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Mobile Ad Hoc Network for Collision Avoidance in Mac Protocol Using Logarithmic Back off Algorithm

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***Abstract*: The main application of the VANETS is to provide the routing between the vehicles. During the transmission of data collisions may occur. To avoid the collision problems the Binary Exponential Back off (BEB) Algorithm is proposed. BEB results in a high delay in message transmission, collisions and ultimately wasting the limited accessible data transfer capacity. As every hub needs to get medium access before transmitting a message, in thick systems, the crash likelihood in the Media Access Control (MAC) layer gets to be high when a poor back off calculation is utilized. The Logarithmic calculation proposes some improvements to the back off algorithms that aim to efficiently use the channel and to reduce collisions. The algorithm under study is based on changing the incremental behavior of the back off value. This paper carries out a deeper study and analysis of the logarithmic back off algorithm that uses logarithmic increment instead of exponential extension of window size to eliminate the degrading effect of random number distribution.**

Keyword: MANETS, Back off Algorithm, Hidden Terminal problem, Exposed Terminal problem, Logarithmic Back off Algorithm.

I. INTRODUCTION:

Mobile Ad Hoc Networks (MANETs) are an extraordinary sort of specially appointed systems. As the term states, MANETs have cell phones as hubs and are joined by remote connections. Like all specially appointed systems, MANETs are planning toward oneself and don't utilize a brought together organization. Since the system hubs are versatile it is pass that the system topology changes frequently over the long run and accordingly courses is not such a simple assignment. The primary issue that a MAC convention for MANETs needs to settle is to stay away from transmission ways.

If the collided station tries to access the channel again, the packets will collide as the nodes are synchronized in time. So the nodes need to be displaced in time. To displace them temporally, a back off algorithm is used. For instance, in BEB calculation, at whatever point a hub's transmission is included in an impact with an alternate hub's transmission, both hubs will pick an arbitrary holding up time and hold up for this measure of time before endeavoring once more.

To provide the back off time for the collided nodes is our objective

- The collided node takes some back off time from the contention window.
- When the channel is ideal then they decrement the back off time.
- When the back off time is equal to zero and they sense that the channel is ideal more than DIFS then they send the data.

The rest of the paper is organized as follows. As I discussed about various algorithms surveyed as a part of my paper. Explanation about the flowchart and the algorithm of logarithmic back off and the description of each step. Finally I present my conclusion and discuss some possible directions of future work.

Introduction to MANETS:

The primary issue that a MAC convention for MANETs needs to settle is to maintain a strategic distance from transmission crashes. This is not such a straightforward errand in light of the way that the hubs are versatile and subsequently it is harder to figure out whether the imparted medium is free or not.

Hidden Terminal Problem:

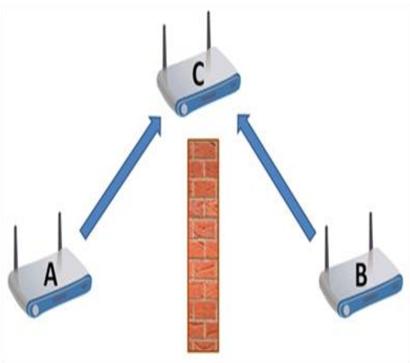

Fig: Hidden terminal problem

The issue happens when two terminals (An and B) are not in scope of one another and they both need to transmit information to a third terminal (C). Since they can't see each other, terminal an and B are not aware of the others plan to send data to the terminal C. Subsequently they both start sending data to terminal C and a transmission effect happens.

Exposed Terminal Problem:

The uncovered terminal issue happens when, attempting to keep a transmission impact, a terminal is not permitted to send information, despite the fact that it would not meddle with the continuous transmission. In Figure 2 the terminal S1 needs to transmit information to the terminal R1, so it educates its neighbor S2 of that aim, an a while later begins transmitting information to R1. Terminal R2 is not in scope of terminal S1, furthermore terminal R1 is not in scope of terminal S2. Consequently, S2 could send information to R2 in the meantime S1 sends information to R1, in light of the fact that no transmission impact would happen. But since S2 was educated by S1 to hold up, the transmission from S2 to R2 is put off.

