

An Improved Multipath AODV Protocol Based On Minimum Interference

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ABSTRACT: Frequent link failures are caused in MANET due to node's mobility and use of unreliable wireless channels. Due to this, multipath routing protocols become an important issue. However, the inter-path interference limits the gain of multipath routing in MANET. In this paper, I propose a Node disjoint minimum interference multi-path (ND-MIM) routing protocol for MANETs based on AODV protocol. The main goal of the propose method is to determine all node-disjoint routes from source to destination with minimum routing overhead. When the route is broken, the data is transmitted continuously through other route. Simultaneously in selecting node-disjoint path, the protocol takes also into account the energy and distance of intermediate node in the path for extending the network lifetime.

Keywords- AODV, energy efficient, interference avoidance, MANET, multipath routing, Node-disjoint

I. INTRODUCTION

Mobile Ad hoc Network (MANET) is one that comes together as needed, not necessarily with any support from the existing Internet infrastructure or any other kind of fixed stations. A mobile ad hoc network is formed by mobile hosts. Some of these mobile hosts are willing to forward packets for neighbors. These networks have no fixed routers, every node could be router. All nodes are capable of moving and can be connected dynamically in an arbitrary manner. The responsibilities for organizing and controlling the network are distributed among the terminals themselves. The entire network is mobile, and the individual terminals are allowed to move freely. In, some pairs of terminals may not be able to communicate directly with each other and have to rely on some other terminals so that the messages are delivered to their destinations. Such networks are often referred to as multi-hop networks. Multi-hop or ad hoc, wireless networks use two or more wireless hops to convey information from a source to a destination. A Mobile Ad-Hoc Network where :- The mobile routers are free to move randomly and organize themselves arbitrarily. The network's wireless topology may change rapidly and unpredictably.

In ad hoc networks mobile nodes are basically small sized terminals depending on battery operated. Energy is also a critical issue for battery-powered mobile devices in ad hoc networks and routing based on energy related parameters is used to extend the network lifetime. Mobile nodes in MANETs are constrained by their limited power, processing, memory resources and high degree of mobility. In such networks, the wireless mobile nodes may dynamically join or leave the network topology.

In conventional wired networks, each node does not frequently change the network topology. Routing protocols for wired networks are therefore inadequate for ad hoc networks where the network topology changes dynamically. In a network composed of mobile nodes, changes in the network topology require the frequent rebuilding of routes, so maintaining stable routes may be infeasible. Therefore, routing protocols for MANETs consider node mobility, stability and the reliability of data transmission.

Using a single path, it is difficult to respond to a large burst in traffic even though additional network resources may be available. Further, if the path fails, and source has data to send, a new route discovery must be initiated resulting in significant delay and packet loss. In ad hoc networks, multiple paths are desirable since they provide fault-tolerance and can be used simultaneously for data transfer.

This paper present a node disjoint multipath routing protocol based on AODV, NDM_AODV protocol, in order to reduce overhead and ensure multiple paths disjointedness and sufficiency. Simultaneously in selecting node-disjoint path, the protocol takes also into account the energy of nodes in the path and hops to prolong the life time of links and reduce the frequent of route discovery. Also in order to achieve an optimum route connection by extending the network lifetime, the distance factor of the source-intermediate-destination needs to be combined with the initial energy of the node when selecting a participating node in a route path.

II. RELATED WORK

[1] Shunli Ding, Liping Liu propose a scheme to find all node-disjoint paths from source to destination. A node-disjoint multipath routing method (NDM-AODV) based on AODV routing protocol also considers the residual energy of nodes while selecting the routes and hops to prolong the life time of links and reduce the frequent of route discovery.

[2] Chhagan Lal, V. Laxmi, M.S. Gaur developed a node-disjoint multipath routing method (NDMP-AODV) based on ad-hoc on-demand distance vector (AODV) routing protocol. The proposed approach minimizes the effect of link failure. Hence, the two problems caused by frequent link failures are addressed. NDMP-AODV ensures that after a route is broken, the node can continuously send data without any delay, using one of the backup routes stored in its routing table during route discovery process. NDMP-AODV discovers multiple paths with a very low routing overhead as compared to other existing multipath AODV protocols.

[3] Wenjing Yang, Xinyu Yang, Guozheng Lu, Wei Yu propose the Greedy-based Interference avoidance Multipath Routing Protocol (GIMR) to provide high rate data transmission in MANETs. In GIMR, they adopt the greedy forwarding mechanism to identify two interference avoidance paths for a source-destination pair. In particular, in the route discovery, routing request packet is transmitted in a greedy forwarding manner, while the ID and geographic information of each forwarding node will be recorded in the routing request packet. When the routing request packet arrives at the destination, the backward route request is then initiated to establish the second path with the help of geographic information based on least-interference restriction.

