



Route Maintenance in DSR

Deepta Modi

CSE Department, Kurukshetra University
Haryana, India

Abstract— Mobile Ad-hoc network is a collection of mobile nodes that communicate via wireless links and communication is carried out without any centralized control or fixed infrastructure. Dynamic source routing protocol is used to find out the performance of network. In this we proposed enhanced DSR. Reputation based scheme are used which gives better results compared to standard DSR. There are different aspects which are taken like Throughput, Packet delivery ratio, average end to end delay, protocol energy consumption and average hop count. we consider energy consumption during path establishment need to be considered and keep track by exchange of information with the neighbour nodes[1]. The resulting routing protocol of Ad hoc network is based on minimum hop count and ten times high throughput. There is high packet delivery ratio. In our approach we take care of energy awareness of nodes by keeping track of energy of nodes by exchanging information by its neighbor nodes by introducing the concept of sniffer packets. So the parameters that consider energy consumption during path established need to be considered for a energy efficient routing protocol to increase network lifetime. This enhancement also results in low delay that is time taken for a packet to be transmitted across a network takes less time in reaching from source to destination.

Keywords— Mobile ad hoc network(MANET),Ant colony optimization(ACO),Dynamic source routing(DSR), ad hoc on-demand distance vector routing (AODV).

I. INTRODUCTION

A mobile ad hoc network [MANET] is a temporary infrastructure less network [1]. Backbone infrastructure and fixed access points are not always viable (Infrastructure may not be present in a war zone or any disaster location). Mobile Ad hoc Networks are established for extemporaneous services customized to application. It is self configuring network that can be formed without the presence of an trusted, pre-configured infrastructure or platform. Ad-hoc networks are easy to deploy. One of the main challenges in ad-hoc networking is reliable delivery of packets to mobile nodes. Various protocols have been developed so that high packet delivery fraction can be obtained.

Dynamic Source Routing protocol (DSR)

The Dynamic Source Routing protocol (DSR) is a simple and efficient routing protocol designed for use in multi-hop wireless ad-hoc networks of mobile node[2] where dynamic means node that want to send data packets, discover a route across multiple network hops to any destination dynamically and Source means it uses source routing where each data packet contains ordered list of all intermediate nodes of path from source to destination in its header through which it is to be travelled [3]. The main purpose of dynamic protocols is to find a best, less time consuming path between nodes in the mobile network. Ad hoc network do not have any pre-existing infrastructure.

It consists of two phases

1. Route discovery
2. Route Maintenance phase.

Route Discovery: To find a route to its destination, a source broadcasts a route request packet to all nodes within its radio transmission range. With source and destination address there also exists a route record which is present in route request packet, which is the record of nodes visited by the route request packet. When a node receives a route request, it does the following:

- If the destination address of the request matches its own address, then it is the destination. We assume here bidirectional links as there is also a need to send route reply packet to source which is send in reverse order.
- If it is not destination then it is intermediate node. If a node has a route to the destination in its cache table then it creates route reply packet from its cache and sends this reply packet to source. Such replies are called Intermediate-Node replies; if it does not have a route, it appends its own address to the route record, and then rebroadcasts the request. Then it increments hop count by one.

Route Maintenance: It is triggered when a link breaks between two nodes along the path during transferring of data packet. The node that detects the break, send a RouteError message to the source about the broken link. After getting route error packet, the source node erase all the information of routes containing that broken link from cache and will use another cached route or request a new route using route discovery mechanism. For example, the intermediate nodes cache the route towards the destination and backward to the source. Route cache is widely adopted in DSR.

II. RELATED WORK

The author Mano Yadav, Vinay Rishiwal, S. Verma ,S. K. Bajapai in year 2009[1] proposed an efficient algorithm for enhancing network lifetime.For today's adhoc network there is a need of efficient power aware protocols. Algorithm states that by minimizing the power consumption, network lifetime is maximized during the source to destination route establishment. Power is one of the most important design criteria for adhoc networks as batteries provide limited working capacity to the mobile nodes.

Rajendra V. Boppana and Anket Mathur[2] suggested three simple and intuitive changes to the routing protocol.The paper showed the new techniques which provide significant performance improvements for various network densities and traffic loads.For the better results they present 2k factorial analyses of the simulation data.They showed that limiting replies by destination is the most beneficial change to the routing protocol and that network density has significant impact on performance in uncongested networks.In this DSR is shown to perform better with certain optimizations turned off.

Dipti Goel in year 2014 [3] described two things:First is Route discovery and route maintenance phase of DSR protocol and another are some local error recovery techniques of DSR protocol like packet salvaging, automatic route shortening etc. Many dynamic routing protocols are designed for efficient transmission of data packets like DSR, AODV, TORA etc. A new approach for selecting a route from route cache in DSR based on time routing metric and modification in the propagation process of RouteError message during local error recovery is also proposed in this paper.

