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ROAR: New Resource Aware Opportunistic Routing Protocolfor for Reliable Communication

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Abstract

The research work proposses Opportunistic routing algorithm which supports broadcasting saving. The routing protocol which is based on opportunistic routing for reliable communication. Here introducing new algorithm to introduced which is resource aware and trust based.

In paper discusses algorithm which is based on broadcasting. If the system gets dense then its nodes increases in topology and broadcasting is restricted to few nodes in dense system It supports multicasting. If system is sparse then system supports broadcasting.

Keywords: RAOR, Opportunistic routing, Ad-hoc network , Mobile Adhoc Network(MANET).

INTRODUCTION

Mobile ad hoc network (MANET) is a type of wireless ad hoc network. MANET doesn't require centralized control .Each node itself act as a router.So algorithm runs at each and every node at the time of transmission .

Opportunistic routing is reliable to frequent pathloss and communication delays and it uses candidate list instead of next hop to forward data from source to destination. The routing protocol used for

opportunistic networks are different from opportunistic forwarding used in MANET. The opportunistic routing in MANET is used to fully utilize the broadcast nature of wireless medium and to improve transmission reliability. [5][6][8]

ROAR is a new algorithm which provide new solution for opportunistic routing. Here system is counter based and it supports broadcasting. Forwarder list selection is based on battery rank and trust rank. In counter based broadcasting, a counter is associated with each node which keeps track of duplicate packets; it also inserts a small random delay before broadcasting the packet which causes the timing of the broadcasting be differentiated. The remarks on the counter based scheme 1) Network may contain regions with nodes positioned very close to each other as Such region is called dense region. 2) Network may contain regions with nodes positioned very far from each other a. Such region is called sparse region. According to the dense and sparse region it will select threshold and send the data.

Limitation of opportunistic routing:

There are many challenges which are available in opportunistic routing:

1. selection of forwarder list.
2. Priority of candidates.
3. When relay will forward the packets.

PROPOSED WORK

In proposed work, opportunistic routing based on sparse and dense topology of network. Algorithm will select broadcasting or multicasting for transmission as per the sparse or dense topology.

To achieve both reach ability (end to end delivery)and broadcast savings (less no of broadcast transmission) the counter is to be set dynamically according to the nodes neighborhood. The nodes is characterized as dense if degree of nodes (no of participated nodes) is greater than the average number of neighbors.

The node is characterized as sparse if degree of node (no of participated nodes) is smaller than the average number

If topology is sparse and mobility of nodes is high it causes the link failure in the network. Hence in sparse region, to improve network lifetime the speed of nodes is considered while make broadcasting decision. It eliminates many redundant broadcasts by choosing the nodes with low speed to discover a more stable path. The approach suggests avoiding the unstable paths containing high speed nodes which in turn avoid link breakages in the network because of mobility of nodes.

If the topology is too dense, nodes may run out of their energy quickly and cause of link failure which ultimately affects lifetime of network. Link failure can be inhibited by considering energy of the nodes into an account. The weak mobile node does not forward the route request control packet, but simply drops it. Thus, it does not participate in the selection and forwarding phase. This leads to decrease in the link failure. es listen that transmission.

Recourse based protocol operates on timer. When timer out it starts sending data and second timer indicate how much time data can be hold, so by using theses timers nodes can coordinate in an efficient manner.

It is an acknowledge based system. Acknowledgment send from the receiver that data has been successfully received .After that,the next set of data can be transferred.

By using timer, capacity calculation ,sparse and dense topology selection and acknowledgement network can efficiently recover data. And packet loss ratio and throughput will increase because high capacity node will is in use to transmit data.

Neighborhood Discovery :

In a MANET packet transmission HELLO message has been sent, Hello message gives initial establishment of network connection.

In this research advanced controlled HELLO messaging is used, which is a modified version of traditional MANET HELLO message protocol to contain node's resources capacity.

