

Optimal Scheduling Based On Instance Niche For Channel Assignment In Ad-Hoc Network.

Dr.D.Arivazhagan¹,D.Helen²

¹Hod,Department of Information Technology,AMET University,Chennai.

²ResearchScholar,Department of Information Technology,AMET University,Chennai.

ABSTRACT

In ad-hoc network nodes are connected instantly without any pre-established arrangement. Due to the dynamic changing topology, allocating channel for the ad-hoc network is an inspiring task. The collision may happen to access the channel during the node communication. This collision may degrade the network performance and nodes throughput. There is an essential need for an effective channel allocation technique to avoid the collision in the network. The proposed paper, use scheduling mechanism to access the channel based on time slots in the network frame. Scheduling based channel access may reduce the interference among the nodes in the network. Thus the 85% of the collision can be reduced by scheduling the channel for network communication. The throughput increased to 80% and delay may reduce to 3.47μs.

Keywords: topology, channel, collision, scheduling, interference.

INTRODUCTION

The nodes in the ad-hoc network need to access the channel based on the schedule/contention based technique. The ad-hoc network is easy to install [7]. The ad-hoc network is distributed and multi-hop [9]. The IEEE 802.11(b) uses the Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA) technique for scheduling [4]. The Collision Avoidance structure makes the ad-hoc network as flexible by reducing collisions during communication. The collision avoidance method cannot able to fulfill the parameter near-far problem [7], fading and channel assignment [5]. Scheduling technique use to overcome the interference during the channel access. Generally the channel access may be done in two ways, the first one is scheduling mechanism, this mechanism is based on pre-established technique. Example Time Division Multiple Access (TDMA) [9]. In second one the channels are accessed randomly as a result the collision may occur. The scheduling technique has been studied in [3,4] these papers provide approximate solutions. The collision in channel access may be overcome by implementing collision resolution protocol [2]. The researcher try to improve the use of spectrum in WLANs to avoid the network collision. Accessing the channel based on scheduling mechanism provide some advantages they are, 1) enhance the channel utilization 2) provide scalable network. The proposed paper defines the scheduling method based on time during the channel access [11].

PROBLEM FORMULATION

The channel assignment is one of the serious problems for ad-hoc network. The existing mechanism uses maximum number of slots for communication. Thus using maximum slots increase the network size and overhead may ensue. Implementing number of time slots may enhance the maximum execution time. In previous work they use maximum number of slots for message transmission. As a result overload occurs in network.

METHODOLOGY

NETWORK CREATION

The network is denoted by a graph $G = (V, E)$ where V is the set of nodes, and E is the set of links. $E = V \times V$ is a pair of link between the nodes. The link (u, v) established within the particular transmission range, so the communication occurs via common channel. The neighbor node i is defined as N_i^1 . Thus the neighbor information of node i use the union operator to know its presence of neighbor node in distinct hop communication. It is equal to,

$$N_i^1 \cup \left(\bigcup_{j \in N_i^1} N_j^1 \right)$$

LIMITING THE FRAME SIZE

Defining maximum number of subframe will work effectively during the initial execution. If the frame size increase to large then delay may occur to access the slot for a particular node. According to the paper the maximum number of slots is conflicting to $n + 1$.

PROPOSED METHOD

The paper discuss to access the channel based on individual time slot in the frame. The time slot provides least interval time for transmission/reception. The source node transmits the data to destination node based on the number of slots in each frame. The source node transmits the data to the neighbor node based on allocated time slots in the frame. Each node use the allotted slot for transmission and use the corresponding slot for communication. The following equation identifies the next time slot,

$$t' = t \text{ mod } T_c$$

t' - next time slot, t - current time slot, T_c -consecutive time slots.

