COLLISION DETECTION IN MAC LAYER USING OPPORTUNISTIC CONCURRENCY

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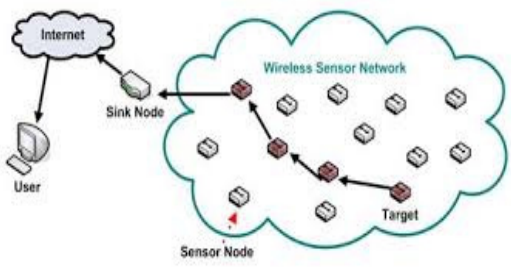
Abstract Opportunistic Concurrency (OPC) a new MAC layer scheme, which enables sensor node to capture the opportunistic concurrency and carry out parallel transmissions instead of always waiting for a clear channel. To overcome the delay of OPC, Time Division Multiple Access is used. In order to increase the amount of data, TDMA divides each cellular channel into three time slots.

Index Terms- mac layer, cellular channel, waiting time reduced, parallel transmissions, clear channel, opc, sensor node.

I. INTRODUCTION

A local area network that transmits over the air with an unlicensed frequency in the range of 2.4GHz band. A wireless LAN does not require lining up devices for line of sight transmission.



Example of Wireless Sensor Network

Wireless access points (base stations) are connected to an Ethernet hub it is used to transmit a radio frequency over an area of several hundred to a thousand feet which can penetrate walls and other non-metal barriers. Roaming users can be handed off from one access point to another like a mobile phone system. Laptops use wireless network cards that plug into an existing PCMCIA slot or that are self contained on PC cards, while stand-alone desktops and servers use plug-in cards (ISA, PCI, etc.).

II DESIGNING CSMA-MAC PROTOCOLS

MAC data communication protocol is a sub layer of the data link layer. The MAC sub layer provides addressing and channel access control mechanisms make it possible for several terminals or network nodes to communicate within a multiple access network that incorporates a shared medium.

E.g. Ethernet network

The MAC sub layer acts as an interface between logical link control sub layer and the networks physical layer.

Maca-p: a mac for concurrent transmissions in multi-hop wireless networks

Design and performance study of MACA-P, RTS/CTS based on the mac protocol that enables simultaneous transmissions in multihop ad-hoc wireless networks. The algorithm is used to MACA-P technique. The merits are avoiding collisions and improving system throughputs. And a challenge of the data transmission is delayed.

X-MAC: A short preamble MAC protocol for duty-cycled wireless sensor networks

X-MAC, a low power MAC protocol for wireless sensor networks (WSNs) was presented to transmit short preambles to the Receiver node. The algorithm is used to adaptive algorithm. The merits are reduces energy usage at both the transmitter and receiver. The challenge of the energy consumption is high.

RMAC: A routing-enhanced duty cycle mac protocol for wireless sensor networks

An RMAC protocol is proposed to meet the demanding energy requirements of wireless sensor networks and to handle traffic contention. The algorithm is used to data fusion algorithm. And the merits are reducing the contention in the area quickly. The challenge of the end to end delivery latency and poor traffic contention handling.

Auto MAC: Rate less Wireless Concurrent Medium Access

Auto MAC provides a rate less MAC design that systematically exploits interference and consistently achieves good performance across both uplink and downlink scenarios. The algorithm is used to Auto Mac's decoding algorithm. The merits are .Auto MAC achieves a median throughput that is 35% better than the omniscient. The challenge of the existing set of clients continues to transmit concurrently after receiving the ACK/NACK packet.

Walking down the stairs: Efficient collision resolution for wireless sensor networks

STAIRS, a time and energy efficient collision resolution mechanism for wireless sensor networks is presented. The algorithm is used to Change Point Detection algorithm. The merits are Improves the network performance in terms of both latency and throughput. The challenges of the existing approaches of collision resolution have drawbacks with respect to energy efficiency and processing latency.