Capacity Calculation:

(FC)Final Capacity function:

f(NC,T)* = NC +T/2, where *T = Trust value, NC = Node Capacity

If receiver is ultimate destination, it will broadcast the **REMAING_PACKET_REQUEST** or D**EST_ACK.**

BROADCAST SAVING

Instead of always broadcasting packets, based on node mobility, dense and sparse network introduced algorithm to use multicast or broadcast to reduce overhead and reliability.

EVALUATED RESULT

We evaluated performance of proposed work again ExOR and MORE. Simulation is based on different number of nodes in network and energy level. We observed improved performance as compare to ExOR and MORE both in all metrics.

Throughput :

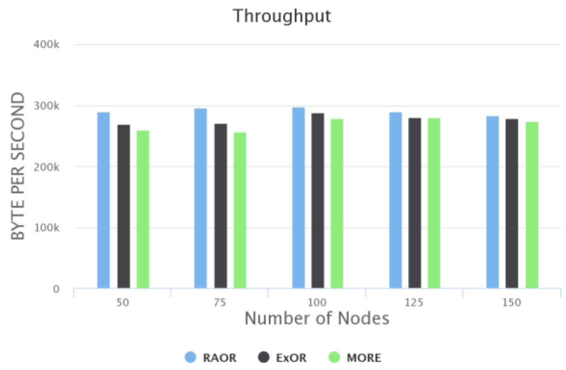

Figure 1: Throughput comparison among ExOR, MORE and RAOR.

In normal scenario, average improvement throughput of RAOR is 0.9% against ExOR and 3.08% against MORE.

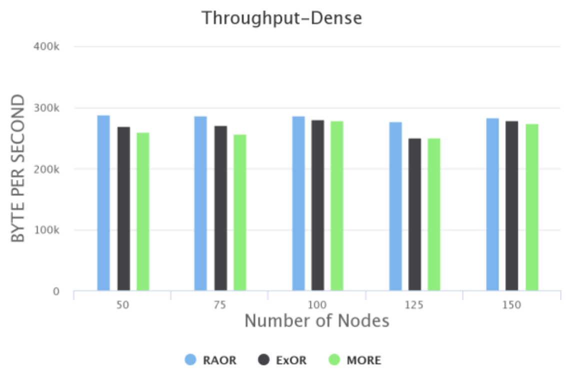

Figure 2: Throughput comparison in desnse network among ExOR , MORE and RAOR

In dense network, average throughput improvement of RAOR is 0.8% against ExOR and 2.09% against MORE.

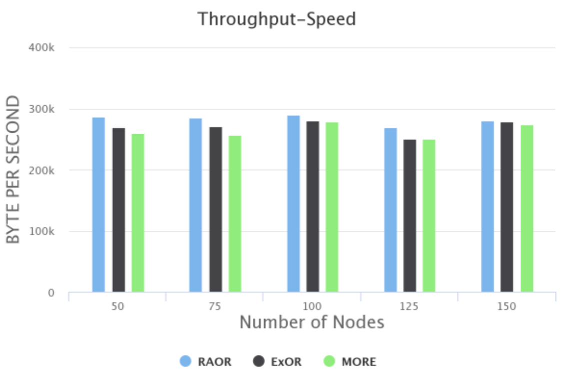

Figure 3: Throughput comparison in dense with heavily moving nodes

In dense network with frequently moving nodes, average throughput improvement of RAOR is 0.3% against ExOR and 1.9% against MORE.

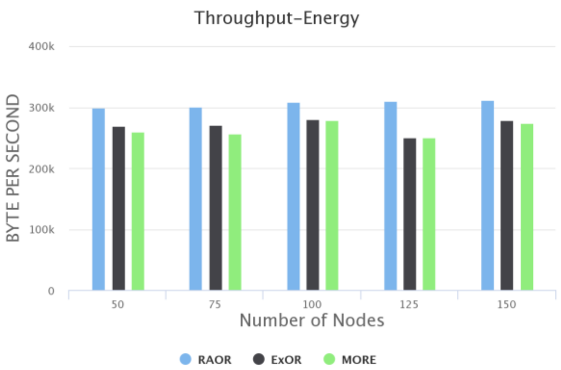

Figure 4: Throughput comparison in varying energy level of nodes

In varying energy level of nodes, average throughput improvement of RAOR is 2.9% against ExOR and 4.9% against MORE.

