An Energy Conservation Approach For AODV In MANET’S

Harsh Patel
M.E (IT),
LJ Institute of Engineering and Technology.

Mr. Swarndeep saket
Assistant. Professor. PG Department,
L.J Institute of Engineering and Technology.

Abstract- Mobile Ad-hoc Networks (MANETs) is used proliferation of wireless voice and data communications services to the users above to approached of fixed network connectivity. Each connected node in MANETs has characteristic of mobility which gives the advantage of move from one location to another location within a boundary. Ad hoc On-Demand Distance Vector (AODV) Routing is a routing protocol for MANETs and other wireless ad hoc networks. Each node in MANETs is mobile device and each device has its own residual energy basically battery operated, and that have access to limited amount of energy. Discharge of residual energy is lead to link failure. During the active session of communication, which is energy wastage due to re-run procedure of AODV. This work will propose modification of AODV procedure to account the residual energy and select the best path based on the existing matrices and total energy of the path.

Keywords – MANET, AODV.RREQ, RREP.

I. INTRODUCTION

The maturity of wireless transmissions and the popularity of portable computing devices have made the dream of “communication anytime and anywhere” possible. Users can move around, while at the same time still remaining connected with the rest of the world. We call this mobile computing or nomadic computing, which has received intensive attention recently. Generally, most of the nomadic computing applications today require single hop connectivity to the wired network. This is the typical cellular network model that supports the needs of wireless communications by installing base stations or access points. In such networks, communications between two mobile hosts completely rely on the wired backbone and the fixed base stations. Nevertheless, the wired backbone infrastructure may be unavailable for use by mobile hosts for many reasons, such as unexpected natural disasters and radio shadows. Also, it might be infeasible to construct sufficient fixed access points due to cost and performance considerations; for instance, having fixed network infrastructure in wilderness areas, festival grounds, or outdoor assemblies, outdoor activities is sometimes prohibitive. In emergency search-and-rescue or military manoeuvres, a temporary communication network also needs to be deployed immediately. In the above situations, a mobile ad hoc network (MANET) can be a better choice.

II. INTRODUCTION OF MANET

A network is set of devices connected with each other to share resources. Main goal of network is to share resources, resources may be hardware ,software or data. Network has five components sender(system which want to send data), receiver(system which is requested by sender system) , message(data),communication medium and protocol. Based on communication medium networks are divided mainly into two types wired network and wireless network. Ad hoc wireless networks are defined as the category of wireless networks that utilize multi-hop radio relaying and are capable of operating without the support of any fixed infrastructure (hence they are also called infrastructure less networks). The absence of any central coordinator or base station makes the routing a complex one compared to cellular networks.

A Mobile Ad Hoc Network (MANET)[1] is a continuously self configuring, infrastructure-less network of mobile devices connected without wires. Ad Hoc is Latin & means “for this purpose” Each device in a MANET is free to move independently in any direction and will change its links to other devices frequently.

The mobile Ad hoc networks are different from internet in two major ways. The first is that the hosts in this network are resource-constraint. They have only limited energy, computing power & memory. The second is that the hosts (and therefore the routers) of the network are mobile & the topology changes rapidly. These two features pose great challenges to the researchers working in the area.
Characteristics of MANET

MANET has the following features:

Autonomous Terminal:

In MANET, each mobile terminal is an autonomous node, which may function as both a host and a router. In other words, besides the basic processing ability as a host, the mobile nodes can also perform switching functions as a router. So usually endpoints and switches are indistinguishable in MANET.

Distributed operation:

There is no background network for the central control of the network operations and so the control and management of the network is distributed among the terminals. The nodes involved in a MANET should collaborate amongst themselves and each node acts as a relay as needed, to implement functions e.g. security and routing.

Multihop routing:

Basic types of ad hoc routing algorithms can be single-hop and multi-hop, based on different link layer attributes and routing protocols. Single-hop MANET is simpler than multi-hop in terms of structure and implementation, with the cost of lesser functionality and applicability. When delivering data packets from a source to its destination out of the direct wireless transmission range, the packets should be forwarded via one or more intermediate nodes.

Dynamic network topology:

Since the nodes are mobile, the network topology may change rapidly and unpredictably and the connectivity among the terminals varies with time. MANET should adapt to the traffic and propagation conditions as well as the mobility patterns of the mobile network nodes. The mobile nodes in the network dynamically establish connectivity among themselves as they move about, forming their own network on the fly. Moreover, a user in the MANET may not only operate within the ad hoc network, but may require access to a public fixed network (e.g. Internet).

Fluctuating link capacity:

The nature of high bit-error rates of wireless connection might be more profound in a MANET. One end-to-end path can be shared by several sessions. The channel over which the terminals communicate is subject to noise, fading, and interference, and has less bandwidth than a wired network. In some scenarios, the path between any pair of users can traverse multiple wireless links and the link themselves can be heterogeneous.