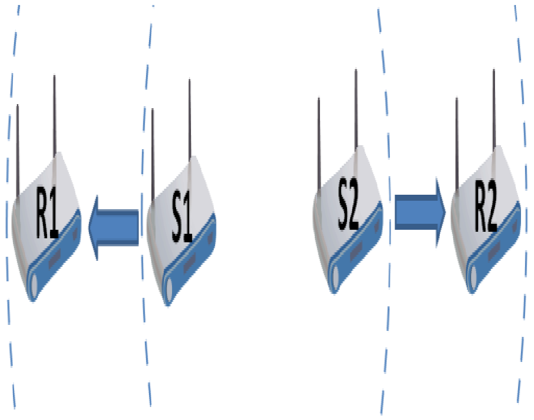

Fig: Exposed terminal problem

The primary convention proposed for remote systems was ALOHA ("hi" in Hawaiian). The throughput of the channel is extremely influenced by this technique, being decreased at just 18.4 percent.

Back off Mechanism Principle:

Back off instruments finish the channel access work by living up to expectations with different components coordinately. 802.11 DCF decreases the crashes between the hubs by embracing dynamic back off calculation taking into account openings; particular work methodology is as per the following: the hubs take numbers which are chosen arbitrarily from 0 to current (Contention Window) as the beginning back off counter estimation of this sending process before attempting to send information. In case BO is lessened to 0, the center can send information quickly.

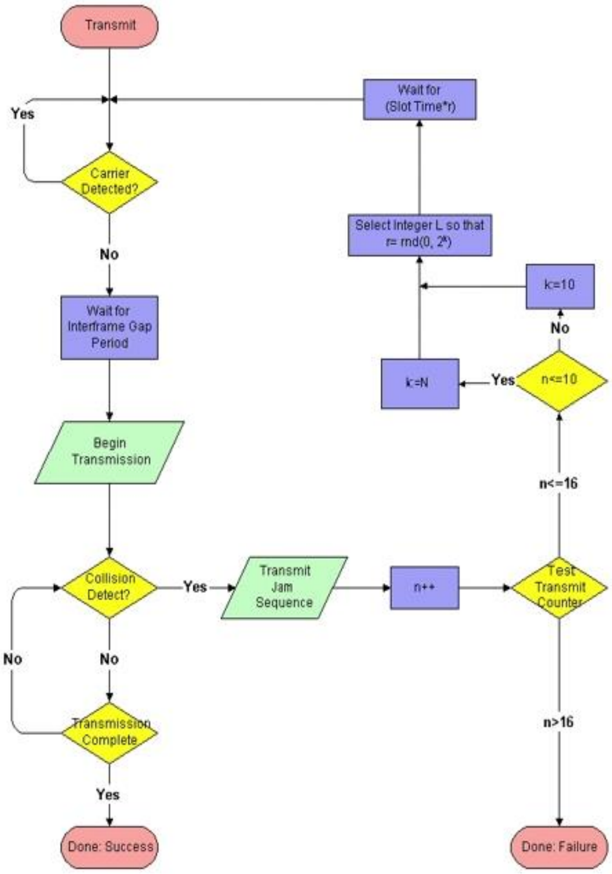

Fig: back off mechanism

Different back off algorithms:

There are different types of back off algorithms using for collision avoidance in VANETS. Some of them are:

- ➢ Binary Exponential Back off Algorithm
- ➢ Logarithmic Back off Algorithm

Binary Exponential Back off Algorithm:

In an assortment of PC systems, double exponential back off or truncated parallel exponential back off alludes to a calculation used to space out rehashed retransmissions of the same piece of information regularly as a component of system blockage shirking. The retransmission is deferred by a measure of time got from the space time and the quantity of endeavours to retransmit. For instance, if the roof is situated at i = 10 then the greatest deferral is 1023 space times.

Disadvantages:

➢ Conventional back off requires some investment for (Contention Window) CW to effectively adjust to one side quality when the dynamic populace (of hubs) is substantial (here, customary back off technique implies CSMA/CA plan with twofold exponential back off (BEB), unless and overall indicated).

➢ The MAC convention dormancy execution is high if CW is substantial.

