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IMPROVING THROUGHPUT IN MANET USING COOPERATIVE ROUTING STRATEGIES

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Abstract-In this paper, we work on the problem of opportunistic data transfer in mobile ad hoc networks and the solution to this problem is called the Cooperative Opportunistic Routing in Mobile Ad hoc Networks which is popularly called as CORMAN. There are 2 important modules implemented in this paper; small scale retransmission and large scale update. The nodes in this network make use of lightweight proactive source routing protocol in order to decide the set of intermediate nodes that are capable of transmitting the data packets to the destination. Therefore the data packets will reach the destination quickly even though there is minimal loss of data packets. Comparison graph is plotted for analysis of CORMAN and AODV by varying network densities and node mobility rates.

Index Terms-Cooperative communication, opportunistic routing, opportunistic forwarding, mobile ad hoc networks, proactive source routing, retransmission, forwarder list update

1. INTRODUCTION

A Mobile ad hoc network is a wireless communication network, where in the nodes are not within the direct transmission range of each other and will need other nodes to forward the data. The network layer is focused more while working on mobile ad hoc networks. Therefore many routing protocols are proposed[1], in this network and they differ in their objectives from one another and they have been used for different specific needs. In Ad hoc networks data forwarding will follow the same criteria as in IP forwarding in the Internet. The main aim of research in wireless networking is to make the wireless links as good as wired ones. For mobile ad hoc networks to accomplish above labs and testbeds, we must tame and utilize its broadcasting nature instead of discarding it. Therefore Cooperative communication is a competent way to accomplish such a goal. CORMAN is our proposed system which is basically a network layer scheme. Here the data is forwarded in a batch operated fashion as in ExOR. In this network, the nodes make use of lightweight proactive source routing protocol to determine a list of intermediate nodes that the data packets should follow to reach the ultimate destination. As packets move in the network the nodes that are listed as forwarders can modify the forwarder list if any topology change is required. This is usually referred to as large scale live update. We have other nodes that have not been listed as forwarders but can still retransmit the data. It is referred to as small scale retransmission. Once the data packets are broadcasted by the upstream node, it will be received by downstream node along the route, and continues its way from there and thus will arrive at the destination node sooner. This is easily achieved through cooperative data communication at the link and network layers.

Contributions in our solution are highlighted as follows:

1) We can extend the applicability of ExOR[2], to mobile multi-hop wireless networks without

depending on external information sources, such as where exactly nodes are positioned.

2) CORMAN suffers a smaller overhead than ExOR byincluding shorter forwarder lists in the data packets.

In this paper, the performance of CORMAN is studied by using the Network Simulator NS-2(version 2.34) and later we compare it against AODV by varying network densities and node mobility rates.

2. RELATED WORK

ExOR[2], is a cross layer opportunistic data forwarding technique in Multi-Hop wireless networks. It combines the MAC (Medium Access Control) and the network layer, so that the MAC layer can determine the actual next-hop forwarder after transmission depending on the transient channel conditions at all selected downstream nodes. Nodes are allowed to transmit the packets in the channel, irrespective of whether it is meant for it or not. Majority of forwarders can forward the packet as long as it is included in the forwarder list carried by the packet. The major challenge is to ensure that exactly one of the listed forwarder should always relay the packet that is closest to the destination at the same time. This is addressed by Prioritized Scheduling among the listed forwarders according to their priority indicated in the forwarder list. Later they are combined with an 802.11 DATA frame header before they are broadcasted.

3. DESIGN & IMPLEMENTATION

A. System Architecture:

System architecture provides the basic understanding of the building blocks of the overall system that defines both the structure as well as the system behavior. It defines the system components or building blocks and provides a plan from which products can be procured, and systems developed, that will work together to implement the overall system. However the proposed system architecture of the overall system is illustrated below:

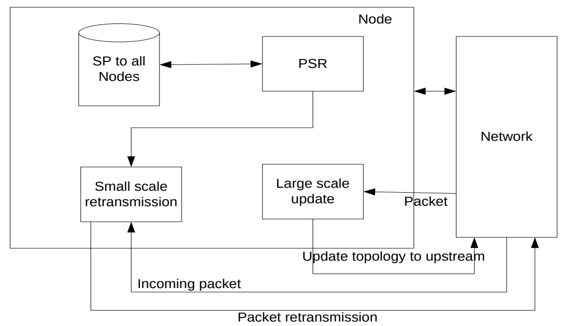

Fig. 1 System Architecture

This system consists of four modules; PSR, sensor network, small scale retransmission & large scale update of which the two major modules include:

Small scale retransmission: This module will try to find adjacent node which will retransmit the packet to the network.

Large Scale Update: This module will find the frontier and route the shortest path, which will then update the shortest path to the network.

B. Pseudocode of the Proposed Algorithm

Algorithm for PSR

input: Network topology

output: shortest path will be the output

Each node exchange neighbor list to other nodes

Node calculates shortest path to sink

For all packets

Route on shortest path

End

Algorithm for Small scale updates

input: if any packet fails, it will be retransmitted

output: packet retransmit

Data transmission at node i

If any forward node does not give Ack

F <- choose best next forwarder for i

Route using F

End

Algorithm for Large scale updates

input: if any changes in the topology

output: route list is updated as output

If node down detected at node i

Update neighbor information

End

Node recalculates shortest path to sink

4. RESULTS AND DISCUSSION

In the proposed work, Linux (ubuntu) platform is used forimplementation. Designs and simulations are carried out using NS2 simulator. NS2 is a simulator intended for networking research and provides substantial support for simulations of various protocols. We discuss the results by comparing the CORMAN with AODV by varying network densities and node mobility rates.