Objective of the project is Carrier Sense Multiple Access with Collision Detection (CSMA/CD) in the LAN access method used in Ethernet. When a device wants to gain access to the network, it checks to see if the network is free. If the network is not free, the device waits a random amount of time before retrying. Or else, if the network is free, the two devices access the line exactly at the same time, leading to collide. When the collision is detected, they both back off and wait a random amount of time before retrying.

Advantages

- Reliable; Collisions are detected and packets are re-sent, so no data is lost.
- Relatively fast; a computer does not have to wait its "turn" to transmit data.
- It reduces the chance of collision because the stations wait a random amount of time. It is unlikely that two or more stations will wait for same amount of time and will retransmit at the same time.
- It reduces the chance of collision and improves the efficiency of the network.

Challenge

- Computation time is higher.
- Attack cannot be found easily.
- The traffic occurred in the channel is more will sending nodes.

MODULES

Sending Preambles

This module helps in transferring information to Receiver node by sending current IP address of the system. File need to be send will have to give IP address and files are send from sender to receiver system.

Concurrency Control Algorithm

This module helps in current local concurrency map, a node can decide whether the channel is fit for transmission or not. If carrier sense detects that the channel is clear, the transmission should be allowed. Otherwise, according to the concurrency map and SINR condition, a node can analyze whether the packet concurrency will occur or not. If the SINR requirement is satisfied, the sender launches the transmission instead of making way for the interference.

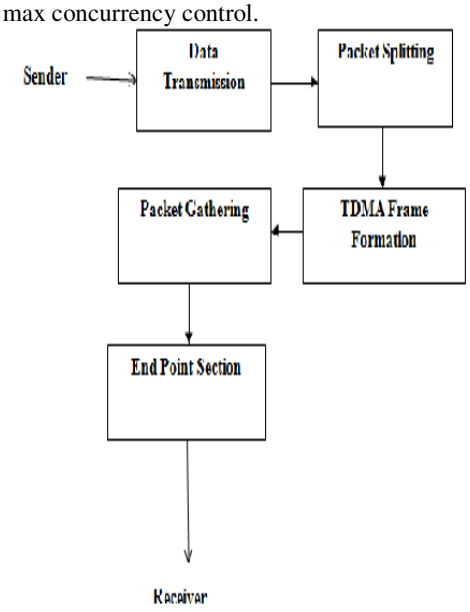
Receiving Information

If any alert message is received due to some changes in packet, sender stops delivering packet to the network. This helps in building the secure process in the network, the packet is sent to the Receiver node successfully.

Here after packet matching if the unwanted code found in the network it will stop the transferring the packets to the Receiver node. Doing so only the particular system knows the packet has unwanted code in the network. So broadcast message ("Alert") is given to the system connected in the Network via LAN.

Calculation of Throughput

This throughput map can be used to display the performance of throughput (i.e., the average number of successful transmissions per unit time) it presents the average throughput in different network scales of nodes it presents the average throughput with varying data rates. This chat presents the average throughput under different max concurrency control.



III RELATED WORKS

PROPOSED SYSTEM:

Time **D**ivision **M**ultiple **A**ccess(TDMA), a digital wireless transmission technique. TDMA allocates each user a different time slot on a given frequency. TDMA divides each cellular channel into three time slots in order to increase the amount of data that can be carried. In addition to the above mentioned TDMA technique we employ OPC technique in this project.

Advantages of TDMA:

- Energy saving for sending and receiving data in the WSN, using TDMA based techniques
- Throughput increasing when traffic is high.
- Supports cross layer.
- End to end timely data delivery and reliability guaranteed.

Modules

Data transmission
Packet splitting
TDMA Frame formation
Packet gathering
End point Section

Data Transmission

- Data which are to be send must be selected.
- Data analyzing includes analyzing of length of the data, data content, transmitting time required for the data to be transmitted are done in prior.
- The IP address of selected data is forwarded to the destination node through TDMA frames.