Light-weight terminals:

In the MANET nodes are mobile devices with less CPU processing capability, small memory size, and low power storage. Such devices need optimized algorithms and mechanisms that implement the computing and communicating functions

III. WORKING OF AODV

AD HOC ON DEMAND DISTANCE VECTOR (AODV) ROUTING PROTOCOL

AODV routing protocol which uses the reactive approach of routing but it is based on the DSDV protocol explained in the former section. It uses the table driven approach but finds the routes only when necessary. Any reactive protocol does three functions in
the network as discussed earlier viz. a) Route Discovery, b) Data Forwarding and c) Route Maintenance. AODV performs these functions by using FOUR control packets i.e.
1) Route_Request (RREQ) packet
2) Route_Reply (RREP) packet
3) Route_Error (RERR) packet
4) Hello packet

IV. LITERATURE SURVEY

A. A RELAVANCE SURVEY ON ENERGY CONSERVATION APPROACH FOR AODV IN MANET’S

In this paper [1] we are considering available energy of the nodes, need of energy for current transaction as well as future energy of the nodes. In this mechanism first an energy threshold will be set to avoid immediate dead node occurrence. Whenever transaction is needed first neighbour nodes will be filtered on current sending nodes region. Then next hop will be selected based on available energy, need of energy for transaction and future energy. Need of energy will be calculated based on distance of transaction and size of data. Future energy of the node will be computed by subtracting need of energy with available energy. If future energy is greater than energy threshold means that particular node is away from dead node.
occurrence in current situation, so it will be considered to be a next hop. nodes with lowest need and good future energy will get more priority to be chosen as next hop. This mechanism will help us to find effective energy aware route which consumes lowest energy for each transaction. This route will be changed according to position of the nodes. Ultimately, we will obtain good lifetime at node level as well as entire network level as a result of improved remaining energy and packet delivery ratio.

In this paper [2] an energy efficient algorithm, which is used for AODV. They used HELLO massages of AODV to calculate the difference between transmitting power and receiving power and which gives the value of propagation loss, somewhat modified the original 32-bits destination sequence number field to a new 32- bit value, obtained from the source battery function in RREQ. The formatted HELLO RREP by reserving a field of (9 bits) for power loss level with 8 bit long length. This field is a power loss for specific link. As source is having all the information so it is easy to compute the power loss by subtracting the received energy from the transmitting energy. The proposed an adaptive low battery alert mechanism to overcome the overuse of the fustly established route. They used 50% or 40% of the new battery capacity. The result shows that this algorithm can improve network lifetime in both static and mobile networks.

In this paper [3] The protocol that is proposed in this paper integrates the concept of drain count into AODV in order to make it energy efficient. If the energy of a node is lesser than the set threshold energy, then the drain count value of the path is incremented by a factor of 1. The path that has the least drain count, i.e. the path which has least number of nodes having energy below the threshold energy, is chosen from among the paths that are traversed by the first few control packets that arrive at the destination node. This ensures that a path with a reasonably short distance is chosen. In the case that two or more paths have the same drain count value, then the path with the least hop count is selected in accordance with AODV. If two or more paths with equal hop count exist, then the path containing nodes with least transmission power is chosen. This also helps in obtaining a longer network lifetime. In case of a link failure in the chosen path, then an alternate path is chosen with low convergence time as the paths that were discovered initially are stored at the destination.

In this paper [4] To extend the energy efficiency in AODV, proposed method have considered for energy enhancement technique in AODV routing protocol. This scheme is applied on AODV routing protocol in route discovery phase. A recvRevrese()function is used at certain threshold level to check out the energy level of the node. If energy of node is less than the set threshold energy then, it does not consider the concept of packet dropping and do not need any connection reestablishment. It initiates the work without any disconnection of the nodes. Basically, it invokes the function recvRevrese() to go back the previous node. After reaching there, it send RREQ message to find out the new route without breaking the path. It avoids initiating the path from source node again which significantly improves its energy. But in the existing AODV routing protocol after drop packet, it again reinitiates the path from source node which increases energy consumption in AODV. Hence, the proposed AODV routing protocol works efficiently than the existing AODV protocol.

In paper [5] The proposed solution in this paper mainly deals with the total residual energy of the path. In order to achieve the efficiency in energy consumption, three changes where done to the original AODV protocol. The proposed steps as following.

