An Enhance Approach of Energy Aware Route Selection in AODV Over MANET

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Abstract— **MANETs are a gathering of self-motivated wireless moveable nodes which offers individuality and scalable for MANET. In Mobile ad-hoc network, nodes continuously change their position. It is composed of moving mobile nodes that are battery operated. Therefore moveable node consumed more energy. Energy is a critical object for any system or network so it necessity be exploited capably as possible. To overcome the above problem we have proposed methods for saving the energy of the mobile ad hoc network. The conditions energy calculations remain to be done by destination node only. After getting packet at destination node the destination node decide that which path is best for the reply with help of evaluated cost function in RREQ packet. Calculations are made and based on that higher energy path will be chosen. Cost function includes remaining energy and number of hop count. The proposed research work improves network energy and reduces the consumption of power also increase throughput, goodput etc. The performance of the proposed work will be examined and evaluated with NS-2.35 simulator.**

Keywords— **Mobile Ad-hoc Network, AODV, Network Simulator.**

I. INTRODUCTION

A mobile ad hoc network is a set of wireless mobile nodes that dynamically establishes the network in the absence of fixed communication. One of the individual features of MANET is, each node must be able to find out the optimal path to forward a packet. MANETs provide talented technology for civilian and military applications. One of the important research areas in MANET is starting and maintaining ad hoc network through the use of routing protocols. The increasing development in wireless local area networks has opened new limits in the field of telecommunication. MANET a composed of nodes that can communicate with each other without knowing their position [5]. These networks are needed in conditions where short-lived connectivity is required [5].

There are two well known secured-initiated on demand routing protocols include AODV and DSR. These protocols are based on plan of finding valid paths once they are needed by the source node. This procedure, known as route discovery engage the route request phase (RREQ) and route reply phase (RREP). All of these protocols construct a single-path route between a source node and a destination node. Whenever communication link breaks on the active route, each protocol has to raise a route discovery process can cause the performance badly. Single path protocols learn.

Routes and select a single best route to reach each destination [1].

In Section II, gives an overview of the original AODV protocol. In Section III, Present the literature survey on AODV. In Section IV, Problem definition. In Section V, Simulation result. In section VI, Conclusion.

II. OVERVIEW OF AD HOC ON-DEMAND DISTANCE VECTOR ROUTING PROTOCOL

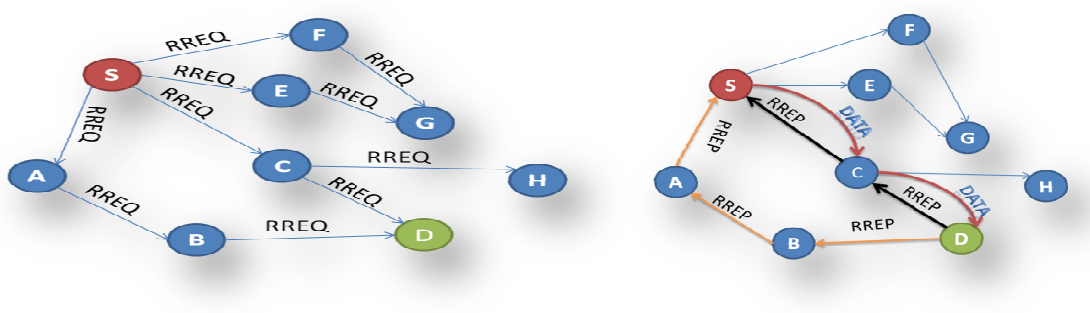
AODV stands for ad hoc on-demand distance vector routing protocol. AODV is a reactive protocol. AODV is a single path distance vector routing protocol in ad hoc wireless networks. This protocol mixes the route discovery mechanism in DSR with the approach of destination sequence number in DSDV [5]. Basically when there is one node that wants to communicate with another node that is not in range, it finds a route through the other nodes. It minimizes the number of broadcasts by creating rotes on-demand as oppose to all possible routes as in DSDV. AODV is a loop- free, single path, distance vector protocol based on hop-by-hop routing approach. There are two main procedures in AODV:

1. Route discovery
2. Route maintenance

1. Route Discovery

When source node wants to communicate with destination and if path is not available to destination then source node rebroadcast to its entire neighbor in the network. When intermediate node receives RREQ, they create reverse link to previous node. They first of all check whether valid route to destination or present. If valid route is present then another condition is hold, i.e.

intermediate node's sequence number Should be at least as great as destination sequence number in RREQ packet. If both condition hold then that node generate RREP packet. If valid route is not present then RREQ is further forwarded. RREP contains IP address of source node as well as destination and destination sequence number once the node creates the forwarded route entry. If forwarded the RREP to destination node. The RREP is thus forwarded hop by-hop to the source node. Once receives the RREP. It can utilize the path for the transmission of data packet [3].



