Abstract

Collisions due to interference signal are frequent in multi-hop wireless networks. Interference signal can be reduced below a threshold level if all parallel transmitter-receiver pairs maintain a minimum of 'safe-distance' between them. A node observes a significant sudden increase or decrease in its received signal whenever another node within its 'safe-distance' begins or ends its transmission. Thus, if any node observes a sudden increase in its received signal by more than the 'significant' value, it infers that another node within its 'safe-distance' has begun its transmission. Similarly, when any node observes a sudden decrease in its received signal by more than the 'significant' value, it infers that another node within its 'safe-distance' has completed its transmission. In this paper we propose a protocol where a node begins its transmission only if it has a minimum of 'safe-distance' from the nearest parallel transmitter-receiver pair, and compute the values of 'safe-distance' and the 'significant' change in received signal. We then propose modifications in IEEE 802.11 protocol such that every node ensures a minimum of 'safe-distance' from the nearest transmitter-receiver pair before it
begins its transmission. Analysis shows that when all receivers in the network have a Signal to Interference & Noise Ratio SINR $\geq ?$, collisions due to interference can be completely prevented. It also brings out the situations where interference might exceed $1/N$; however, the probability of interference exceeding $1/N$ lies between 0 and 0. 1577*10^{-5}.

References


Index Terms

Computer Science Wireless
Keywords

Wireless multi-hop networks  Ad hoc networks