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AODV Path Ranking In MANET With QOS Parameters

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Abstract: A Mobile Ad-Hoc Network (MANET) is a development of computer networks it is an infrastructure less (wireless) network. In wireless network it changes the network topology randomly and communication can be done by anywhere, anywhere and anytime. A fundamental issue arising in mobile ad hoc networks is the selection of the optimal path between any two nodes. The propose QoS based Ad hoc On-Demand Distance Vector (AODV) Protocol with path ranking to select optimal path for transmission.

Keywords: Mobile Ad-Hoc Network (MANET), QoS, DSR, Path Ranking, AODV.

I. INTRODUCTION

A mobile ad-hoc network is a collection of wireless nodes that can communicate with each other without any dependence on a fixed infrastructure or centralized administration. Therefore MANET is a “spontaneous network “that automatically “emerges” when nodes gather together. Each node in a MANET can perform as a router and a host. Nodes in the MANET can communicate with other all nodes within their radio range or can use intermediates nodes to communicate with the nodes that are not present in their radio range.

Characteristics of MANET such as: Rapidly deployable and self-configuring, each nodes can work as hosts and routers, no infrastructure dependency, wireless links are used for the communication, nodes are always in mobile condition, routing updates very frequently, less physical security and packet delivery ratio, MANET facilitates communication in different fields such as: Military and police work, Mine cite work, Disaster relief work, To arrange urgent business meeting.

Mobile ad-hoc routing protocols are divided into following categories: Proactive protocols in which each node has to, maintain up-to-date information about all other nodes within an ad hoc network in its routing table. Reactive protocols in which routes are created on demand. Whenever a node wants to send data it initiates route discovery. Hybrid routing protocols which is combination of above two. Within a small domain proactive is used and among domains reactive approach is used.

QoS (Quality of Service) routing requires finding a route from a source to a destination with required bandwidth. The bandwidth calculation scheme developed above only provides a method to calculate the available bandwidth for a given route. Real-time applications (such as video and audio transmissions) need QoS (quality of service) support. Two widely used QoS constraints are packet delivery ratio and delay requirements. It is not a routing protocol and needs to be used together with a routing protocol to perform QoS routing.

Quality of service is the performance level of a service offered by the network to the user. The size of the ad-hoc network is directly related to the quality of service of the network. If the size of the mobile ad-hoc network is large, it might make the problem of network control extremely difficult. The goal of QoS provisioning is to achieve a more deterministic network behavior, so that information carried by the network can be better delivered and network resources can be better utilized. These QoS parameters however are generic and their calculations depend on specific networks. The QoS measure used here is packet delivery ratio.

II. RELATED WORK

Sreerama and Das et al. [1] proposed an ad hoc network is defined as an “infrastructure less” network, meaning a network without the usual routing infrastructure like fixed routers and routing backbones. Typically, the ad hoc nodes are mobile and the underlying communication medium is wireless. Each ad hoc node may be capable of acting as a router. It's characterized by multihop wireless connection and frequently changing networks. We compare the performance of on-demand routing protocols for mobile ad-hoc networks are distributed cache updating for the Dynamic Source Routing protocol(DSR) and ad hoc on-demand distance vector routing (AODV).the simulation model of the medium access control(MAC) layer is evaluating the performance of MANET protocols. DSR and AODV protocols share similar behaviors

Bhavyesh Divecha et al. [2] observed the Impact of Node Mobility on MANET Routing Protocols Models. The performance of a routing protocol varies widely across different mobility models and hence the study results from one model cannot be applied to other model. Hence it has considered the mobility of an application while selecting a routing protocol. DSR gives better performance for highly mobile networks than DSDV. DSR is faster in discovering new route to the destination when the old route is broken as it invokes route repair mechanism locally whereas in DSDV there is no route repair mechanism. In DSDV, if no route is found to the destination, the packets are dropped.

Ayyaswamy [10] compared the performance of DSR, AODV, FSR and ZRP with respect to propagation model.

Reactive routing protocols (AODV and DSR) have got good packet delivery ratio. When compared with proactive and hybrid routing protocols, hybrid routing protocol have got next higher packet delivery ratio. Similarly reactive routing protocols have got less delay and jitter.

Byung-jae Kwar [6] described that the performance of a mobile ad hoc network is related to the efficiency of the routing protocol in adapting to changes in the network topology and the link status. However, the use of many different mobility models without a unified quantitative "measure" of the mobility has made it very difficult to compare the results of independent performance of routing protocols. In this paper, a mobility measure for MANET's is proposed that is flexible and consistent. It is flexible because one can customize the definition of mobility using a remoteness function. It is consistent because it has a linear relationship with the rate at which links are established or broken for a wide range of network scenario.

