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A Setup of a Novel Approach for Path Recovery in Mobile Adhoc Networks

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Abstract - The term "Mobile Ad hoc Network" refers to a network in which the nodes are mobile and engage in multi-hop communication with one another (MANET). With the use of MANETs, issues like data loss and network congestion can be avoided in a number of different contexts. A major problem with mobile ad hoc networks is the poor quality of service they provide. The mobile ad hoc network is a self-configuring system in which mobile nodes can freely enter and exit the network. The main problem that needs to be fixed is routing, which is highly unstable due to the dynamic nature of the network. There are three main types of routing protocols: reactive, proactive, and hybrid. The AODV routing protocol is used to set up a safe and efficient route from the source to the destination. Network link failure degrades the efficiency of the routing protocol. With the help of this study, we are able to modify the AODV protocol and significantly lessen the likelihood of a network link failing. The suggested method efficiently recovers the path between the source and the destination and keeps network quality constant. The suggested method is developed, and current algorithms are compared against it on a set of metrics..

Keywords - Mobile Ad hoc Network, Path recovery, AODV, Link Failure.

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1. INTRODUCTION

The term "Mobile Ad hoc Network" refers to a network in which the nodes are mobile and engage in multi-hop communication with one another (MANET). There is no master computer or other governing body in a network of this kind. Since there is no underlying structure for this network, node movement is completely at random and can take place in any direction. Mobile hosts can talk to one another over the wireless connections. The network nodes function as routers, relaying data packets to their intended destinations. With the use of MANETs, issues like data loss and network congestion can be avoided in a number of different contexts. These networks are implemented as needed in the armed forces, the healthcare system, and the academic research community. One of the primary concerns of MANETs is the upkeep of network paths. Several local link repair approaches were previously developed by different scholars in an effort to reduce the link failure problem. When network services are available, for instance, a local area network (or "ad hoc network") can be formed by connecting all of the devices in the region. The mobile nodes continuously broadcast the message to their neighbors, who in turn receive it. Some nodes, however, cannot communicate with others. As routers, the intermediate nodes play a crucial role in this situation by forwarding packets to their final destinations. Due to the random mobility of nodes, a predetermined path via which the messages can be transmitted cannot be generated in this network. Several problems arise with MANETs as a result of the nodes' features, such as their inherent mobility. Because of the haphazard placement of nodes and the movability of intermediary nodes, the path or route is disrupted.

In computing, a wireless network is one in which data transmissions between nodes do not rely on physical cables. In wireless networks, data is transmitted between devices using electromagnetic waves such as radio waves and microwaves. Each of the two communicating devices is within radio range of the other. 802.11 is the IEEE standard for wireless networks. Mobility, ease of use, and low or no upfront costs are just a few of the many benefits of wireless networks. Without the need for a permanent infrastructure or a commanding central hub, "peer" mobile nodes are autonomously connected to form a wireless ad hoc network. As a result, there is no permanent communication hub or base station. Every node functions as a router, sending and receiving data packets between itself and other nodes. Connected wirelessly and without the need for permanent infrastructure, mobile devices form ad hoc networks, or mobile ad hoc networks (MANETs). Since no device in a MANET is restricted in its freedom to travel in any direction, the devices' connections to one another are constantly shifting. Each one is a router in that it forwards traffic that isn't directly relevant to its own function. The most difficult part of creating a MANET is making sure all of the nodes have the resources they need

to reliably store and update the data necessary to appropriately route traffic. A mobile ad hoc network (MANET) is a network of wirelessly connected, self-contained mobile nodes. Radio-accessible mobile nodes can talk to each other without the help of any intermediary nodes. Ad hoc networking relies on a number of crucial yet finicky mechanisms, one of the most critical and challenging being the routing system. Simply put, an ad hoc routing protocol is a set of rules established by a group of nodes for directing the flow of data packets between them. Due to a lack of information on the network's structure, the nodes in an ad hoc network must rely on route discovery. According to their intended purpose, routing protocols in MANETs can be broken down into three distinct groups. When establishing a connection, AOMDV is based on the AODV protocol. Protocol based on a reactive multipath architecture. In an effort to solve the infinite problem, AODV employs the DSR technique developed from Ford's algorithm. It has two primary nodes, both of which are generated by flooding that, in turn, leads to the disjoining of links and the release of.

2. LITERATURE REVIEW

In this research, authors Pratik Gite et al. (2017) present the novel technology of Mobile Ad-hoc Network for use in wireless communications. In this study, the authors suggest a new routing system that prioritizes accessible routes based on the stability of their paths. Signal strength was used as the basis for the link prediction technique used in the example. They actually put the suggested routing idea into practice on the AODV protocol. This technique significantly enhances the previously-mentioned problems of routing overhead, energy usage, and throughput for a range of experiment counts.

