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Enhanced M-AODV: Modified Ad Hoc On-demand Distance Vector Routing Scheme

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Abstract:
The mobile ad hoc networks are differentiated from the wireless sensor networks because of mobility of the nodes. This often causes links between the nodes getting broken now and then. If the link between the nodes were breaking too often, that would mean they are relatively moving at the faster speeds. The mobility of the nodes must be taken into account to avoid the link breakage between the nodes and to increase the performance of the network. This paper presents a scheme which takes into account the quality of the links to select the path from source to destination node. The quality of the links is determine by the throughput and relative mobility of the nodes comprising the link. The performance of the network has been done on the basis of remaining energy, throughput and packet delivery ratio. These parameters have shown an improvement over the existing scheme.

Keywords: MANETs, throughput, link breakage, relative mobility.

I. INTRODUCTION

A network system that involves an accumulation of PCs and other equipment related to it associated by means of correspondence channel for sharing information and data. There are two sorts of networks Wired and Wireless Networks. Wired network are those network in which PC mechanical assemblies are associated with each other with the help of wire. The wire goes about as medium of correspondence for transmitting information from one purpose of the network to other purpose of the network. While a wireless network is a network in which PC gadgets speaks with each other without requiring any wire. The communication medium between the PC devices is wireless. At the point when a PC device needs to speak with any substitute devices, the target devices must exist in the radio range of each other. The transmission and gathering of information in wireless sensor network networks is done utilizing the electromagnetic waves. As of late wireless networks are getting notable subsequently of its flexibility, straightforwardness and amazingly direct and cost saving foundation. Mobile Ad-Hoc Networks goes under Wireless Networks. Mobile Ad-Hoc Networks are autonomous and decentralized wireless frameworks. MANETs include mobile nodes that are allowed to move done in the network. Nodes are the gadgets that are mobile and that take an interest in the networks, for example, mobile telephone, portable PC, individual computerized help, MP3 player and PC. These nodes can go about as host/switch or both all the while. They can structure self-emphatic topologies depending upon their availability with each other in the framework. These nodes are able to arrange themselves and because of this interesting capacity, they can be conveyed earnestly without the need of any foundation. The nodes in mobile ad hoc networks are battery driven and are mobile in nature. They continue to move from one position to another and their routing is governed mostly by the reactive routing protocols such as DSR and AODV. Since, the reliability of data is very important so all the packets sent by the source node must reach the destination node intact otherwise it results in loss of data packets. The packets loss in the network can be due to packet collision, it may result due to presence of some malicious node in the network, the packet loss may be resulting out of link breakage etc. The existing routing protocols provide the shortest path from source to destination node in terms of hop count. These do not consider the energy efficient routes neither they consider the quality of the links while deciding the route between source and destination node. This paper presents a scheme focused at improving the quality of the links in the network. The scheme has been presented in Section III.

II. LITERATURE SURVEY

Hridya V Devaraj ET. al., [2016] proposed ECDSR convention. To increase the lifetime of the network, routing must be energy efficient. Routing conventions like DSR, ESDSR, ECDSR, AODV, TORA, EEAODR, and EPAR are proposed for MANET. Outline of energy efficient routing convention is the key issue for mobile ad hoc networks. ECDSR convention chooses nodes on the premise of minimum edge energy. As ECDSR, convention has overhearing and stale course issue, which leads to parcel misfortune and over vitality utilization. In this paper author proposed the answer for address overhearing and stale course issue by suggesting change in ECDSR convention. MANET is utilized as a part of ongoing basic applications. [1].

Choukri, A. et. al., [2014] describes a routing framework for a correspondence network constituted by a few ad hoc mobile nodes. This framework optimizes energy consumption. It isolates the network into groups. From that point, it recognizes the ideal path in terms of energy. This comprises to figure the energy required for each accessible way and select the ideal

passages. Every group is distinguished by a cluster head, which is chosen according to its position and its remaining energy by using a clustering calculation. The main goal of this paper is to upgrade the quantity of live nodes by assigning to every network task the suitable nodes [2].

Mohammed Aashkaar and Purushottam Sharma [2015] proposed an improvement in an AODV convention, which is an upgrade in the current AODV convention. The convention computation, which is gotten by Energy Efficient Ad Hoc Distance Vector tradition (EE-AODV), has upgraded the RREQ and RREP taking consideration of system to save the essentialness in phones. In this paper AODV, convention is executed by using 30 nodes. The goal of this paper is to quantify the efficiency of protocol at 30 nodes. The execution estimations used for evaluation are conveyance proportion, throughput, framework lifetime and typical energy expended [3].

Shilpi Jain and Sourabhjain [2012] proposed the EEMLAR (Energy Efficient Maximum Lifetime Ad-Hoc Routing) algorithm to enhance the systems lifetime in MANET (Mobile Ad-hoc Network). One Change for the AODV convention is to boost the Systems lifetime by applying an Energy effective extreme lifetime Ad-Hoc Routing algorithm. The greatest limitation is the restricted energy of the batteries. As of late, chiefly centered on the briefest way technique to limit energy, which may come about into system disappointment since a few nodes may deplete quick as they are utilized redundantly, while some different nodes will not not be utilized by any means. This can prompt to energy irregularity and to network life lessening and much research has been under taken to not just enhance the systems Lifetime [4].