The source node gain a frame for transmission, but the destination/intermediate never need to gain the frame for data communication. For example, during the particular slot node i spread the data to its neighbor node j of node i . The node i need to have atleast one slot for transmission .At the time j 's other intermediate node never sends any packet to j .The frame is divided into maximum number of slot .The maximum slot is limited to $n+1$. Thus the limitation use to avoid overloading in frame size. All the frames are subdivided into $n+1$. The n subframe is allotted with time slots. The fig 1 explains time based scheduling when the frame structure is 4. According to TDMA each slot duration is $6.25\mu s$

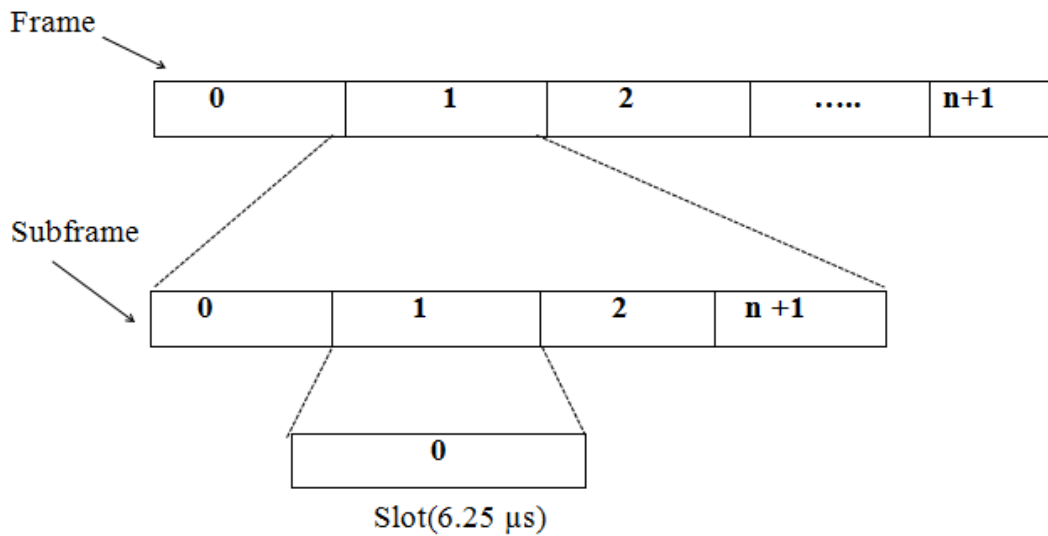


Fig:1 Outline for scheduling frame structure when $n=4$.

STIMULATION

The proposed technique evaluate the channel access based on time slot to avoid the interference and increase the network performance. The stimulation is done in 1000×1000 area with 100 nodes .The stimulation time is 6.25 seconds for the node to access the channel. The throughput increase to 85 % by avoiding the collision in the network. Improved throughput may reduce the packet drop between the nodes in the network .The transmission delay may reduced to 6 % for collision free ad-hoc network. Figure 2 explains the increased throughput in the network.

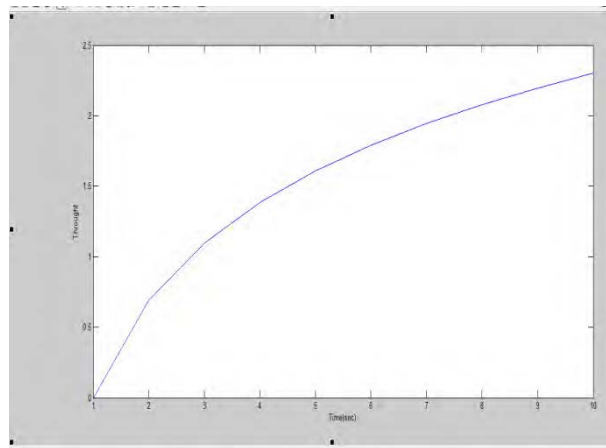


Fig:2 Throughput Vs Time

CONCLUSION

The paper define scheduling technique for ad-hoc network. In ad-hoc network nodes are access the channel, by defining time based scheduling in the network frame. The maximum frame length is subject to $n+1$. Each node allocated with time slot with $6.25\mu s$ and next free slot is identified by formula to access the collision free channel. Thus the collision can be maximum avoided upto 75 % in the ad-hoc network.

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