International Journal of Research (IJR)
e-ISSN: 2348-6848, p- ISSN: 2348-795X Volume 2, Issue 10, October 2015
Available at http://internationaljournalofresearch.org

Relay Selection on Co-operative Communication using MAC Network coding

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Abstract: -

Ad Hoc Network used in military and emergency rescue environment. Cooperative communication effective technique to deal with the channel fading and improve network performance, also refers to processing of this overheard information at the surrounding nodes and retransmission towards the destination to create spatial diversity, thereby to obtain higher throughput and reliability. Ad Hoc Networks can connect different wireless devices to enable more powerful wireless applications and mobile computing capabilities. Co-operative approach promises improved throughput and delay performance. This work, proposed a network coding aware utility based relay selection strategies, to choose the best relay in an efficient and distributed manner. Focus on the MAC layer protocol design which is critical to reap the performance gains brought from the physical layer. Use of NCAC-MAC protocol in wireless ad hoc networks increases the throughput and reduces delay. The conventional Acknowledgement (ACK) frame and Negative ACK (NACK) frame a new control frame named Eager-To-Help (ETH) is introduced in this schema to enable the efficient and distributed best relay selection.

Keywords: -Co-operative Communication; Medium Access Control; Network coding; Relay Selection

1. INTRODUCTION

Mobile Ad-hoc Network (MANET) is a self-configured network of mobile terminals connected by wireless links. Mobile terminals such as cell phones, portable gaming devices, PDAs and tablets all have wireless networking capabilities. By participating in MANETs, these terminals may reach the internet when they are not in the range of Wi-Fi access points or cellular base stations, or communicate with each other when no networking infrastructure is available. MANETs can also be utilized in the disaster rescue and recovery. One primary issue with continuous participation in MANETs is the network lifetime, because the aforementioned wireless terminals are battery powered, and energy is a scarce resource. Cooperative communication techniques have been shown to improve network performance by combining the transmission powers of multiple users. While most of the attention has been on improving signal-to-noise ratio in the physical layer, research focus has also been devoted to exploiting cooperative diversity at the MAC layer. Existing work on cooperation in the MAC layer can be broadly divided into proactive and reactive strategies. Proactive strategies involve making use of relays to improve the transmission quality between stations where the channel condition is low. In case of reactive strategies, intermediate nodes wait for an indication of incorrect reception of data from the receiver, following which they retransmit cached copies of the original data with the objective of reducing the number of retransmissions. The IEEE 802.11 standard lists

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five modes for a network interface to operate: transmit, receive, idle, sleep and switch off. While the power consumption values for the first three states do not differs by much, a node can go into a low power sleep state to save energy, though it cannot transmit and receive data in this state. In cooperative MAC protocol design whom to cooperate, how to cooperate and when to cooperate these are main issues. To increase performance of the communication best relay selection takes place. Selection of relay in the network two types in which first in which relay selection process before the direct transmission called Proactive schema and second in which relay selection takes place when direct transmission fails this approach called Reactive schema. In the transmission process relay node enable to retransmit data for source node, when deliver its separate data continuously, Hybrid Cooperation Network Coding (HCNC) [1]technique introduced to employ the network coding technique in cooperative transmission process and take advantages to the both network coding and cooperative communication, used reactive CMAC policy. Relay selection done by randomly and relay node assist other node and serve their own traffic, transmission process transmission failed at that time neighbouring nodes retransmit data behalf of the source node. In HCNC technique coding technique not guaranteed, multirate capacity of the network does not exploited and reduce the overall delay all this issues on the network coding and cooperative communication on the MAC layer

2. RELATED WORK

Existing System

Munari et al. proposed a reactive CMAC policy, namely Phoenix, based on HCNC. By Phoenix, relay nodes can assist other nodes and serve their own traffics simultaneously during the retransmission processes. In Phoenix, when the direct transmission fails, the neighboring node sensing free medium at the end of a random back off time, wins the contention and performs the retransmission on behalf of the source node. Whether the randomly selected relay node holds the packets that can be coded with the retransmitting packet is uncertain. The packet queuing conditions at different relay candidates are not considered. To reduce the overall delay, the relay node with large queuing packets in the buffer should have a high priority to perform the coded retransmission.

