International Journal of Scientific Research and Engineering Development-– Volume 3 Issue 4, July-Aug 2020

Available at www.ijsred.com

RESEARCH ARTICLE OPEN ACCESS

Energy Efficient Multipath Routing Technique in MANET using Fitness Function

Lakshmi Prasad[1], Bibin Varghese[2],Smita C Thomas[3]

[1](P G Scholar, Department of Computer Science and Engineering,Mount Zion College of Engineering, Kadammanitta
Email: lakshmiprsd24@gmail.com)

[2](Assistant Professor, Department of CSE, Mount Zion College Of Engineering, Kadammanitta)

[3] (Research Scholar, VelsUniversity,Chennai
Email: smitabejoy@gmail.com)

----------**********----------

Abstract:

Mobile Ad Hoc Network (MANET) is a collection of wireless sites that form a temporary network without relying on any infrastructure or central management. Electricity consumption is considered one of the major constraints on MANET, as areas that are not compatible with electricity and have to rely on batteries, thus reducing network life time as batteries run out of power as zodias move and change their locations rapidly in MANET. The research proposed in this paper highlights this specific power consumption problem in MANET through the Fitness Function process to increase energy expenditure in the Ad Hoc On Demand Multipath Distance Vector (AOMDV) protocol protocol. The proposed protocol is called Ad Hoc On Demand Multipath Distance Vector by Fitness Function (FF-AOMDV). Exercise function is used to find the right path from the source to the destination to reduce energy expenditure on the route multipath. The effectiveness of the proposed FF-AOMDV protocol was tested using Network Simulator Version 2 (NS-2), where performance compared to AOMDV and Ad Hoc On Demand Multipath Routing with Life Maximization (AOMR-LM), both of which are very common Popular agreements proposed in this area. Comparisons were evaluated based on power consumption, inputs, packet delivery rate, end delays, network life and performance metrics for maximum measurement, node speed variations, packet size and measurement time. The results clearly show that the proposed FF-AOMDV AOMDV failed and AOMR-LM under metric metrics and network performance parameters.

Keywords **—Energy efficient protocol, mobile ad hoc network, multipath routing, and fitness function**

----------**********----------

I. INTRODUCTION

Power consumption is an important issue for ad hoc networks because mobile nodes are enabled. To prolong the lifespan of ad hoc networks, it is a very sensitive issue to reduce the energy consumption of spaces. In this paper, the efficient power protocol selects the most efficient method. The plan also looks at the potential for the transmission of alternatives such as metric energy to increase network lifespan and reduce the energy consumption of transit areas. The purpose of the proposed system is to obtain an accurate route based on two power metrics while selecting the data transfer packets. This process was performed using NS-2.34. Imitation results indicate that the proposed protocol for the dynamic route and the remaining power of the power control mode can extend the life span and can achieve higher performance compared to the traditional ad-hoc protocol for veterinary grade (AOMDV) protocol.

In MANETs, the battery capacity of the mobile number affects the survival of the network because the connectors are connected when the battery is empty. Therefore, the law governing the power of a mobile node is important to ensure network connectivity and extend network time [3]. Power-conscious route agreements deal with strategies that reduce the battery power of mobile devices. This method is done primarily by sending traffic through nodes that their batteries have high power levels. This will increase network time.

Various power sensitization suggestions have been proposed based on the power consumption of the transmission or the remaining battery level of the transit or both. Using such well-known information, various route costs and route selection algorithms have been investigated with the aim of improving energy efficiency in MANET [4]. Many route agreements have been formed over the last few years to extend the lifespan of the route and change the life of the network. One of these developments is repetitive policies. Multipath Route Agreements enable the source node to select the best route between multiple routes during a single route acquisition process. This process in retrieving multiple routes will reduce the number of router acquisition processes as there are already supported routes and in the event of an alternative failing to reduce end delays, power consumption and network time.