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PACKET SPLITTING

- Data which are selected in the previous section are splitter into smaller data packets for easier transmission and also to avoid hacking.
- Packet splitting must be based on, node capacity which are involved in the routing path and length of the entire file.
- Select a file to be transmitted. The selected file must be verified for the data length and capacity. TDMA decides the correct routing path with active nodes. Data packets are transmitted within the TDMA frame. At the destination data packets are gathered and reach the receiver section.

TDMA FRAME FORMATION

- Time division multiple access technique is implemented to decide the routing path for data transmission
- During TDMA implementation, each node gets a slot in which it sends its data packets to the channel.
- TDMA frames are formed for transmitting data packets and these frames detect the node capacity before transmitting.

PACKET GATHERING

- While receiving data, each data packet is combined at the receiver section to form the entire file.
- Since data is transmitted as packets, it is essential to form the entire transmitted file

END POINT SECTION

- At the end point section receiver verifies the received data Ip address and if it the correct one file is received at the destination point.

CHALLENGE OF TDMA

- Supports small number of nodes, maximum allowed number of nodes is 25.

IV. RESULT AND DISCUSSION

OPC needs 5% more transmissions. It is easy to understand: 1) encourage the nodes to create transmission concurrency only within the local interference knowledge, so hidden terminal problem is out of the consideration; 2) the interference may not correctly estimated.

TDMA technique can be employed in our future work. **T**ime **D**ivision **M**ultiple **A**ccess (TDMA) is a digital wireless transmission technique allocates each user a different time slot on a given frequency.

V. CONCLUSION

OPC is an assistant component that helps current MAC protocol make transmission decisions to improve network performance. Decision making scheme decides the routing path on which the packet can be transmitted concurrently based on a local concurrency map, even though the channel is detected as unclear. TDMA divides each cellular channel into three time slots in order to increase the amount of data that can be carried. The aim is coming up with another version of TDMAC which will assign slots dynamically so as to be fit for applications in which sensor nodes‘.

VII REFERENCES

[1] Arup Acharya, Archan Misra, and Sorav Bansal. (2003),’ Maca-p: a mac for concurrent transmissions in multi-hop wireless networks’, In Proceedings of the IEEE PerCom.

[2] Buettner M., Yee G.V., Anderson E. and Han R. (2006),’ X-MAC: a short preamble MAC protocol for duty-cycled wireless sensor networks’, In Proceedings of ACM SenSys, Boulder, Colorado, USA.

[3] Chipcon cc2420 radios. http://www.ti.com/product/cc2420.

[4] Du S., Saha A.K., and Johnson D.B. (2007),’ RMAC: A routing-enhanced duty cyclemac protocol for wireless sensor networks’, In Proceedings of IEEEINFOCOM, Anchorage, Alaska, USA.

[5] Gnawali O., Fonseca R., Jamieson K., Moss D., and Levis P.(2009),’ Collection tree protocol’, In Proceedings of ACM SenSys, Berkeley, California.

[6] Gollakota S., and Katabi D. (2008),’ Zigzag decoding: combating hidden terminals in wireless networks’, ACM SIGCOMM Computer Communication Review, 38(4):159–170.

[7] Gudipati A., and Katti S. (2011),’ Strider: Automatic rate adaptation and collision handling’ In Proceedings of ACM SigComm, Toronto, Ontario, Canada.

[8] Gudipati A., Pereira S., and Katti S. (2012),’ Auto MAC: Rate less Wireless Concurrent Medium Access’, In

Proceedings of ACM MobiCom, Istanbul, Turkey.

[9] Halperin D., Ammer J., Anderson T., and Wetherall D. (2007),' Interference cancellation: Better receivers for a new wireless mac', In Hot nets.

[10] Halperin D., Anderson T., and Wetherall D. (2008),' taking the sting out of carrier sense: interference cancellation for wireless LANs', In Proceedings of ACM MobiCom, San Francisco, California, USA.