The author Vaibhav Godbole in year 2012 [4] proposed various ACO(Ant colony optimization)methods. ACO is Biology-inspired technique which are applied to the MANET routing problem and now adaptable in various problem domains.Some of the ACO based protocols are hybrid ACO (AntHocNet,imProved ant colony optimisation routing algorithm for mobile ad hoc NETworks (PACONET), AntNet,ACO based dynamic source routing (Ant-DSR),ACO based on demand distance vector (Ant-AODV) and performance is determined in terms of QoS parameters eg. packet delivery ratio and end-to-end delay.

The author Kulbir nain, Roshan Lal Hiranwal and Poonam kumari in the year 2012 [5] has proposed a set of minor extensions to the DSR protocol proposed,by implementing the reputation based scheme on it.Scheme results in increasing the performance of the network as risk of dropping of data packets is reduced.According to network metrics used there is also increase in packet delivery ratio and throughput.This mechanism allows a node to autonomously evaluate the "reputation" of its neighbors based on the completion of the requested services. Results of simulation will show the decrease in data drop and routing overhead.

III. PROPOSED WORK

By improving the power consumption balance among nodes and the connection of the network,the overall lifetime of the entire ad hoc network can be increased.In most existing protocols, a mobile node may consume all its energy to participate in the operation without considering the remaining energy. The new protocol uses a cost function to decide route selection instead of using the traditional shortest hop algorithm. The reason that DSR is used as our base model is mainly due to the fact that it is a typical on demand protocol with less bandwidth and energy use. Main objective is to

1. To propose a new route discovery algorithm that considers the remaining energy for each node and uses a cost function to choose the best power saving route.
2. To propose a new route maintenance algorithm that deals with the broken routes due to the nodal energy depletion and node mobility.

IV. RESULTS

Table 1 Existing and Proposed value of DSR

| PARAMETERS | EXISTING | PROPOSED |
|---------------------------------|------------|-------------|
| Packet delivery ratio(in %) | 6.43 | 63 |
| Average hop count | 1 | 8 |
| Throughput in network(in kbps) | 5.209 | 51.012 |
| Average end to end delay(in ms) | 0.00135788 | 0.006879669 |
| Protocol energy consumption | 99.728316 | 99.739761 |

In this table there is comparison between existing and proposed values of DSR. First column represents the parameters which helps in comparison. Second column represents the existing values of DSR. Third column represents the enhanced values which gives better results. Average hop count have been increased from 1 to 8.There is large increase in packet delivery ratio and throughput values.

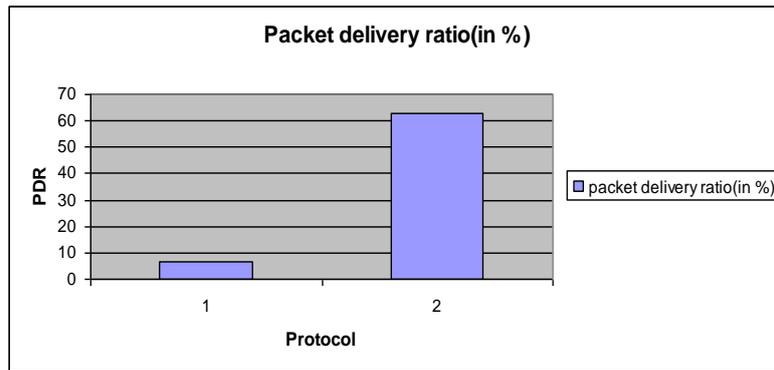


Figure 1 PDR for Existing and Proposed values

This figure represents the graphical comparison between two values of packet delivery ratio. There is high deviation between existing and enhanced DSR.

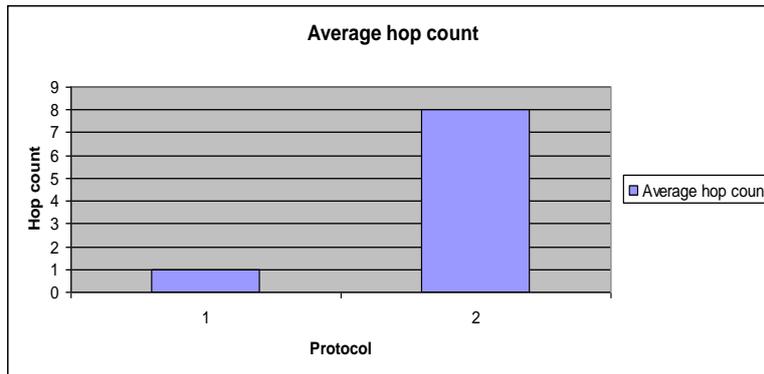


Figure 2 Average Hop Count for Existing and Proposed values

This figure represents the graphical comparison between two values of average hop count. There is high deviation between existing and enhanced DSR.