III. PROPOSED SYSTEM

The Proposed system includes four phases

- ✓ Network initialization
- ✓ Selecting source and destination nodes
- ✓ Ad hoc On-Demand Distance Vector (AODV) for finding the path.
- ✓ Data packet transmission.

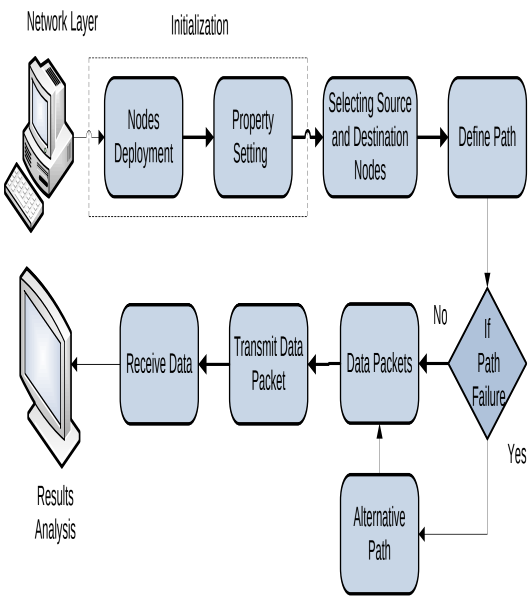

Figure 1: proposed architecture of path selection

A. NETWORK INITIALIZATION

In network initialization phase, the network owner creates its public and private keys, and then loads the public parameters on each node before the network deployment it consists of number nodes as packets by initializing each node. Also includes property setting before communication starts.

B. SELECTING SOURCE AND DESTINATION NODES

In our proposed system user will select the source and destination nodes for transmission of packets.

C. AD HOC ON-DEMAND DISTANCE VECTOR (AODV)

In AODV, each node has the routing table, and the freshness of routes is ensured with the sequence number of each the routing information. When each node receives a control packet that occurred in on demand, the routing table is updated based on the sequence number or the number of hops. If a route to a destination is needed, it is established at the route discovery phase and is maintained at the route maintenance phase

Route Discovery When a source node needs a route to a destination node and there is not the valid route in the routing table, the source node broadcasts a route request packet (RREQ) to the destination node. When each node receives the RREQ, it creates or updates a reverse route to the source node in the routing table. If it does not have a valid route to the destination node in the routing table, it rebroadcasts the RREQ. When the RREQ flooding from the source node arrives at the destination node, the destination node creates or updates the reverse route. And it uncast a route reply packet (RREP) which has an incremented the sequence number to the reverse route. When each node receives the RREP, it creates or updates a forward route to the destination node and it forwards the RREP to the reverse route. When the RREP arrives at the source node

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along with the reverse route, it creates or updates the forward route, and starts communications.

Route Maintenance Each node broadcasts a Hello packet periodically for local connectivity. It broadcasts the RREP with TTL=1 as the Hello packet. When the node does not receive any packets from a neighbor during a few seconds, it assumes a link break to the neighbor. In addition, when the node has the link break to the neighbor based on an acknowledgment of MAC layer, it detects a route break to the destination node that the next hop of the route is the neighbor. When the node that detects the link break is close to the destination node (that is to say the number of hops to the destination node is smaller than the number of hops to the source node), it requires a new route to the destination node, which is known as Local Repair.

D. PATH RANKING

On the basis of packet forwarding successfully and dropping probability each node maintains rank of every other node in the Ad-hoc network. Path ranking is determined by taking average of the rankings of each node in the path as this allows choosing shortest path algorithm if no metric is given to nodes. In case of more than one (multiple) path to the destination a path with highest ranking is chosen.

ALGORITHM FOR ASSIGNING RANK TO A NODE

- ✓ For a neutral node, that is a new node, is given a ranking of 0.5.
- ✓ Ranking of each node is done with highest ranking of 1.0 to make sure that if all are neutral nodes then shortest path first is chosen.
- ✓ For every 200ms the ranking of nodes on active path is incremented by 0.01.
- ✓ Neutral node ranking assigned 0.8.
- ✓ Packet is dropped on a link and if a node becomes un-reachable to other nodes than its ranking is reduced by 0.05.
- ✓ Lower limit of a neutral node is assigned 0.0.
- ✓ Changes on the rankings of other nodes than one mentioned above are not performed.
- ✓ Any misbehaving node given a ranking of - 100.
- ✓ If the simulation is run for long period of time then the negative rankings can be reset after a long timeout period.
- ✓ In case when no node is found that can be given packet to forward, Send Route Request is given.