[4] Jailani Kadir, Osman Ghazali, Mohamed Firdhous, Suhaidi Hassan propose a probability based node selection method for identifying the intermediate node with optimum stored energy that could withstand through duration of connection. This not only helps to sustain the communication with the lowest chance of interruption, but also prolongs the network lifetime due to the lowest possible consumption of energy for a given communication.

[5] Ashok Kumar, Vinod Kumar, Narottam Chand propose a clustering of sensor nodes for using the node energy optimally and prolong the lifetime of energy constrained wireless sensor network.

III. LITERATURE SURVEY

“A node-disjoint multipath routing protocol based on AODV”, Shunli Ding, Liping Liu proposed: The main goal is to discover multiple node-disjoint paths with a low routing overhead during a route discovery. They also pay attention to residuary energy of nodes. The initial energy of each node in network is different and in the course of working the consumption rate of energy is also different, so it must pay attention to the energy left of node in selecting various routing protocol.

“A Node-Disjoint Multipath Routing Method based on AODV protocol for MANETs”, Chhagan Lal, V. Laxmi, M.S. Gaur, propose and implement a node-disjoint multipath routing method based on AODV protocol. The main goal of the proposed method is to determine all available node-disjoint routes from source to destination with minimum routing control overhead. With the proposed approach, as soon as the first route for destination is determined, the source starts data transmission. All the other backup routes, if available, are determined concurrently with the data transmission through the first route. This minimizes the initial delay caused because data transmission is started as soon as first route is discovered. They also propose three different route maintenance methods. All the proposed route maintenance methods are used with the proposed route discovery process for performance evaluation.

“An Interference Avoidance Multipath Routing protocol based on greedy forwarding in MANETS” which is proposed by Yang Wenjing, Xinyu Yang, Guozheng Lu, Wei Yu uses the Greedy-based Interference Avoidance multipath Routing (GIMR) protocol. With the aid of geographic information, two least-interference paths between a source and destination pair is established with low overhead. The GIMR uses the route discovery, data transmission, and route maintenance.

“Node Selection Based On Energy Consumption in Mobile Ad Hoc Networks”, Jailani Kadir, Osman Ghazali, Mohamed Firdhous, Suhaidi Hassan proposed probability based node selection method considers a new parameter known as the energy distance factor. This factor helps to

select the best next hop node for optimizing the energy efficiency of the network. The scheme also considers the residual energy of the nodes as a fraction rather than the absolute energy levels. Based on this scheme of selecting nodes with sufficient residual energy, an energy aware routing protocol for MANETs is proposed in this project. The aim of this scheme is to improve the performance of the path lifetime by selecting the best nodes along the path from the source to destination.

“Energy Efficient Clustering and Cluster Head Rotation Scheme for Wireless Sensor Networks”, Ashok Kumar, Vinod Kumar, Narottam Chand propose an energy efficient protocol consisting of clustering, cluster head selection/rotation and data routing method to prolong the lifetime of sensor network. In proposed protocol, clusters are formed only once during the lifetime of sensor network, which results in substantial saving of energy.

IV. PROPOSED WORK

The main goal is to improve the performance and throughput of existing on-demand routing protocols. The two common on-demand routing protocols are dynamic source routing(DSR) protocol and ad-hoc on demand distance vector routing (AODV) protocol. So from them, I select AODV protocol to implement our propose scheme because AODV is an efficient routing protocol which removes any unnecessary and out moded information quickly, and does not create traffic unless necessary. So that’s why AODV can react totopological changes that have an effect on active routes in a timely and quick manner. AODV performs better in scenarios with extra load and/or higher node mobility; as a result it’s more scalable than DSR

The propose algorithm is simulated using network simulator NS-2 In our propose approach from Fig1 the first work is done of node creation and traffic generation. After that proposed mechanism will design.

After that propose method determine all available node-disjoint routes from source to destination. As soon as the first route for destination is determine, the source starts data transmission. All the other backup routes, if available, are determine concurrently with the data transmission through the first route. when path fails while transmitting data, by applying our propose algorithm we will get stable path to destination and send data through other paths which is having less interference without having any data transmission delay.