Deeptiet. al., [2015] presents an enhanced plan of DSR. The enhanced technique is straightforward and vitality-sparing routing protocol. The proposed conspire drags out the lifetime of network without adding to network load. In a word, the enhanced protocol is more down to earth than past-distributed technique. Once a routing framework is made, association by connection transmit control change per packet is done in light of a vitality productive approach. Vitality Efficient approach fundamentally gives a less vitality and gives same support of the network. There is an extension to concentrate on execution examination of DSR Routing protocol and accomplish effective routing in Ad-hoc network. There is a concentrate on the need a vitality effective routing and its routing administration [5].

Triptiet. al., [2014] proposed the vitality utilization effectively with "Range Switching". They utilize connected range changing strategy at to the Gradient based routing Protocol for enhancing the execution and it demonstrates the potential pick up in its throughput. This network speaks to a creative prototype for separating data from the earth for different applications. It comprises of different sensors that is utilized to send their detected data to sink. Therefore, vitality protection is a key issue for sensor nodes as they have limited power. This improve the network lifetime [6].

Shivashankaret. al., [2013] proposed effective power aware routing (EPAR), a routing protocol that upgrades lifetime of MANET. Rather than past calculations, EPAR check the limit of a node by its leftover battery control, as well as by vitality spent in sending data packets over a specific connection. EPAR pick the way that has the best packet limit at the packet transmission limit. This protocol must have the capacity to deal with high versatility of the nodes that frequently cause changes in the network topology [7].

Nilamet. al., [2016] proposes an Energy Aware Routing Protocol (AODVEA) in light of AODV that incorporates nearby sending choice with node vitality edge for transitional nodes and routing in light of max min vitality calculation to expand the lifetime of the network. Likewise extend proposes Modified AODV (AODVM) which joins same nearby sending choice for middle nodes however routing depends on blend of max min vitality calculation and most limited separation [8].

III. PROPOSED WORK

In our proposed work, the existing M-AODV will be modified by combining the throughput with relative mobility of the links as the deciding factor to select the route. The proposed scheme is based on existing AODV. The broadcasting phase to find the path to the destination is similar to the traditional AODV. The source node forwards the RREQ packet to the neighbours in order to find a route to destination node when destination is not found in its routing table. A small change done to the RREQ packet is that, the nodes while forwarding the RREQ packets, will forward the information about mobility to the neighbour node. When the node receives the packet, it will check on the relative mobility and the throughput of the link. The value of the throughput field in the RREQ packet is compared with the link throughput, when forwarding the RREQ packet. If the throughput of the link is less than the throughput field value in the RREQ packet, then the throughput field value is replaced by the throughput of the link and vice versa. Similarly, if the mobility value in the RREQ packet is more than the mobility of the link, the mobility of the link will be replaced in the RREQ packet. When RREQ reaches the destination, it will sort out the paths according to highest throughput and minimum mobility and execute RREP phase. The source node will send data via the first path sorted in the optimized order.

IV. RESULTS

The proposed and the existing schemes were implemented in NS2.35. The performance of the network was analyzed based on three parameters namely packet delivery ratio, throughput and remaining energy in the network.

Figure.1. Comparison of Remaining Energy

This graph shows the comparison of the average energy remaining in the network at the end of the simulation time. At the end of the simulation, the remaining energy for the proposed scheme was13 Joules approximately and 12.5 Joules for the existing scheme.

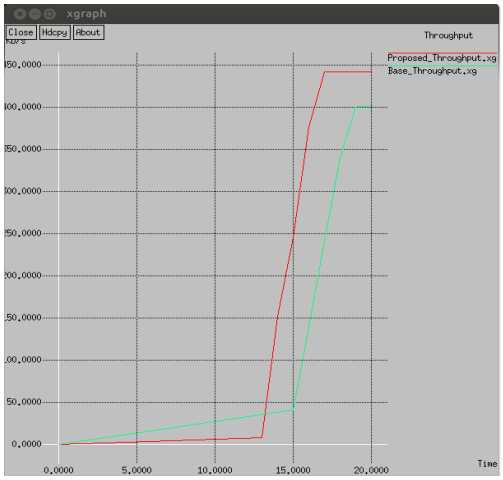

Figure.2. Throughput comparison

This figure shows the comparison of the throughput for both the schemes. The values for the proposed scheme is found to be hovering near 440 Kbps and for the existing scheme it was found to be near 400 Kbps.

Figure.3. PDR Comparison

The above figure shows the comparison of the Packet delivery ratio values for both the schemes. The value of this parameter for the proposed scheme was approx. 0.85, and for the existing scheme was 0.80.

V. CONCLUSION

The proposed work aims at factoring in the link breakage by considering the relative mobility of the nodes as the parameter to select the path from source to destination node. The proposed scheme considers that path which has least relative mobility of the nodes and high throughput of the links. As a result, the link between the nodes tend to sustain for longer period and lesser packets are dropped when forwarded over such a path. In future, work can be expanded to make the network more efficient in terms of energy consumption. In addition, parameters such as delay, jitter etc. can be considered to analyze the performance of the network.

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