Disadvantages:

The coding opportunity is not guaranteed. The multi rate capability of the network is not exploited. Since nodes support different data rates depending on different channel conditions. Whether the randomly selected relay node is in the best channel condition that can transmit the coded packet with the maximum data rate to the destination is unsure.

Proposed System

NCAC-MAC protocol means novel HCNC-based reactive CMAC policy. This paper focus on the reactive CMAC protocol that initializes the cooperative retransmission when the direct transmission fails. It utilize a connectivity table to predict the condition of node D in advance.It introduce the frame exchanging process of NCAC-MAC first. Second, introduce two collateral approaches.

Network Coding Supported-Cooperative Retransmission (NCS-CR) Pure-Cooperative Retransmission (P-CR) NC and CC in wireless ad hoc networks has two ingredients. A physical layer protocol that can handle coded retransmission.A MAC policy that can coordinate the cooperation process.

Advantages: The NovelNCAC-MAC protocol increases the throughput and reduces the delay.

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3. IMPLEMENTATION

M-QAM modulation technique is used for channel allocation. Here the power is optimally allocated to the source and relay nodes with the objective of minimizing the total transmission power under the average BER (Bit Error Rate) constraint. BER is used to identify the error rate like packet failures while the data transmission. Energy-Efficient Topology Control algorithm is used to build the Cooperative energy spanners so that the individual paths energy will be guaranteed. It aims to produce a strongly connected network topology here if any node energy will be getting down means link failure will occur.

A Cooperative MAC (CoopMAC) used to perform the overheard transmission. The CoopMAC protocol mainly designed for the wireless LANs. This protocol will construct a CoopTable which consist low data rate node. During the transmission each low data rate node selects either transmission through a relay node or direct transmission in order to minimize the total transmission time. But this protocol does not work larger size network area because their size and weight limitation.

One of the frequently used cooperative communication technique is Extended Dominating Set (EDS) for **Ad hoc Network**. EDS is a set of nodes all the node has its own neighbor node. Here the original message is divided into small packets then the independent copies of packets forwarded to the destination it generates diversity and combats the effects of fading. But the QoS parameters are very low in this method.

COMAC is a one type of MAC protocol it establish the cooperative communication in the way of it overheard packets from the neighboring nodes of the sender node. This method is also use the BER (Bit Error Rate) concept to calculate the error rate in which amount of packet does not reach the destination. COMAC provides some robustness to the wireless channel. It will increase the packet success radio and the transmission range. The limitation of this technique is it works only the limited battery powered devices and the location and energy models are not updated in this method

Distributed Space-Time-Coded Protocol is introduced for Exploiting the Cooperative Diversity in the Wireless Sensor Networks. This will exploit the spatial diversity available among the group of distributed terminals. In this technique the source node will send the data to the destination node with the help of the intermediate nodes. The main drawback of this protocol is it has very poor energy efficiency and it does not suitable for larger size wireless sensor network.