Packet Drop Ratio :

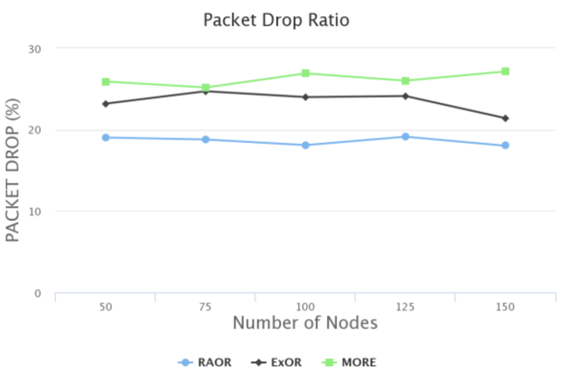

Figure 5: Packet drop ratio comparison among ExOR, MORE and RAOR

In normal scenario, average improvement of packet drop ratio of RAOR is 2.7% against ExOR and 3.98% against MORE.

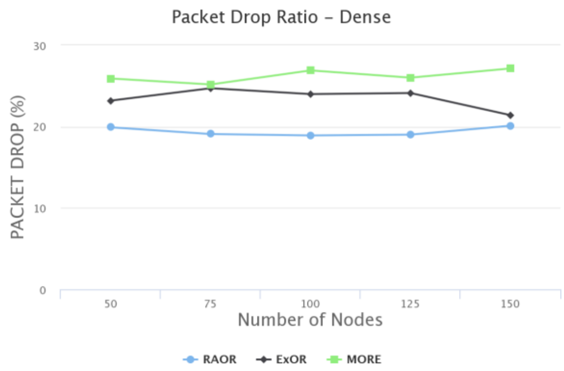

Figure 6: Packet drop ratio comparison in dense network among ExOR, MORE and RAOR

In dense network, average packet drop ratio improvement of RAOR is 0.7% against ExOR and 1.9% against MORE.

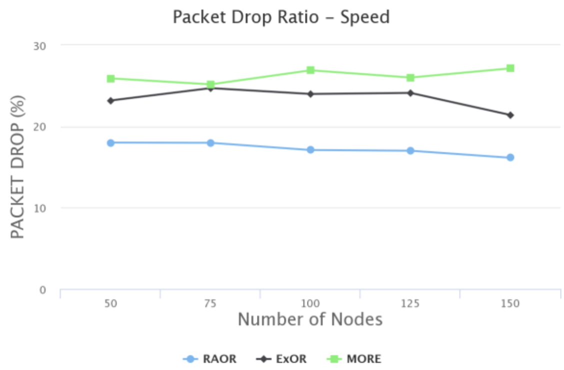

Figure 7: Packet drop ratio comparison in dense with heavily moving nodes

In dense network with frequently moving nodes, average packet drop ratio improvement of RAOR is 1.5% against ExOR and 2.9% against MORE.

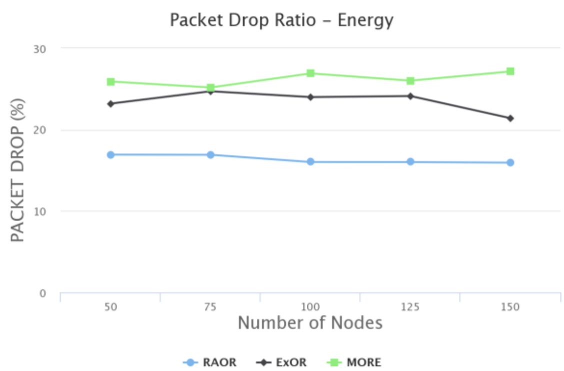

Figure 8: Packet drop ratio comparison in varying energy level of nodes

In varying energy level of nodes, average packet drop ratio improvement of RAOR is 1.9% against ExOR and 3.9% against MORE.

CONCLUSION

This paper discuss new algorithm for opportunistic network which is based on sparse and dense topology.

In this paper new algorithm is proposed which provide solution of packet duplication and saving of broadcasting.

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