Based on the path selected by the AODV based on the rank assigned, data packets will be transmitted. If the path fails to transmit due to traffic, AODV will find alternate path and transmit the data packets along the path selected and reach the destination.

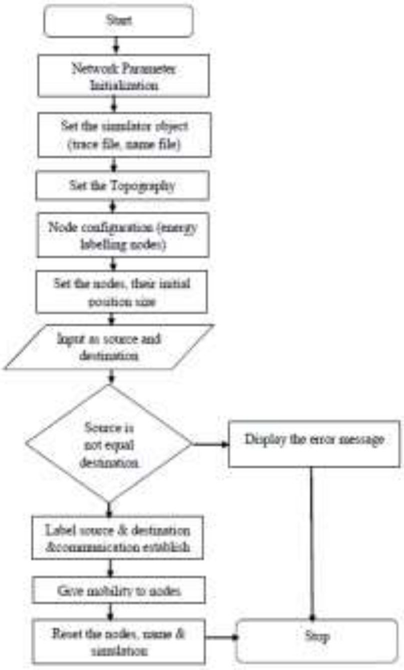

Figure 2: flow chart of the proposed system

IV. RESULTS

This section explains the Output of our proposed system. We are finding output using NS2 tool for analyzing our proposed system.

Figure 4 shows the menu where the user enters the source and destination nodes for data transfer. Initial network initialization is as shown in figure5.Next each node in the network find its neighbor node to find the path as shown in figure 6. After user's selection of source and destination nodes, for packet transmission each source and destination nodes tries to find its neighboring nodes to reach from source to destination. Once the source node finds the shortest path packet transmission takes place, the path is shown green in color. When any other node interfaces AODV method we are using to find the optimal path finds an alternative path for data transmission. Which is blue in color explain in figure 7.