Multipath route protocols have several drawbacks. One of them is to find the best route from springs to your destination. The problem becomes complicated with the large number of mobile sites connected to each other through data transmission. In this case, a lot of energy will be used during the short-term investigation. Later, most of the energy is spent on data transfer.

Strength functioning is an optimization method that comes as part of many usable algorithms such as genetic algorithm, bee colony algorithm, firefly algorithm and particle swarm optimization algorithm. Physical fitness is a very important factor in the process of fitness, which can be many factors depending on the purpose of the research. In MANET, the strength factor is often the power, the distance, the delay, and the bandwidth. This is similar to the reasons for designing any road system, as it aims to improve network resources.

II. LITERATURE SURVEY

Literature reviews are the text of a scholarly paper, which includes current information including findings, as well as theoretical and topic contributions to a particular topic. Literature reviews are a second source, and do not report new or original experimental work. The textbook review can be included as part of a peer-reviewed essay that explores new research, provides access to the current study within the body of relevant literature and provides the reader with context. In such a case, reviews often precede the process and the results of the work.

The ad hoc networks (MANETs) contain a collection of wireless communication sites that exchange information between them without relying on a limited channel or wireless network.

MANET environments are often divided by their limited power, processing, and memory resources and high mobility. In such networks, wireless cell nodes can dynamically enter the network and leave the network. Due to the limited range of wireless network transfers, more hops are often required for a node to transfer data to any other node in the network. Thus routing is an important problem in the construction of MANET. In this paper, we take a direct look at the issues of route duplication in MANETs. Multipath route allows the establishment of multiple routes between a single source and a single local area. It is generally recommended to increase the reliability of data transfer (e.g. error tolerance) or to provide load balancing.

Energy conservation is an important issue in ad hoc networks (MANET), where institutions are constantly given limited power. The new traffic protocol is being developed in light of low-energy impact studies on ad hoc networks. The novel novel protocol (protocol sensing routing protocol, ESRP) is based on the power sensing strategy. Strategies to confuse multiple strategies and replacement rides are both accepted in this paper. Considering the level of residual energy and energy consumption, different packaging methods are selected. Location adjustment is accepted, which can reduce the return of packets effectively when the link breaks. We focus on network time more on all activities.

In the event of any natural disasters such as earthquakes, floods in the area will be relocated i.e., people in the area will not be able to communicate with others outside the area. In that case the ad-hoc network is helpful. Today the ad-hoc network implements the AOMDV protocol. The AOMDV router protocol requires high power to transmit data and therefore has limited network life.

In MANETs, the battery capacity of the mobile number affects the survival of the network because the connectors are connected when the battery is empty. Therefore, the law governing the power of a mobile node is important to ensure network connectivity and extend network time.

In this paper agreement the power to use a line called ad-hoc in the multipath range for fitness function is used (FF-AOMDV) used to reduce power consumption during messaging. FF-AOMDV uses robust function as a process of optimization. The biggest advantage is that we can send the package with less power consumption, less time, higher packet delivery rate, and higher network life time. In this paper the Dijikstras algorithm is used to find the shortest route and the AES is used for encryption to ensure security.

III. EXISTING SYSTEM

Mobile Ad Hoc Network (MANET) is a collection of wireless mobile operators that build temporary network power without relying on any infrastructure or central management. In the event of any natural disasters such as earthquakes, floods occur in an area where the area will be relocated. i.e., people in the area are unable to communicate with others outside the area. In that case the ad-hoc network is helpful. Today the ad-hoc network implements the AOMDV protocol.