4. EXPERIMENTAL RESULTS

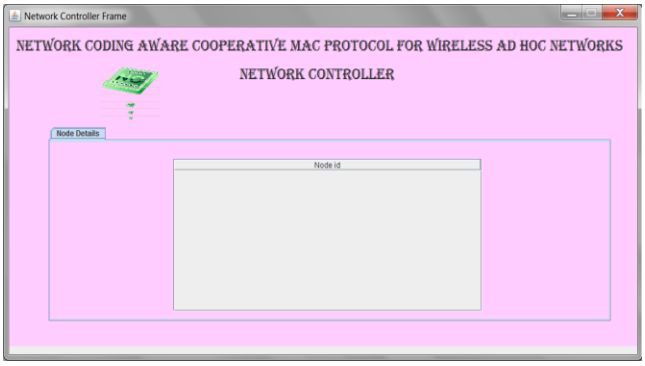

Fig:-1 Node Page

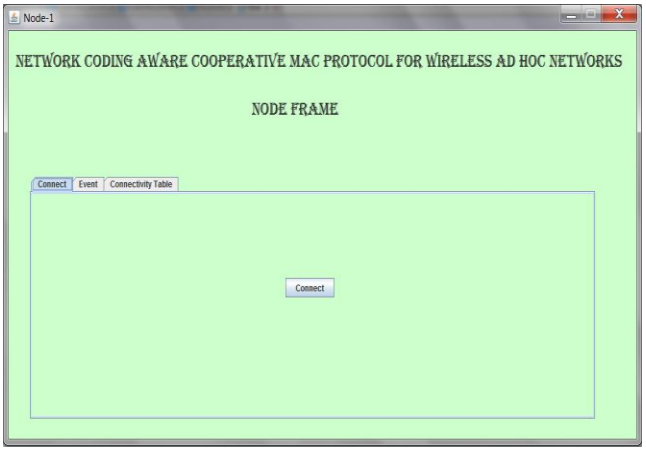

Fig:-2 Node Selection

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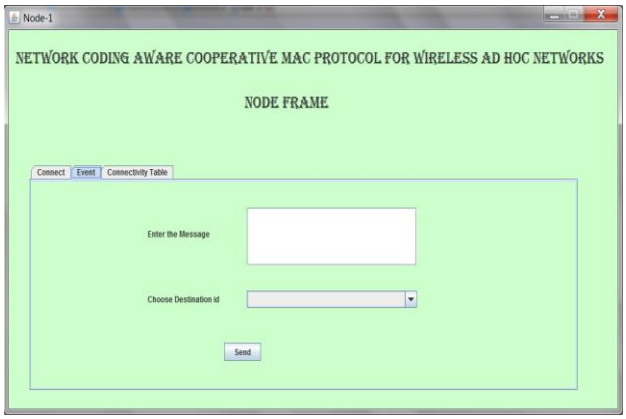

Fig:-3 Sender

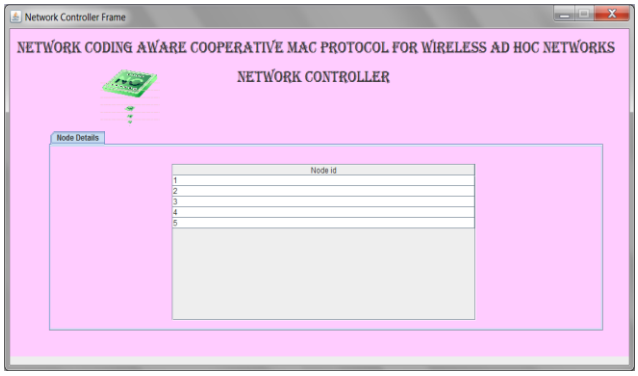

Fig:-4 Relieving End

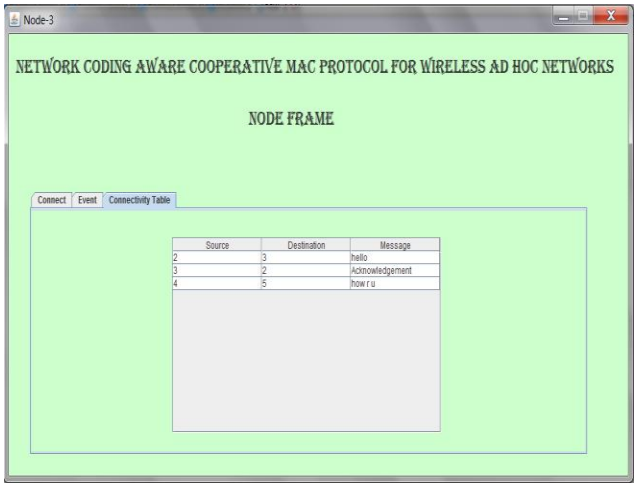

Fig:-5 Results

5. CONCLUSION

A network coding aware utility based relay selection strategies to select best relay in an efficient and is tribute manner. Group contention based relay selection and splitting algorithm based relay selection are the two collision free strategies are used to improve throughput, efficiency and delay. In this paper, we proposed the design of aenergy constrained cooperative MAC protocol ECC-MAC protocol based on a cooperation framework which seeks to optimize the tradeoff between network throughput and network lifetime. An detailed analytical frame work is given for the computation of transmission decision factor based on which best possible relay is chosen. Our results show that ECC-MAC maximizes network lifetime without sacrificing the throughput. Thus, optimizes tradeoff between network lifetime and throughput. As part of our future work, we will investigate our ECC-MAC for multirelay cooperation for larger scale network size and with high mobility. Also, we foresee a more suitable scenario for multi-relay cooperation in 802.11a/g networks which support a larger set of data rates than 802.11b.

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