ENERGY EFFICIENT DSR TO IMPROVE THE ROUTING IN MANET

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***Abstract*- Dynamic Source Routing protocol (DSR) has been accepted itself as one of the distinguished and dominant routing protocols for Mobile Ad Hoc Networks (MANETs). From various performance analysis and results, it is shown that DSR has been an outstanding routing protocol that outperforms consistently than any other routing protocols. But it could not pervade the same place when the performance was considered in term of energy consumption at each node, energy consumption of the networks, energy consumption per successful packet transmission, and energy consumption of node due to different overhead. Because, DSR protocol does not take energy as a parameter into account at all. And as MANET is highly sensible towards the power related issues and energy consumption as it is operated by the battery with the limited sources, needed to be used efficiently, so that the life time of the network can be prolonged and performance can be enhanced. we have proposed a novel energy efficient DSR (Dynamic Source Routing) routing protocol which modified to improve the networks lifetime in MANET in terms of energy. We also provided a solution, based on considering the energy of each node because each node's energy state has a huge influence on the entire network lifetime. All simulation is performed in NS2 simulator.**

***Index Terms*—MANET, DSR, EE-DSR, AODV**

I. INTRODUCTION

Networks are classified into two main types based on connectivity, wired and wireless networks. A wireless network provides flexibility over standard wired networks. Only with the help of wireless networks, the users can retrieve information and get services even when they travel from place to place. [1] Ad Hoc Network is a multi-hop wireless networks which is consist of autonomous mobile nodes interconnected by means of wireless medium without having any fixed infrastructure. It's quick and easy deployment in a situation where its highly impossible to set up any fixed infrastructure networks, has increased the potential used in different applications in different critical scenarios. Such as battle fields, emergency disaster relief, conference and etc. [2].The single-hop and multi-hop Mobile Ad-hoc Networks (MANET) are the two major classifications of wireless networks. Base stations are used in single-hop networks to accomplish communication between nodes. MANETs are infra-structure- less, self-organizing networks of mobile nodes without any centralized administration like base stations. The communication between nodes is accomplished via other nodes which are called intermediate or forwarding nodes. So there is a need of a routing procedure between nodes. And hence the routing protocol plays a major role in MANET.

II. RELATED WORK

A number of routing protocols have been projected and implemented for wireless ad hoc network in order to enhance the bandwidth utilization, higher throughputs, lesser overheads per packet, minimum consumption of energy and others. All these protocols have their own advantages and disadvantages under certain situations [3].

DSR Protocol Overview

The Dynamic Source Routing is an on-demand protocol based on source routing. It consists of two main mechanisms that allow the discovery and maintenance of routes in the MANET. The DSR protocol is composed of two mechanisms that work together to allow the discovery and maintenance of source routes in the ad hoc network:

Route Discovery is the mechanism by which a node S wishing to send a packet to a destination node D obtains a source route to D. Route Discovery is used

only when S attempts to send a packet to D and does not already know a route to D.

Route Maintenance is the mechanism by which node S is able to detect, while using a source route to D, if the network topology has changed such that it can no longer use its route to D because a link along the route no longer works. When Route Maintenance indicates a source route is broken, S can attempt to use any other route it happens to know to D, or can invoke Route Discovery again to find a new route. Route Maintenance is used only when S is actually sending packets to D.

Route Discovery and Route Maintenance each operate entirely on demand. In particular, unlike other protocols, DSR requires no periodic packets of any kind at any level within the network. For example, DSR does not use any periodic routing advertisement, link status sensing, or neighbor detection packets, and does not rely on these functions from any underlying protocols in the network. This entirely on-demand behavior and lack of periodic activity allows the number of overhead packets caused by DSR to scale all the way down to zero, when all nodes are approximately stationary with respect to each other and all routes needed for current communication have already been discovered. As nodes begin to move more or as communication patterns change, the routing packet overhead of DSR automatically scales to only that needed to track the routes currently in use.

In response to a single Route Discovery (as well as through routing information from other packets overheard), a node may learn and cache multiple routes to any destination. This allows the reaction to routing changes to be much more rapid, since a node with multiple routes to a destination can try another cached route if the one it has been using should fail. This caching of multiple routes also avoids the overhead of needing to perform a new Route Discovery each time a route in use breaks.