The link failure inside the mobile ad hoc network happened due to the movement of the nodes was given as the main problem by Kavitha T, et al. (2017). While many approaches have been developed that use hop count as a parameter to quickly re-route the packets, they do not yield optimal results in terms of end-to-end delay. Since this is the case, they devised a methodology in this work called Instant Route Migration to immediately design a path while taking into account path distance and hop count. Since cache maintenance occurs at each node, this technique makes it simple to reroute packets to their final destination in the event of a connection failure. According to the findings, the proposed method provides superior performance to preexisting systems in terms of throughput, end-to-end delay, and speed of route migration.

This study discusses the many problems that arise from the design of routing protocols for mobile ad hoc networks, as reported by Chanda Dhakad et al. (2016). In this study, they suggested a new method in which nodes determine their neighbors' RSSI values. The suggested technique computes the LFF up to the destination node as well as the LFF for each node in the network. After calculating all the values, the path with the lowest link failure factor is chosen. A route is chosen based on the fewest number of hops required to get data from sender to receiver. The results of the trials show that compared to SEAODV, the proposed LFAODV has better routing overhead, throughput, and packet delivery ratio.

There are frequent link failures in mobile ad hoc networks due to the mobility of the nodes and the unreliability of the wireless channels over which the data is transmitted, as detailed by Er.Rubia Singla et al. (2014). They suggest using the AOMDV protocol to implement node-disjoint multipath routing. The primary purpose of the proposed method is to acquire all nodedisjoint routes between the source and the destination with minimal routing management overhead. According to the proposed method, data transmission begins at the origin as soon as the first path to the destination is identified. Parallel to the primary path, data transmission is planned to occur along any accessible secondary paths. To demonstrate the efficacy of their proposed approaches in terms of End-to-End Delay, Throughput, Hop Count, and Packet Delivery Ratio, they will run a number of simulations, with results showing that Node Disjoint- Multipath based on the congestion threshold provides the best possible outcomes.

In this research, Jyoti Upadhyaya et al. (2016) introduced the Mobile Ad-hoc network, a decentralized and infrastructure-free system. Consequently, the shortest and most ideal route may not be chosen at the opportune moment, leading to a change in the routes. Using their proposed new routing metric method, the signal intensity of neighboring nodes may be easily determined. In this study, the authors propose a delay that depends on the remaining energy in the nodes. Only by taking the most reliable path to the destination can network performance and longevity be improved. According to the simulation results, the suggested SSED-AODV approach outperforms the currently used routing protocol.

According to the work given by MOHAMMAD M. KADHUM et al. (2016), MANET has been used for data collecting in a number of important sectors, including emergency search and rescue, law enforcement, and military activities. Consequently, numerous routing protocols have been devised so far to address all these challenges, with backup routes being constructed first in the route discovery phase. Since the chosen paths do not accurately represent the topology changes, they are less likely to be used. Assuming you have access to sufficient information about the link, you can restore the active route before the breakage occurs and avoid losing access to it. The process improves network efficiency and reduces packet loss..

3. RESEARCH METHODOLOGY

This study focuses on the relationship between link failure and network quality of service. Using these new network parameters, this study aims to enhance multipath routing. The path from origin to destination is set up using on-demand routing protocols. The path with the highest sequence number and the fewest hops is chosen for path establishment. The nodes with the most available power and the ability to evenly distribute the data load are chosen as the multi-intermediate path's stops along its journey from source to destination. Various parameters, such as buffer size and node connectivity, are used to determine which nodes will be involved in the actual transmission of data. By applying the nodes with the highest values for power, buffer size, and node connectivity, a new path can be chosen for data transmission from source to destination via the multi-path. Procedures involved in a research study are as detailed below:

1) Deploy the network with the finite number of mobile nodes and define source, destination in the network

2) If (path exists from source to destination)

- Transmit information over selected path Else
- Source flood route request packets in the network
- The adjacent nodes of destination will reply back with route request packets
- Best path is selected on the basis of hop count and sequence number

3) If (link failure occurred)

- Node send its buffer size and adjacent nodes to source node
- Node which has maximum buffer size and node connectivity is selected as best node

4) Repeat step 2.1. Until whole data get transmitted over the path.

