A REVIEW PAPER ON ENERGY EFFICIENT ALGORITHM IN MANET

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***ABSTRACT*:** *Mobile Ad-Hoc Networks (MANETs) are wireless networks that contain collection of mobile nodes. Since node in MANET is highly Dynamic, It's been a critical task to reduce power consumption by each node. The problem of energy efficiency in MANET's can be addressed at various layers. Recently, many researchers have focused on the optimization of energy consumption of mobile nodes, from different point of view. There are many proposals which try to define energy efficient routing protocol, capable of routing data over the network and saving of battery power of mobile nodes. Some proposals are completely new, while others aim to add energy-aware functionalities to existing protocol (like AODV, DSR etc...). This paper presents survey on Different approaches of Energy efficient Algorithm for MANET. After that we have presented two factors DISTANCE FACTOR (DF) and TIME INTERVAL OF RREP (TIRREP) for making them a more energy efficient.*

Keywords—MANET, AODV, DF, TIRREP

I: INTRODUCTION

During the recent past, significant progress in the Communication has become an important part for people to exchange information to anywhere. With the rapid development of computers and wireless communication, the mobile computing has become the prime focus for any researchers. Mobile Ad-Hoc Networks are wireless networks consists of collection of nodes which don't have fixed infrastructure. These nodes are responsible for forwarding data packets from source to destination specifically when two end points are not directly connected within their range. MANETs has been an extensive research area now a days. It's performance is totally dependant on adopted Routing Scheme but traditional Routing approach does not work efficiently. So many approaches like proactive, reactive and hybrid have been proposed [1][2][3][4][5][6][7]. This all approaches tries to satisfy different properties like, fast route convergence, fastest efficient Routing, efficient utilization of bandwidth and battery capacity, increased network lifetime etc.

Each protocol(like table driven, on demand, hybrid etc..) works smartly in their particular field like if there is moderate traffic then DSR(Dynamic Source Routing) approach would be better, but if high traffic is concerned, AODV protocol would be better. Moreover AODV has better scalability and it's header size of data packet is relatively constant [1][2][7].

Routing is a basic issue for any network and for researchers as well [1][2][3][4][5][6][7][8] and the primary goal for any an-hoc networks is to describe for the energy restricted protocols. So eventually power saving within ad-hoc networks is becoming a core concern as mobile node has limited battery power. So by handling such power, one can efficiently increase the network life as a whole.

In our paper, section 2 presents various approaches of Energy Efficient Algorithms. After that section 3 focuses on two factors (Distance & Time) that will be helpful for efficiently utilizing energy by any approaches. Finally, section 4 concludes the work.

2: VARIOUS APPROACHES FOR ENERGY EFFICIENT ALGORITHMS

For reducing the energy consumption in mobile node, so many approaches are to be developed.

But at this moment, most of the researchers are trying to reduce the energy of each node at network layer and develop various approaches to save energy of each node during packet transmission time. We are comparing such type of protocols/algorithms.

The MBCR (Minimum Battery Cost Routing) tries to work with evenly battery power by using a cost function which is inversely proportional to residual battery power. But this approach considers only the total cost, so remaining energy for any individual node may hardly be accounted for. So sometimes there is a possibility that a route will include a node

with little energy while other nodes have a plenty of energy.

MMBCR(Min-Max Battery Cost Routing) has define a new path for maintaining the life of an individual node and to overcome the problem with MBCR.But this approach can set up the route with an excessive hop count and so it will consume a lot of total transmission energy. While CMMBCR (Conditional Max-Min Battery Capacity Routing) approach works efficiently in such type of scenario but it needs to add more control packet in network and adding more control packet is overhead for any network.

DEAR (Distributed Energy Efficient Ad-hoc Routing) approach works with minimum transmission energy consumption and fair node energy consumption in distributed manner. So this approach is more efficient than MBCR as well as CMMBCR [15].

ONM (Online Max-Min Routing) Protocol will generate two different matrics: 1) Minimizing the Power consumption and 2) Maximizing the minimal residual power in the nodes. By using these matrices it will find the route that will consume less power with the help of Dijkstra Algorithm. But maintaining these two matrices are cumbersome and it's not feasible at all.

SPAN Protocol will operate between the routing layer and MAC layer. The main idea behind this approach is to power down (SLEEP) the mobile node when it will no longer be used. But this approach is not feasible for efficiently saving energy by making node into SLEEP mode.PEN (Prototype Embedded Network) Protocol is designed network where rate of interaction is low. So this approach is more suitable for control application rather than data application [21].

AODV-SLEEP approaches are also used for the same purpose but this strategies performs fine for reducing the energy with only a slightly decrease in performance. This work propose that first set the specific threshold limit to each node, and when node reached up to the threshold limit, that node goes to sleep mode so we can save energy and save network life as a whole.