Logarithmic Back off:

Another back off calculation in light of logarithmic capacity is introduced by presenting the parameter which can change with the system state, in mention to the issues of.

FLOWCHART AND ALGORITHM OF LBA:

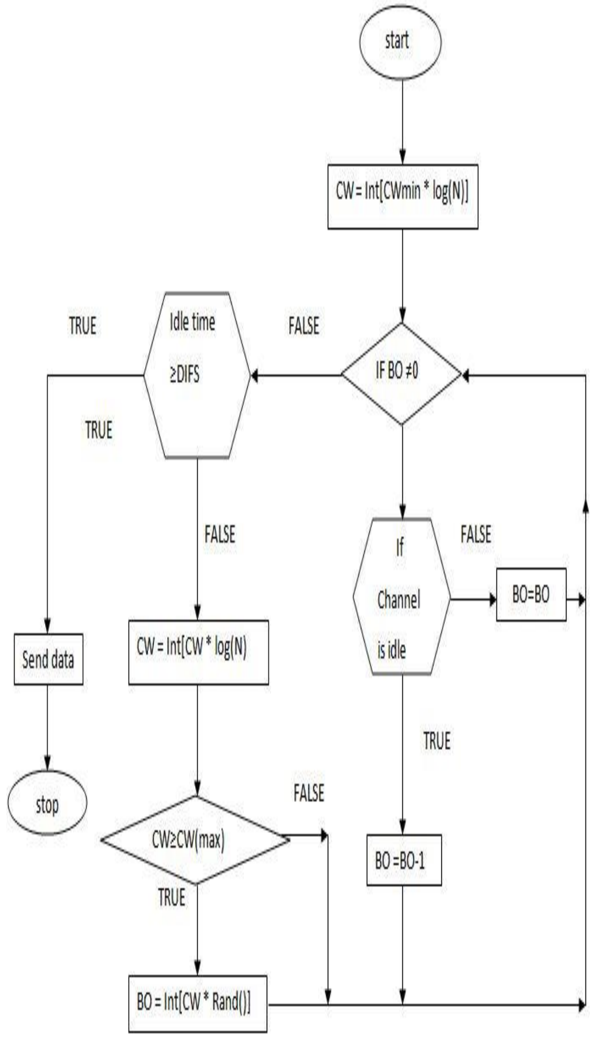

Fig: flowchart for logarithmic back off algorithm

Algorithm for Logarithmic Back off:

Step 1: Start

Step 2: CW = Int[CWmin * log(N)]

Step 3: BO ≠ 0 accomplish for every time opening

Step 4: If channel is unmoving then BO = BO – 1 and go to step 3

Step 5: Else BO = BO and go to step 3

Step 6: IF BO=0 and channel is unmoving and

at that point Send and go to step 12

step 7: Else CW = Int[CW * log(N)

step 8: If(CW > CWmax) CW = CWmax

step 9: BO = Int[CW * Rand()]

Step 10: now it moves to step 3

step11: Else go to step 3

Description of Logarithmic Back off Algorithm

- In the first step when the collision occurs and in order to access the channel, the collided nodes start this logarithmic back off algorithm.
- In the second step the contention window takes the min value as an integer.
- In the third step, it checks whether back off (BO)is not equal to 0 are not for each slot time.
- In the next step, it checks for BO ,if is it zero and the channel is idle then it sends the data and the process is stop.
- In the next step, it the channel is not idle then it freezes the BO value.
- In the next step for a unsuccessful transmission it increases it contention value.
- In the next time the collided nodes take another BO value and the process continues.

CONCLUSION AND FUTURE WORK:

Conclusion:

The Logarithmic calculation proposes a few changes to the back off calculations that expect to effectively utilize the channel and to decrease crashes. It utilizes logarithmic addition rather than exponential expansion of window size to take out the debasing impact of irregular number distribution. The nodes are created and data is transferred between them.

Future Work:

The tried calculation likewise has demonstrated stable system throughput over distinctive rates of hubs, furthermore expanded parcel sending over the system. One disadvantage of the contemplated calculation is a slight addition in the quantity of dropped bundles amid recreation time. In addition the increment in throughput does not increment when no. of hubs are less. In any case, this downside is brought about by different elements also.

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