### B. COMPARISON TABLE

<table>
<thead>
<tr>
<th>Sr No.</th>
<th>Paper Title</th>
<th>Method Used</th>
<th>Advantage</th>
<th>Disadvantage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>E-E-AODV: An Efficient Approach For Energy Conservation in MANETs</td>
<td>RREQ RREP Need of energy threshold</td>
<td>an energy efficient routing mechanism in MANET to improve the overall lifetime by optimizing the remaining energy of the nodes in the network.</td>
<td>The use of throughput, pdr time are delay . use various energy sensitive MANET.</td>
</tr>
<tr>
<td>2</td>
<td>Energy Efficient Routing Protocol with Ad hoc ondemand Distance Vector for MANET</td>
<td>RREQ RREP Residual energy Quality of service</td>
<td>routing protocol provides better lifetime and Quality of Service than the AODV and Max/Min energy routing protocol</td>
<td>The Bettery power of nodes in a mobile ad hoc network.</td>
</tr>
<tr>
<td>3</td>
<td>An Improved Energy Efficient AODV Routing Protocol for MANETs</td>
<td>RREQ end to end delay Packet delivery ratio</td>
<td>the amount of remaining energy helps to probabilistically determine an efficient path.</td>
<td>Control packets are exchanged.</td>
</tr>
<tr>
<td>4</td>
<td>Performance Evaluation of Energy Efficient For</td>
<td>RREQ RREP</td>
<td>It enhances the remaining energy of the nodes</td>
<td>AODV function at certain threshold level for various</td>
</tr>
</tbody>
</table>
MANET Using AODV Routing Protocol | Threshold End to end delay in an ad hoc network | nodes.
---|---|---
5 | Compromising AODV for Better Performance Improved Energy Efficiency in AODV | RREQ RREP PDR | Successful compilation of all the simulations assures that this modification is accurate. | Generate is the trace file.

V. PROBLEM STATEMENT

Development of new routing scheme for MANET is to overcome issues related to efficiency in routing process in MANET to transfer data from source to destination.”

VI. PROPOSED WORK

STEP 1: Actual source and receive
STEP 2: Set source as sender
STEP 3: Filter the neighbor nodes nodes which are toward receiving position
STEP 4: Calculate need of energy for transaction with filtered neighbors
STEP 5: Calculate remaining future energy of neighbor after transation
STEP 6: If future energy is greater than threshold & need of energy
STEP 7: Add next hop into path-YES
STEP 8: Drop the Packet-NO
STEP 9: If next hop is equal to
STEP 10: Data transaction in identified path-YES
STEP 11: Set next hop as sender-NO
VII. PROPOSED MODEL

Actual source and receiving

Set source as sender

Filter the neighbor nodes which are toward receiving position

Calculate need of energy for transaction with filtered neighbors

Calculate remaining future energy of neighbor after transation

If future energy is greater than threshold & need of energy

Add next hop into path

If next hop is equal to

Set next hop as sender

Data transaction in identified path

Figure-5 Proposed Model
VIII. SIMULATION AND RESULTS

A. Simulation Parameters

<table>
<thead>
<tr>
<th>Simulation Parameters</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simulation Area</td>
<td>500m * 500m</td>
</tr>
<tr>
<td>Number Of Nodes</td>
<td>25, 50, 75, 100</td>
</tr>
<tr>
<td>Channel</td>
<td>Wireless channel</td>
</tr>
<tr>
<td>Mac Layer Protocol</td>
<td>IEEE 802.11</td>
</tr>
<tr>
<td>Transport Layer Protocol</td>
<td>UDP</td>
</tr>
<tr>
<td>Network Layer Protocol</td>
<td>AODV, MAODV</td>
</tr>
<tr>
<td>Traffic Type</td>
<td>Constant Bit Rate</td>
</tr>
<tr>
<td>Pause Time</td>
<td>10 ms</td>
</tr>
<tr>
<td>Maximum Speed Of Node</td>
<td>10 m/s</td>
</tr>
<tr>
<td>Maximum Connections</td>
<td>10</td>
</tr>
<tr>
<td>Transmission Rate</td>
<td>4 packets per second</td>
</tr>
<tr>
<td>Packet Size</td>
<td>512 byte</td>
</tr>
</tbody>
</table>

B. Results

Performance analysis of Throughput in Kbps:
Throughput: It may be defined as the rate at which bits transferred between source and destination. It measures in kbps.
Throughput = Total number of Byte Received/Total Time taken

Figure 6 Performance Analysis of Throughput using AODV and MOD-AODV

Performance analysis of Pdr(Packet Delivery Ratio) in Kbps:
Pdr (Packet Delivery Ratio): It may be defined as the ratio of send bytes and received bytes. It measures in kbps.
Pdr = Send bytes / Received bytes.
Performance analysis of Goodput in Kbps:

Goodput: The amount of data considered excludes protocols overhead bits as well as retransmitted data packets. It measures in kbps.

Goodput = Throughput – Header

Figure-7 Performance Analysis of PDR using AODV and MOD AODV

Figure-8 Performance Analysis of Goodput using AODV and MOD-AODV
IX. CONCLUSION

In MANET, that overall the performance of existing AODV protocol can be enhanced by doing a few modifications. MAODV use distance and energy. MAODV give more importance to energy. If weighting factor less than threshold value then this path become shortest and multipath provide the redundancy. As per proposed work MAODV Work AODV with the help of performance metrics such as throughput, energy consumption, PDR. In this way, our primary design is to make AODV more optimizes and energy efficient in MANET.

REFERENCES