RREQ Message RREP Message

Figure.1 Route Discovery

2. Route Maintenance

As MANET is dynamic i.e. mobility and topology of nodes always change, link break occurs, when path breaks both nodes informs their end nodes about link failure who were using path by sending RERR. End nodes delete their entry from route table as path is no longer useful. If source nodes still want to communication with destination. If reinitiate RREQ broadcasting or path finding process or repair broken link [3] .

RERR Message

Figure.2 Route Maintenance

III REVIEW OF LITERATURE

In this it will discuss about the research work of different authors, how they use the protocol to solve the problems like memory overhead, bandwidth energy consumption and extended delay which degrades its performance.

In [1] the author proposed a new advance of energy efficient secure multipath AODV for MANET based on AODV protocol is modified and change to work on multiple paths. The

Proposed Scheme is added secured and improved better result compared to previous techniques. Simulate the under attacking condition AODV and find route request send in each assembly. First calculate the energy consumption of each node and also calculate average energy consumption of each node and generate energy graph. After apply the proposed algorithm then again calculate energy of each particular node and calculate the average energy of each node and after applying this average energy is less compared to previous and the network is more energy secure. So energy of network is reduced with the proposed algorithm and gets the network more secure. This technique could also make DSR and other protocols more energy efficient and better PDR and throughput.

In [2] author propose efficient power aware routing (EPAR), a new power aware routing protocol that increase the network's lifetime of MANET. This paper calculates three ad hoc routing protocols EPAR, MTPR and DSR. EPAR is to minimize variation in remaining energies of all the nodes and extends the network lifetime. Proposed algorithm is for EPAR, the path is chosen based on energy. And first calculate the battery power of each path that is lowest hop energy of path. The path is then selected choosing the path with maximum lowest hop energy. The energy consumption and throughput in small size networks did not tell any major differences, for medium and large ad hoc networks the DSR performance proved to ineffective and the performance of EPAR, MTPR and DSR in small size networks was comparable, but in medium and large size networks, the EPAR and MTPR produced better results and the performance of EPAR in terms of throughput is good in all the situation

In [3] author proposed for this purpose which is based on AODV. The protocol reduced the transmission power of node which is part of an active route if next hop node is closer. The distance between two successive nodes is calculating based on RSS (received signal strength) from next hop during route reply process, if RSS is high it means that nodes are closer. As a result lesser transmission power will be require to forward data. Battery consumption is reduced and performance of EERP protocol is better than accessible AODV. Transmission power control which reduced obstacle prolong the battery lifetime of network.

In [4] author proposed method for finding complete node- disjoint paths between a pair of nodes in an on demand mode. Without begin a new route discovery process, the new route could be set up and a new transmission could be continued. These advances employ the same principle of AODV protocol which is accepted, but the memory path is increased as other paths are stored. Proposed protocol has better delivery ratio with less energy consumption fixed cost when compared with the available network protocols.

In [5] author proposed mechanism for enhanced multi route AODV protocol. In this algorithm, reverse and forward paths are not overlap on each other, between pair of each node. Each node changes its transmission power according to its destination to its next hop. Each path has chosen an optimal route between pair of source and destination proportional to residual energy and to the distance between them. Each node records the optimal transmitter power for its next hop in its forward routing table. Path's lifetime is chosen based on node's lifetime on the path. Compare lifetime and performance of EMR-AODV with AODV, DSR and AOMDV. And showed that improves lifetime of nodes and decreases the routing overhead by reducing the number of route discovery efforts.

In [6] authors proposed move toward uses a data structure named backup-list to hold all the active paths for destination and find optimal route. In this work, an effort has been made to

implement the concept of quick and intelligent route rebuilding at the time of link failure. This work implements a new data structure which stores all the routes that were found during route discovery process and is during link breakage to search optimal route and update routing table protocol prevents the regeneration of control packets to make-up the failed link. It could be constructed that the AODV with proposed approach work better as compared to that of original AODV protocol. This improves packet delivery ratio as well as throughput of the network.