Ad Hoc On-Demand Multipath Distance Vector (AOMDV)

A route search protocol, AOMDV has its roots in the Ad hoc On-Demand Distance Vector (AODV), a one-way rule. AOMDV creates a more comprehensive AODV to find, across the entire route acquisition process, the amount (e.g. several alternatives) between the source and destination. Repetition is a guarantee of discomfort and connection. AOMDV similarly provides two important services: route acquisition and route maintenance. Relying heavily on the AODV route data, which already exists, AOMDV goes beyond AODV through the acquisition of multiple routes. Compared to AODV, in addition to AOMDV only additional RREPs and RERRs are designed for multiple acquisitions and duplicates, as well as additional routes for packing route control packages (e.g. RREQs, RERRs and RREPs) [5]. Adding some fields and changing others has changed the

format of the AOMDV route table. Figure 1 introduces the AODV and AOMDV route table installation structure. In AOMDV, the advertised_hopcount is used instead of hopcount in AODV [6]. Route_ is suspended as a substitute for nexthop; this change defines multiple nexthops with specific hopcounts. All nexthops, however, are assigned the same sequence number. Every time a sequence number is updated, advertising_hopcount is started.

AOMDV's main idea is to find multiple routes within the route acquisition process. The AOMDV design is intended to help dynamic ad-hoc networks emerge frequently from link failure and channel fragmentation. A new route acquisition procedure is required in case all routes to your destination.

AOMDV uses three control packets: route request (RREQ); route response (RREP); and route error (RERR). First, when a source node is required to transfer data packets to a specific location, the RREQ [10] is distributed to the desired location. Because RREQs are a virtual network network, several copies of the same RREQ may be obtained by the node. At AOMDV, all duplicate copies are screened to determine the alternative. However, in all the sets that lead to the sources, the only use of those copies, which maintains a sense of relief and unhappiness, makes way back. In the event that central locations find a flexible route using a copy of the RREQ, perform a check to determine the number of positive routes forward (e.g. one or more) to the destination. In that case, the RREP was generated by a node and the request is sent to the source using the return method. Since the acquisition of this route, RREP has a forward-looking approach that can be employed on any previous RREP. The RREQ is no longer distributed by the central region. Otherwise, the node will also distribute a copy of the RREQ and in the event that any other copy of this RREQ has not been forwarded and this copy has led to the renewal or construction of a return route. As central locations, your location similarly creates flexible routes when it receives copies of the RREQ. As a response to each copy of the RREQ that accesses inland without direct access to the source, the destination produces RREP, despite making delicate routes using only RREQ copies that arrive on the smooth and enjoyable routes to the source. The RERR package is used for AOMDV route maintenance

Disadvantages

AOMDV routing protocol need high energy to send data so it has less network lifetime. In MANETs, the limited battery capacity of a mobile node affects network survivability since links are disconnected when the battery is exhausted. In a normal scenario, when a RREQ is broadcasted by a source node, more than one route to the destination will be found and the data packets will be forwarded through these routes without knowing the routes' quality.Therefore, a routing protocol considering the mobile nodes energy is essential to guarantee network connectivity and prolong the network lifetime.

IV. PROPOSED METHOD

Route agreements in MANET can be divided into two main categories namely the protocol traffic route protocol and the demand protocol. The protocol driven by a road tablet is also called the terms used. In the table-driven protocols for each of the first tablets calculates the path to all the other networks in advance, each node stores one or more tables containing data to move to any other location on the network. All nodes update these tables to maintain a consistent and recent view on the network. When network topology changes nodes it transmits and updates messages across the network to maintain consistent and up-to-date network information across the network.

Most of the protocols need to be built and use only one method for each source list and

destination. A key problem in linking ad hoc is how to effectively move data packets between nodes successfully without prioritization or centralized control, which is the main purpose of ad advertising agreements. Due to node traffic, node failures, and dynamic radio channel signals, road links may be temporarily unavailable and make the route inoperable. The basis for finding alternatives may be higher and further packet delivery delays may be introduced. The Multipath Router tackles this problem by providing more than one route to your destination. Source and intermediate areas can use these methods as primary and secondary routes. Alternatively, traffic can be distributed across multiple channels to improve transmission reliability, providing load balancing and secure data transmission. Multipath rotation effectively reduces the frequency of route acquisition and therefore the latency of the acquisition is reduced when the current route is violated. The duplicate method appears to be a promising method for ad hoc route protocols. Providing multiple channels is helpful for communication, especially in MANETs where routes often run out due to wireless communication quality. Many approaches can be helpful in improving the effective bandwidth of communication, responding to congestion and burden, and service delivery.