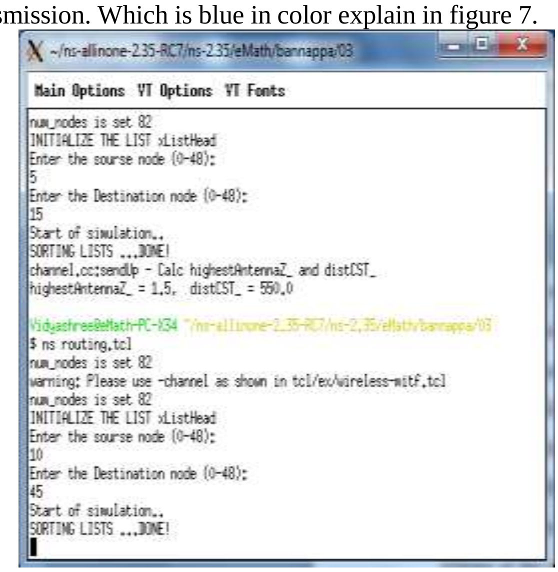

Figure 3: Source and destination node selection

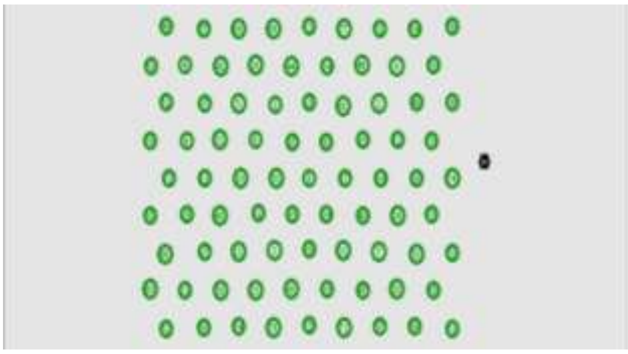

Figure 4: Network Initialization

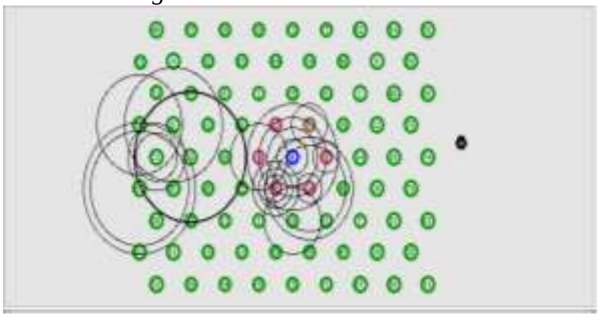

Figure 5: Finding Nearest-Neighbour

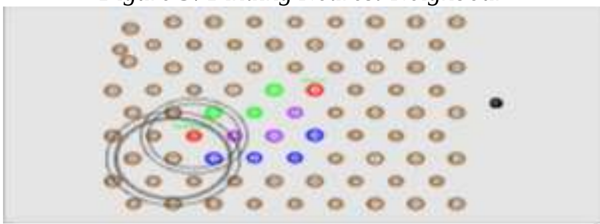

Figure 6: Nearest-Neighbor of source and destination

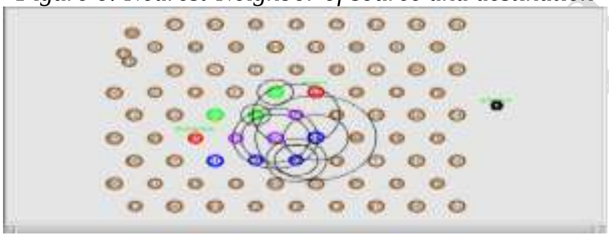

Figure 7: Source and destination node selection

Packet delivery ratio is the ratio of received packet over sent packet in the network. The PDR comparison for existing system and proposed system is shown in figure 8. The AODV protocol used helps in gaining high packet delivery ratio and average delay. The figure 9 shows the comparison graph of average delay for existing system and proposed system.

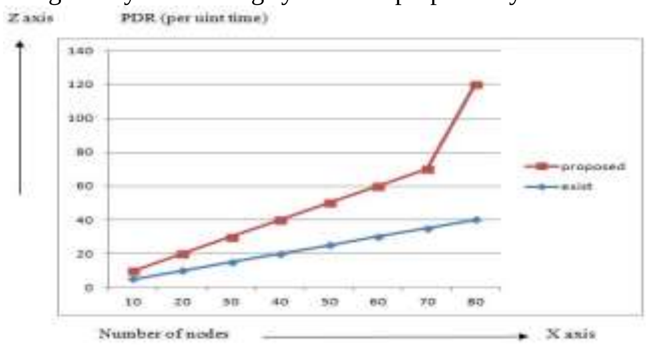

Figure 8: Comparison Graph for Packet Delivery Ratio

From figure 8, it is found that PDR ratio will increase more as compared to the existing work.

SL no	Name of the Author	No of nodes	PDR (per unit time)	Delay (ms)
1	Arzoo Dhahiya and Dr R. K. Kiran	10	98.5	450
		20	98.6	700
2	Bijan paul	30	97.2	300
		40	97.4	320
3	**Proposed Approach**	**50**	**98.58**	**340**
		80	**120**	**200**

Table 1: Comparison work for previous and proposed PDR & Delay

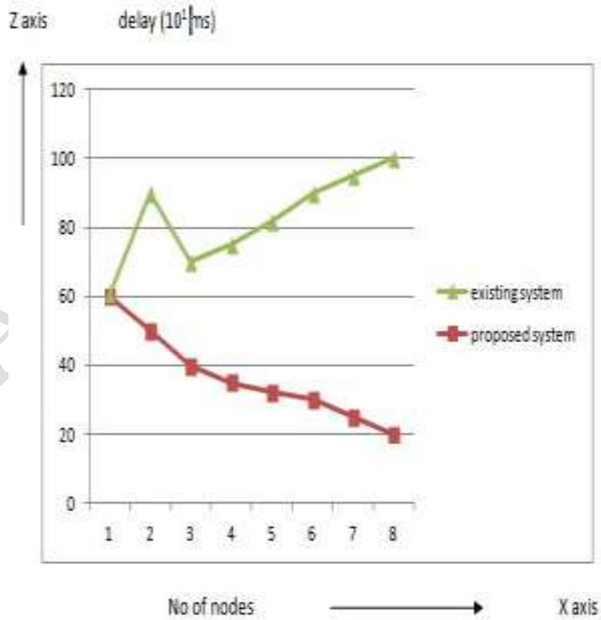

Figure 9: Comparison Graph for Average Delay

From figure 9, it is found that the proposed work reduces delay as compared to existing work.

V. CONCLUSION

The communication quality in multi-hop networks entirely depends on the selection of a multi-hop path from source to destination. Finding a path with good throughput in multi hop

MANETS (Mobile Ad Hoc Networks) is a critical job. AODV use path ranking technique to place for each node and then use dynamic routing protocol to find optimal path for data transmission.

VI. FUTURE WORK

In the future, it is possible to change the mobility of the nodes and also density of the network by directly modifying the speed, protocols, and increasing the number of nodes.

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