IV. PROBLEM DEFINATION

In general conservative AODV routing mechanism, anode broadcasts RREQ message to its neighbors when it needs to communicate with a destination node. If intermediate node lifetime is not sufficient (node expires after some time). Therefore, it could not be able to forward the RREP message on the reverse path. Hence, the source node requires rebroadcasting the route request (RREQ) message in order to find an optimal path for communicating to the destination node. This may possibly cause congestion in the network, reduce the packet delivery ratio; raise the end to end delay and needless rebroadcasting of RREQ packet.

V. SIMULATION RESULT

Network Simulator Version is the abbreviation of NS 2. It is an open-source event-driven simulator. The ns Simulator covers a very large number of applications, of protocols, of network types, of network elements and of traffic models called as "simulated objects". Basically the NS2 is collection of all protocols. Protocols are written in .cc file and the .h file is used to change in header format of protocol. NS2 is kernel which is a part of operating system. For any protocol after compiling the .cc file, .o file is generated this shows the output file of protocol.

In AODV, use energy to find energy of whole path. And To modify the route request packet to introduce the energy modal in aodv.h and packet reception routines in aodv.cc and evaluate the cost function which is denoted in class of aodv send request. Also modified in the same class to particular node energy. At the destination node evaluated Cost function and find out the higher energy value path also including some weight age of hop count at the class of aodv.cc with the function of maximum value of cost function for the support of energy efficiency aim. Fig. a. shows the performance analysis of throughput with respect to number of nodes. The simulation beginning of proposed work in form of phase is to modify the route request field to enhance the improvement of energy and also increase the Throughput of the mobile ad hoc network. According to the modification of energy model and cost function.

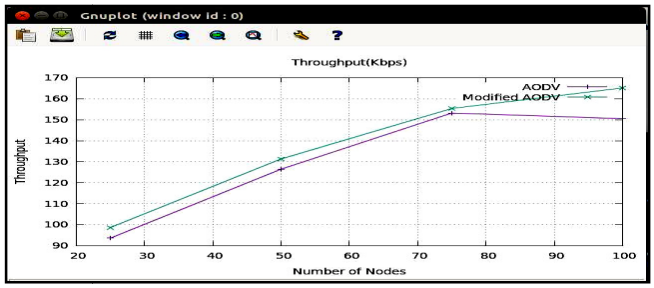


Figure a. Throughput versus Number of Nodes

Fig. b. shows the performance analysis of Goodput with respect to number of nodes. The simulation beginning of proposed work in form of phase is to modify the route request field to enhance the improvement of energy and also increase the Goodput of the mobile ad hoc network. According to the modification of energy model and cost function.

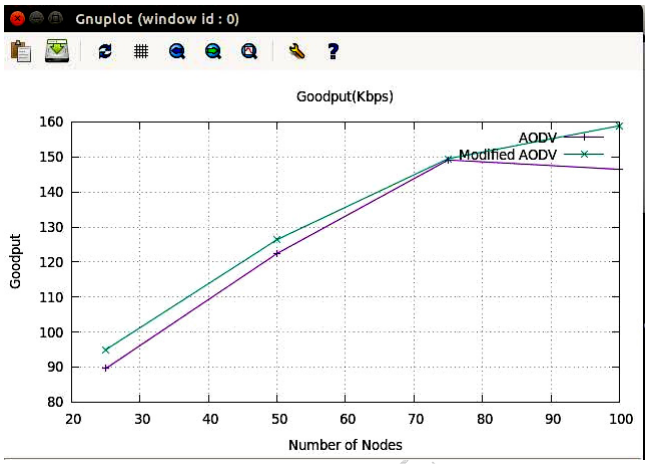


Figure b. Goodput versus Number of Nodes

VI. CONCLUSION

In previous research work, AODV routing modified using metric values like bandwidth, hop count, delay. In our work Modified AODV use energy parameter of whole path and for that purpose we use no extra packet, we just use of RREQ. Based on Energy and Hop count modified AODV find cost of each path and find best path with highest cost value. After Energy model involved the implementation in RREQ packet for the support of energy efficiency aim to evaluate the cost function was done. Where it was proved that to adding parameter remaining energy, hop count, cost function in route request message format in reserved field to select the maximum energy path among all routes. Simulation results shows that the improvement of energy or analyzed that when number of node increase energy of the node will be improved with respect to number of node scenario.

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