Areas in MANET are limited by limited battery power. Therefore, power management is at a critical juncture in those networks. The use of multi-hop radio transmissions requires a sufficient amount of telephone transfer to maintain network connectivity. Therefore, a battery maker is a valuable resource that should be used sparingly to avoid premature demolition of any surface. Power Management deals with the process of managing energy resources by controlling battery inefficiency, adjusting transmission power, eliminating power supply configurations to extend the lifespan of wireless network locations.

FF-AOMDV

In this paper, a new law for the re-use of the FF-AOMDV protocol, which is a combination of Strengthening and AOMDV protocol, has been proposed. Under normal circumstances, when the RREQ is distributed by the source area, more than one route to the destination will be available and data packets will be transmitted through these channels without knowing the quality of the channels. By using the proposed algorithm in the same scenario, the route selection will be completely different. When the RREQ is distributed and accepted, the source node will have three types of information to find a shorter and more efficient way of using reduced power. This information includes:

- Details about the network cover for each of the node levels.
- The distance of all the routes.
- The force used to locate the route.

The route, which uses less energy, may be (a) the shortest route; (b) the method with the highest standards, or (c) both.

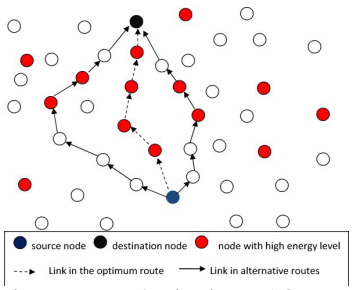


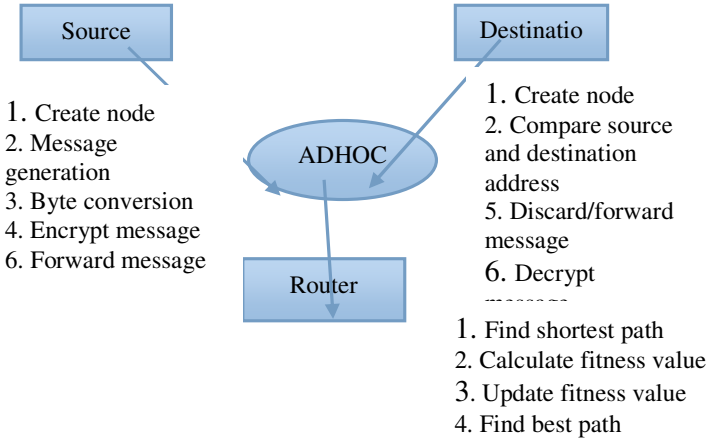
Fig. 1 Optimum route selection in FF-AOMDV

The optimum route refers to the route that has the highest energy level and the less distance. Priority is given to the energy level, as seen on the route with the discontinuous arrow (Figure 4.1). In another scenario, if the route has the highest energy level, but does not have the shortest distance, it can also be chosen but with less priority. In some other scenarios, if the intermediate nodes located between the source and destination with lesser energy levels compared to other nodes in the network, the fitness function will choose the route based on the shortest distance available. In all the cases,

with these two parameters, only those routes will be chosen by the fitness function which has less energy consumption and will prolong the lifetime of the network.

The Overall System consists of Set of Nodes, Router. The Whole system can be represented in a Block diagram as shown below in the figure 4.2. The Node mentioned here can be for sending and receiving message. Router is used to find best path and route packets. The arrow lines only show the flow of data from one entity to other entity and so on.