The operation of Route Discovery and Route Maintenance in DSR are designed to allow uni-directional links and asymmetric routes to be easily supported. In particular, in wireless networks, it is possible that a link between two nodes may not work equally well in both directions, due to differing antenna or propagation patterns or sources of interference. DSR allows such uni-directional links to be used when necessary, improving overall performance and network connectivity in the system.

DSR also supports internetworking between different types of wireless networks, allowing a source route to be composed of hops over a combination of any types of networks available For example, some nodes in the ad hoc network may have only short-range radios, while other nodes have both short-range and long-range radios; the combination of these nodes together can be considered by DSR as a single ad hoc network. In addition, the routing of DSR has been integrated into standard Internet routing,

Where a “gateway” node connected to the Internet also participates in the ad hoc network routing protocols; and has been integrated into Mobile IP routing, where such a gateway node also serves the role of a Mobile IP foreign agent. [10]

III. EXISTING WORK

There two main components of the algorithm.

1. Route discovery
2. Route Maintenance

1. Route discovery

Here the different paths between the given pair of source and destination are first identified and then RREQ packets are flooded throughout the network. When these packets are reaches the required destination, then they store the path present in the packet along with the source and the destination id also. Then a RREP packets are sent from the destination to the source back in order to acknowledge the transmission. These messages can also be piggybacked with not only the path but also some data needed to be sent from the destination to the source. Route discovery is the major and most time taking part of the DSR algorithm as it explores the paths between two nodes. But is doesn’t guarantee reliability as once the discovery is done then in order to keep up the connection maintenance of the network is very important.

2. Route Maintenance

Here the discovered paths are maintained in the sense they are checked on demand to look out for failures or defects or losses. Whenever a connection is loosed then the node just before the failure sends back the

negative acknowledgement informing the sender that from that point there has been failure. Then again after getting this message the sender urges for route discovery to find out another path from the source to destination and hence the routing cache is updated properly with the new entry.

The major constraint of a network are the network parameters. Any network can be visualized as a directed graph where the stations or the systems are compared with the nodes and the edges signifying the connections between them. In simple adhoc network the distance between any two nodes is always the same where as in the Manets the distance changes during each of the simulations. Adhoc networks are characterized by their smaller size and the transmission within a range. When the mobile nodes moves out of the range then there cannot be any transmission. Adhoc networks themselves do not contain any routing facility as the network is very small but to reach from a source to a destination there is a multi-hop transmission taking place where nodes acting as the routers intermediate. Every node in the network maintains a routing cache where the path from each of the source and destination pair is stored. Proposed DSR is an on demand routing protocol where distance, delay, energy are the major factors for determining the entries to the routing cache. This is a multipath approach where before actual transmission there is a forward flooding of RREQ packets for the route discovery. The RREQ packets are duplicated and sent over all possible paths for a given source and destination pair. After reaching the required destination, the packets are then unwrapped for accessing their transmission parameters. The channel through which the packets are travelled is considered to be a delay channel as this parameter determines the energy loss during transmission. Most importantly, of all these parameters we are interested in the minimum energy loss and hop count path. Therefore a statistical collection is made for each of the path present and then their minimum is calculated. Here the back flooding of packets is also taken into account as once a node has been added to a particular path then its not travelled again. Thus based on this algorithm we can say that a particular node can either be a sender , receiver or an idle one whose job is to transmit the packets to the next hop.

Energy loss is directly proportional to:

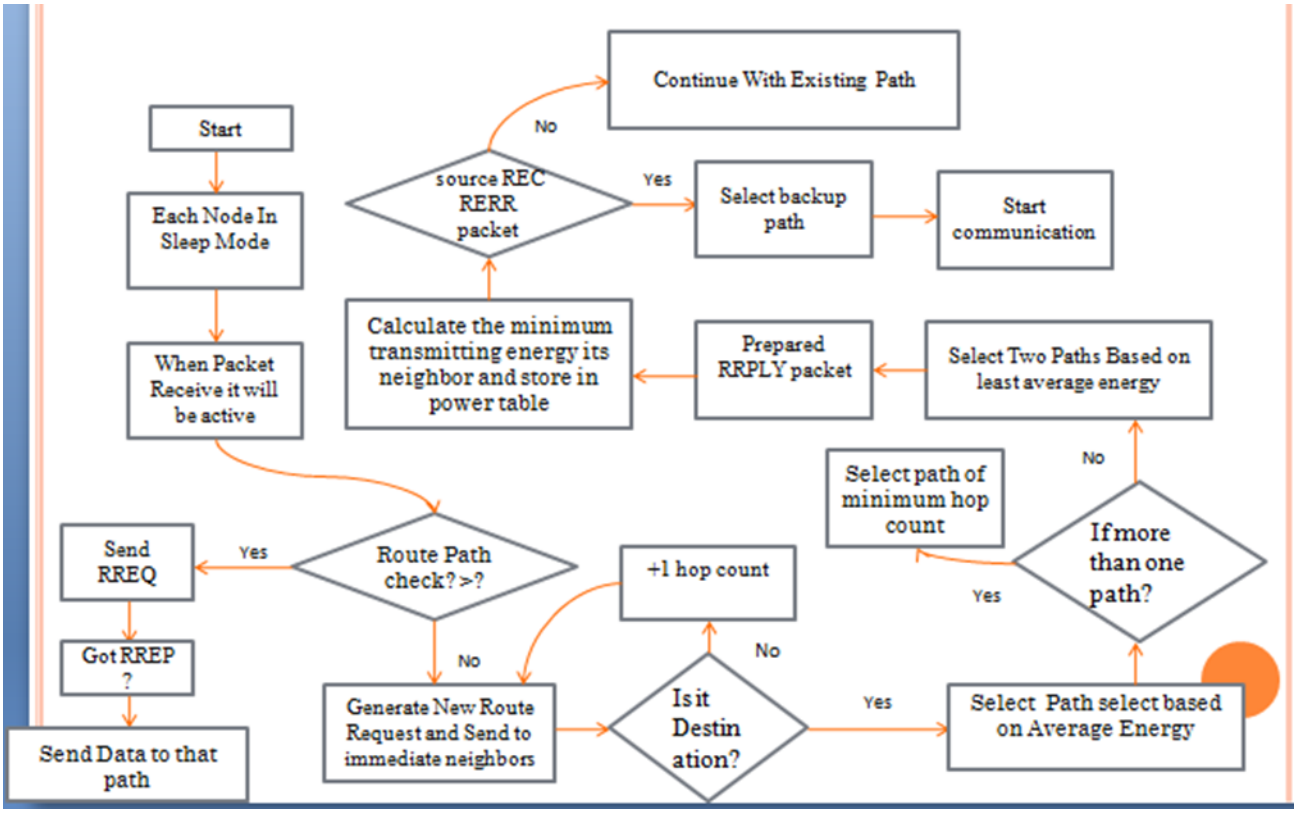
(1) Number of hops
(2) Delay
(3) Packet size

IV.PROBLEM DEFINITION AND NOVELITY

1>One of the problem with this algorithm is that the destination select best path according to minimum hop count only which is not suitable for all condition.

2>If new RREQ is generated and if some of nodes within network do not have energy more than threshold than they simply dropped the packet and due to this it is possible that we do not have any path towards destination. Here in this algorithm there is no need of any threshold value for forwarding RREQ which create a problem some time when some of forwarding node are under threshold. Here path is selected based on the average energy not simply on hop count which provide stable path compare to path selected based on the only hop count. Here I also introduce one back up path such that when running path is failed than source not initiate new RREQ but directly select that back up path.

V. PROPOSED DETECTION MODEL



VI. CONCLUSION

The proposed solution is an enhancement to EE-DSR, which is energy efficient. It improves the network lifetime in MANET in terms of energy. Also, solution is based on considering the energy of each node because each node's energy state has a huge influence on the entire network.

VII. APPLICATION

Here the main application of proposed method is to reduce energy consumption in-such a manner that we can make network more energy efficient and we can overcome the problem related to energy consumption in using DSR.

VIII. ACKNOWLEDGEMENT

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