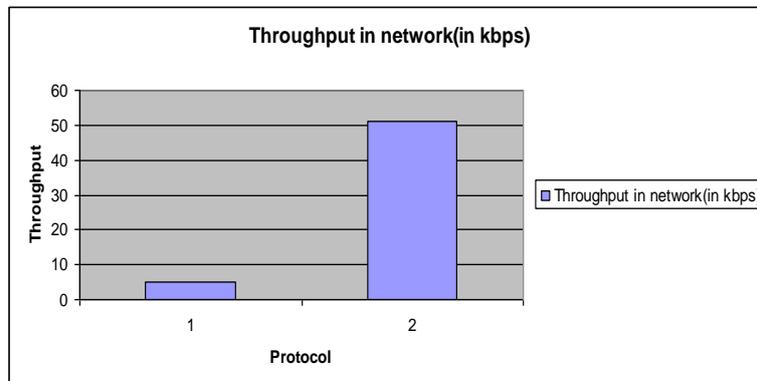


Figure 3 Throughput for Existing and Proposed values

This figure represents the graphical comparison between two values of throughput. There is ten times increase in value of enhanced DSR.

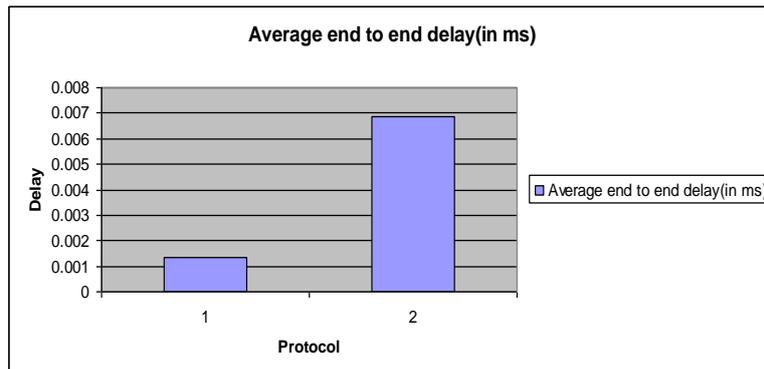


Figure 4 Average Delay for Existing and Proposed values

This figure represents the graphical comparison between two values of average end to end delay.

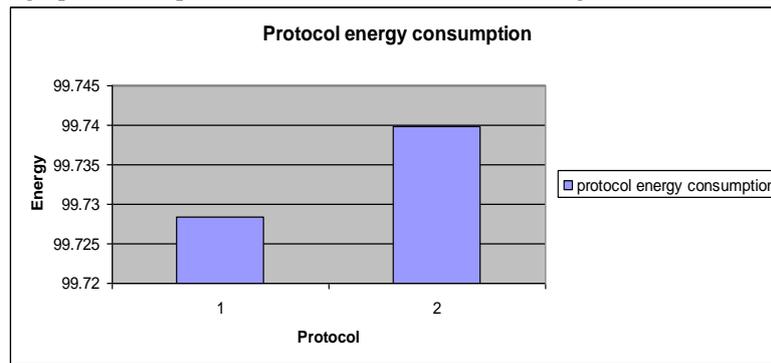


Figure 5 PEC for Existing and Proposed values

This figure represents the graphical comparison between two values of protocol energy consumption.

V. CONCLUSIONS

Nodes have limited energy they get out of energy results in interruption in communication link and decrease network lifetime. So the routing protocol must keep energy aspect in consideration. Therefore, we have introduced the mechanism in which a source node periodically sends out Sniffer Packets (SP). By introduction of the concept of sniffer packets we consider energy consumption during path establishment need to be considered and keep track by exchange of information with the neighbor nodes and thus keeping the energetic nodes in routing to increase network lifetime.

REFERENCES

- [1] Vinay Rishiwal, Mano Yadav, S. Verma, S. K. Bajapai " Power Aware Routing in Ad Hoc Wireless Networks", JCS&T Vol. 9 No. 2, October 2009.
- [2] Rajendra V. Boppana, Anket Mathur "Analysis of the Dynamic Source Routing Protocol for Ad Hoc Networks" CS Department, UT San Antonio.
- [3] Dipti Goel "A New Approach of Route Selection in DSR Using Time Routing Metric in MANET" Volume 4, Issue 4, April 2014.
- [4] Vaibhav Godbole " performance analysis of bio-inspired routing protocols based on random waypoint mobility model" Defence S & T Technical Bulletin, Science & Research Technology Institute for Defence (STRIDE), Vol. 5, No. 2, November 2012, pp. 114-134, ISSN: 1985-6571.
- [5] Kulbir Nain, Poonam Kumari & Roshan Lal Hiranwal " Improved DSR protocol using Reputation based scheme" Journal of Computer Networking, Wireless and Mobile Communications (JCNWMC) Vol.2, Issue 1 Sep 2012 7-15.