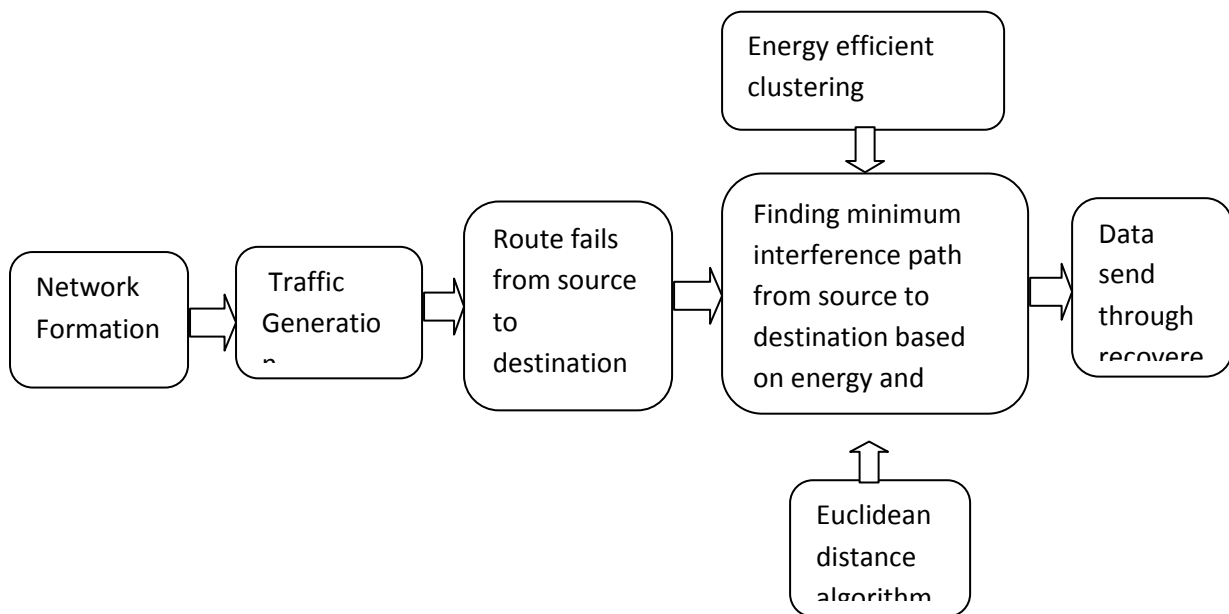


Fig1.system architecture of proposed system

While finding that backup paths, the protocol takes also into account the energy of nodes in the path and hops to prolong the life time of links. So in order to achieve an optimum route connection by extending the network lifetime, this propose system combined the distance factor of the source-intermediate-destination with the initial energy of the node when selecting a participating node in a route path.

V. CONCLUSION

In this paper I propose a node-disjoint multipath routing protocol to overcome the shortcomings of ondemand unipath routing protocols like AODV.

In this paper I will apply propose algorithm to AODV that works on a reactive approach and make use of alternate paths by satisfying a set of energy and distance based threshold area. So I can achieve the following: 1. To extend the life time of ad hoc networks through implementing power aware routing protocol. 2. Improvement in the lifetime of the entire network. 3. I will find out success of packet delivery by preventing nodes from killing out due to energy losses. Our proposed scheme picks the nodes based on their energy level; this may also help insolving the problem of asymmetric links.

REFERENCES

- [1] Shunli Ding , Liping Liu: “ A node-disjoint multipath routing protocol based on AODV”: 2010 Ninth International Symposium on Distributed Computing and Applications to Business, Engineering and Science
- [2] Chhagan Lal, V.Laxmi, M.S.Gaur, “A Node-Disjoint Multipath Routing Method based on AODV protocol for MANETs”: 2012 26th IEEE International Conference on Advanced Information Networking and Applications.
- [3] Yang Wenjing, Xinyu Yang, Guozheng Lu, Wei Yu, “An Interference Avoidance Multipath Routing protocol based on greedy forwarding in MANETS” IEEE International conference on Wireless Communications, Networking and Information Security (WCNIS), June 25-27, 2010.
- [4] Jailani Kadir, Osman Ghazali, Mohamed Firdhous, Suhaidi Hassan, “Node Selection Based On Energy Consumption in Mobile Ad Hoc Networks”: InterNetWorks Research Group, School of Computing, University Utara Malaysia, Malaysia , Sep 15, 2011.
- [5] Ashok Kumar, Vinod Kumar, Narottam Chand,” Energy Efficient Clustering & Cluster Head Rotation Scheme for Wireless Sensor Networks”: International Journal of Advanced Computer Science and Applications, Vol. 3, No. 5.
- [6] Xuefei Li, Laurie Cuthbert, “On-demand Node-Disjoint Multipath Routing in Wireless Ad hoc Networks”: Department of Electronic Engineering, Queen Mary, University of London
- [7] Chang-Woo Ahn, Sang-Hwa Chung, Tae-Hun Kim, Su-Young Kang, “A Node-Disjoint Multipath Routing Protocol Based on AODV in Mobile Ad-hoc Networks”, International Conference on Information Technology, IEEE, 2010.
- [8] Tsung-Chuan Huang, Sheng-Yu Huang and Lung Tang, “AODV-Based Backup Routing Scheme in Mobile Ad Hoc Networks”: 2010 International Conference on Communications and Mobile Computing.
- [9] Zangeneh, S. Mohammadi, “New Multipath Node-Disjoint Routing Based on AODV Protocol”: World Academy of Science, Engineering and Technology 76 2011.