operation. When a node has data to broadcast, it sends out a "WAKEUP"

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message containing a broadcast address and a data slot in each wakeup slot.

2. After receiving such "WAKEUP" messages, all neighbors will wake up in the same data slot to receive the broadcast message.

6 CONCLUSION

The general node transmission range control and packet redundancy control to achive exact per node throughput. The result shows that for the network scenarios considered in this system, it may not be always true that adopting the minimum transmission range can achieve the maximum per node throughput capacity energy consumption and frame length (or delay) needs to be investigated. Also, the current work does not impose a limit on the frame length; hence, there are no assignment failures during the execution of the proposed scheduling algorithm.

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