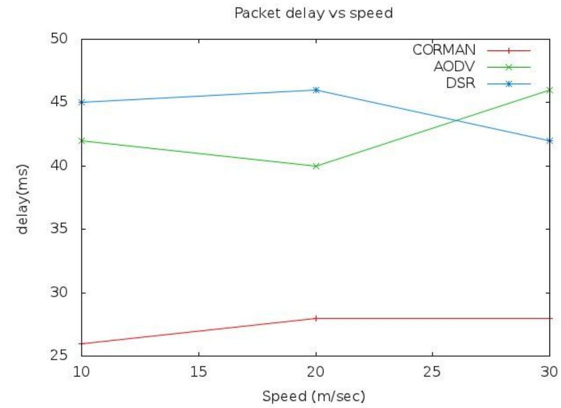

Fig. 2 Packet delay vs speed

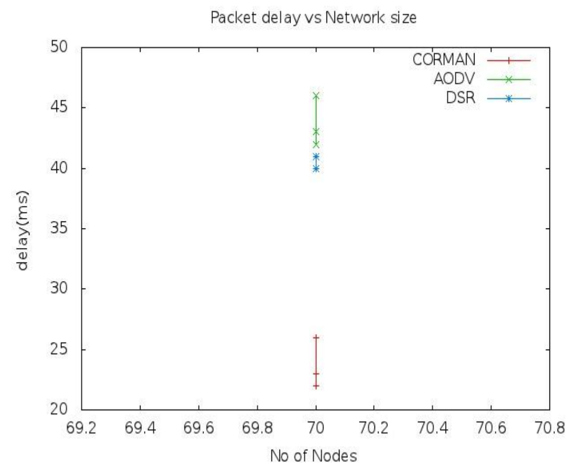

Fig. 3 Packet delay vs Network size

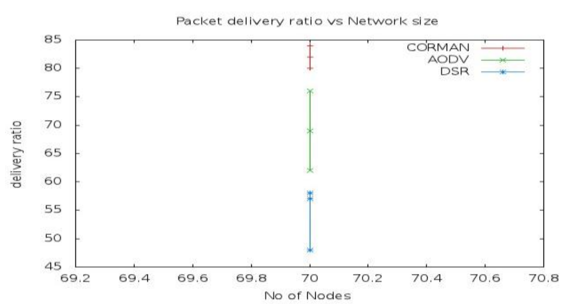

Fig. 4 Packet delivery ratio vs Network size

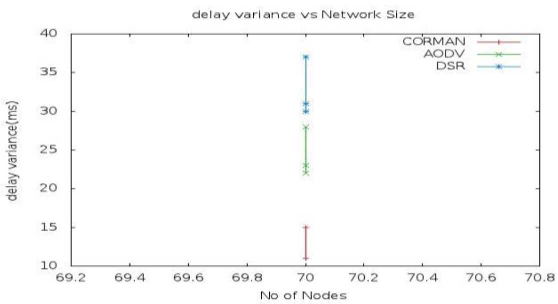

Fig. 5 Delay variance vs Network size

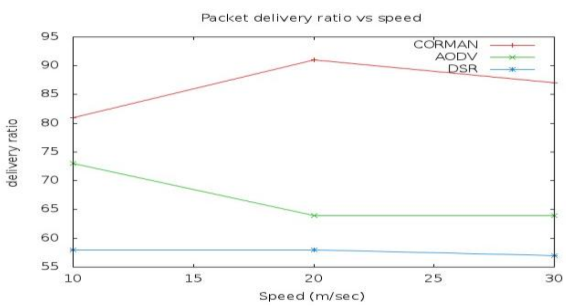

Fig. 6 Packet delivery ratio vs Speed

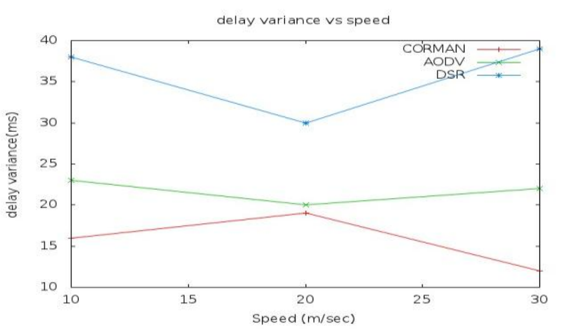

Fig. 7 Delay variance vs Speed

CONCLUSION

In this article,we have proposed CORMAN as an opportunistic routing scheme for mobile ad hoc networks. CORMAN is composed of 3 components 1) PSR- a proactive source routing protocol, 2) large scale live update of forwarder list and 3) small scale retransmission of missing packets. These components make use of the broadcasting nature of wireless channels and is achieved via efficient cooperation among the nodes that are participating in the network.

REFERENCES

[1]R. Rajaraman, "Topology Control and Routing in Ad hoc Networks: A Survey," SIGACT News, vol. 33, pp. 60-73, June 2002.

[2] S. Biswas and R. Morris,"ExOR: Opportunistic Multi-Hop Routing for Wireless Networks," in Proc. ACM Conference of the special Interest Group on Data Communication (SIGCOMM), Philadelphia, PA, USA, August 2005, pp.133-144.