Fig 4.2 Architectural design



Implementation

The implementation of proposed system include these steps:

1. Select the Source and Destination.
2. Source Initialize the route Discovery.
3. Broadcast the Routing Packet to direct nodes.
4. Update the routing information in the Source Routing Table.
5. Source Initialize the Beacon.
6. Broadcast the Routing Packet to direct nodes.
7. Update the Energy and location information in the Source Energy Table for all the nodes in the entire network.
8. check
   If (*ENE* >= High &&*dist*<= Low &&*hop Count*<= Low) … (Eq. 1 & 2)
   Select that route for Communication.
   Else if (*ENE* >= High &&*dist*>= high &&*hop Count*<= Low) … (Eq. 1)
   Select that route for Communication.
   Else if (*ENE* <= Low&&*dist*<= Low &&*hop Count*<= Low t) … (Eq. 2)
   Select that route for Communication
9. Send the periodic route discovery.
10. Send the periodic beacon message

Dijkstra's Algorithm Pseudo code

```
1:  function Dijkstra(Graph, source):
2:      for each vertex v in Graph:
3:          dist[v] := infinity
4:          previous[v] := undefined
5:      dist[source] := 0
6:      Q := the set of all nodes in Graph
7:      while Q is not empty:
8:          u := node in Q with smallest dist[ ]
9:          remove u from Q
10:         for each neighbor v of u:
11:             alt := dist[u] + dist_between(u, v)
12:             if alt <dist[v]
13:                 dist[v] := alt
14:                 previous[v] := u
15:     return previous[ ]
```

V. CONCLUSION

MANET is one of the most important and important technologies that supports the imminent complication situation. MANET special characters bring this technology a great opportunity and a number of challenges. MANET is currently becoming an exciting research center and many research projects are employed by academics and companies around the world. MANET's efficient route protocol protocol uses

robust function helps to achieve reliability, safety, error tolerance, low power consumption.

In this paper, a new high-performance algorithm called FF-AOMDV developed with NS-2 is proposed under three different conditions, different node speed, packet size and measurement time. These conditions were assessed by five (5) performance metrics (Packet delivery rate, Overput, End-to-end-delay, Energy consumption and Life Network). Imitation results have shown that the proposed FF-AOMDV algorithm works much better than both AOMR-LM and AOMDV with output, packet delivery rate and end delays. It also worked well against AOMDV with more energy saving and better network life. As a future project, there are a number of scenarios that can be used with this study to improve power consumption and network health.

REFERENCES

[1]. Mueller, S., Tsang, R. P. Ghosa D, "Multipath routing in mobile ad hoc networks: Issues and challenges", In *Performance tools and applications to networked systems* Springer Berlin Heidelberg, pp: 209-234, 2004.

[2]. Sharma, D. K. Patra, A. N., & Kumar, C., "An update based energy-efficient reactive routing protocol for mobile Ad Hoc networks", *International Journal of Computer Network and Information Security (IJCNIS)*, vol-5, Issue-11, p: 17, 2013.

[3]. Macker, J., "Mobile ad hoc networking (MANET): Routing protocol performance issues and evaluation considerations", 1999.

[4]. Marina, M. K., & Das, S. R., "Ad hoc on□demand multipath distance vector routing". *Wireless communications and mobile computing*, vol-6, Issue-7, p: 9, 2006.

[5]. Sun, B., GUI, C., & Liu, P., "Energy Entropy Multipath Routing optimization algorithm in MANET based on GA", In *Bio-Inspired Computing: Theories and Applications (BIC-TA), 2010 IEEE Fifth International Conference* IEEE, pp: 943-947, 2010.

[6]. Balaji, V., &Duraisamy, V., "Varying Overhead Ad Hoc on Demand Vector Routing in Highly Mobile Ad Hoc Network. Journal of Computer Science", vol-7, Issue no-5, pp: 678-682, 2011.