Chen [23] suggests a protocol to create a connected dominating set and changes the coordinator nodes periodically. As nodes of CDS will only be used and spend more energy and die-out much sooner as compared to non coordinator node. This approach can increases energy saving by adding one more window specifically for non-coordinator nodes.

While Selma, Agale, Garg, [12] proposed a new scheme of variable sleeping time for the non-coordinator nodes based on message history. Here coordinator nodes are responsible for routing while the non-coordinator nodes are responsible for only those packets which is sent by them or addressed to them. So they are allowed to enter into SLEEP Mode which will fairly increase the life of the non-coordinator.

Wang, Proakis, Ramesh Rao proposes a new concept of energy efficient routing algorithm with the use of Directional Antennas [22]. As it can improve system throughput and can preserve energy as well. So with the help of this approach, network life will definitely be increased.

Beacon period (Generating HELLO Packet) is a static approach and it's fixed for specific time interval.

Nath, Anderson, Seshan [20] proposed a new concept of dynamic beacon period to improve energy efficiently for any node.

AODV-DF will reduce overall routing overhead by RREQ packets and overall Energy of Each node. So network life will also be increased. AODV-BR (Backup Routing) concept also fairly works as it creates MESH and will provide multiple alternate paths and can improve the performance of network.

BECA (Basic Energy Conserving Algorithm) and AFECA (Adaptive Fidelity Energy Conserving Algorithm) are also nice approaches that dynamically switching the nodes between different modes like sleeping, listening and active mode [13].

DSR (Dynamic Source Routing), EDDSR (Energy Dependent DSR), LEAR, MDR (Minimum Drain Rate) are also proposed to efficiently energy utilization at routing time.

There are so many other approaches are also used efficiently for saving energy at data link as well as network layer.

3: OUR PROPOSED ALGORITHM

AODV approach is the best on-demand approach where high traffic is concerned. In such type of scenario, route is established between source to destination only when it is required and as nodes in AODV protocols are highly dynamic, some mechanism should be used to keep track of those nodes. HELLO protocol is responsible for this. That establishes and maintains the neighbor relationships [11][18].

By default HELLO packet is disabled

AODV-PROCESS HELLO NO

We can enable it by changing it's parameter. HELLO packet will generate at fixed time interval.

Interval = MinHelloInterval + ((MaxHelloInterval-MinHelloInterval) random::uniform ());

So each node will regenerate HELLO packet for keeping track of it's neighbor node at fixed time interval.

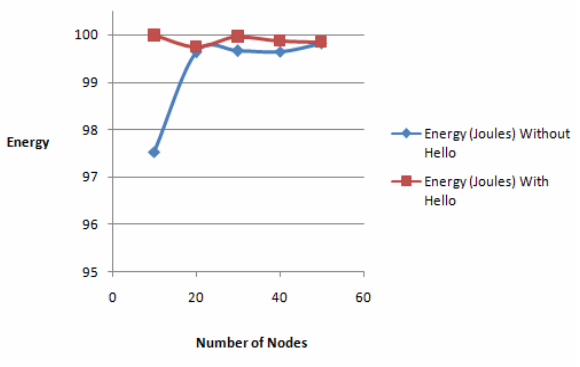

Fig.1 Energy consumed by HELLO Packet

As shown in fig.1, Generation of HELLO packet consumes energy. So we can restrict this by dynamically changing it's time interval.

Algorithm:

Step 1: Listen RREP packet,
(If it not comes in specific time duration gradually Increase HELLO INTERVAL time for generating Hello Packet)
Step 2: REPEAT step 1 for fixed counter.
Step 3: Transfer this node to SLEEP mode if RREP is not received for fixed counter.
Step 4: if any RREP found, RESET the Counter.

Above algorithm says that if certain node does not get RREP in specified time interval. Time of beaconing process should be reduced. So that less no. of HELLO packet will be generated as compared to fixed static time interval and can save energy at some what level.

Distance Factor (DF):

Distance Factor is also an important aspect in network, there are so many nodes which are far away from established Route, and so we should take enough care about distance of each node. As DF (Distance Factor) of any node is increased from neighbor node, HELLO packet generation time should also be increased gradually.

HELLO INTERVAL α DF (Distance Factor)

HELLO INTERVAL α TIRREP (Time interval for RREP Packet)

So by dynamically changing the time interval of HELLO Packet (Beaconing Process).we can efficiently save energy of each node.

4: CONCLUSION

From the above result analysis we can conclude that any fixed time interval, HELLO packet should be generated. But by making it dynamically we can also save energy of each node. In this process, two factor: DF (Distance Factor) and TIRREP (Time interval of RREP packet) plays an important roll to save energy as well. So using this concept we can save energy at some what level.

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