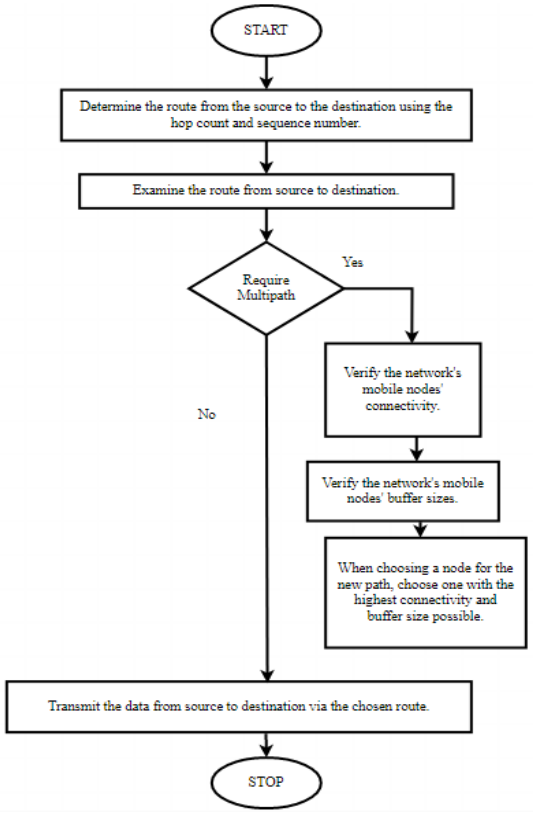

Figure 1: Flowchart of the study

4. RESULTS AND DISCUSSION

Studying how to restore broken links in a mobile ad hoc network is the focus here. Link restoration relies on two variables: buffer size and node connectivity. The parameters PDR, packet loss, and delay are used to evaluate the effectiveness of the proposed technique.

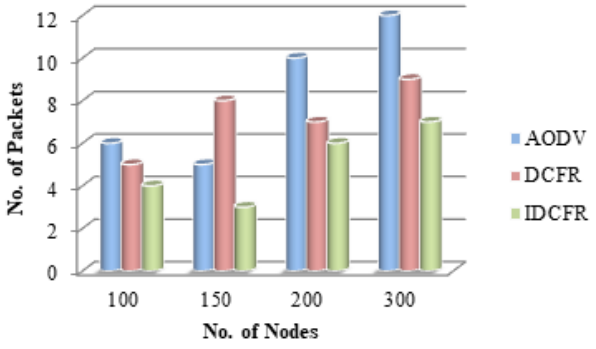

Figure 2: Packet loss Comparison

Figure 2 displays the results of a comparison of AODV, DCFR, and IDCFR with regard to packet loss. As opposed to AODV and DCFR, IDCFR has the lowest packet loss..

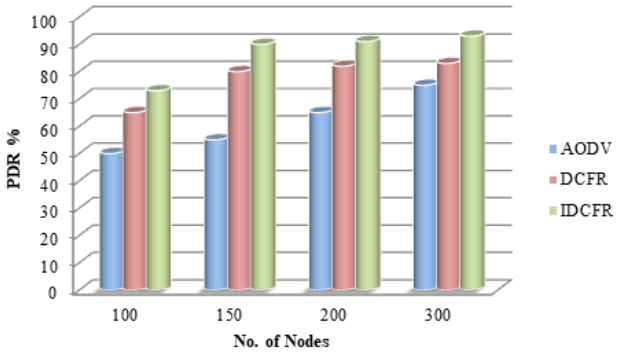

Figure 3: Packet Delivery ratio

Figure 3 displays a comparison of the PDR values for AODV, DCFR, and IDCFP protocols, with the results of this comparison revealing that the IDCFP protocol outperforms the other two. The correlation between the total number of nodes and the frequency with which they are drawn in graphs is examined..

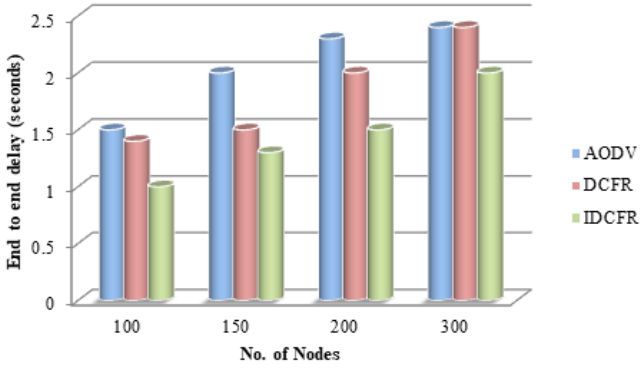

Figure 4: Delay Comparisons

Figure 4 shows a comparison between the enhanced DCFR Protocol and the original DCFR Protocol in terms of delay. The better DCFR Protocol, thanks to its route-maintaining properties, has a lower latency than the original DCFR Protocol. We plot the matrices according to the total number of nodes.

5. CONCLUSION

Nodes in mobile ad hoc networks are free to join or leave the network at will, making it a decentralized system. The network's decentralized design makes it particularly vulnerable to problems with routing, security, and quality of service. Reactive protocols are used to determine the best route from the source to the destination, and they excel in a number of key metrics. AODV has been found to be the most effective reactive routing technique in this study. It is concluded in this work that the key challenges affecting the operation of a mobile ad hoc network are related to its decentralized character, specifically its security, routing, and quality of service. Previous studies have relied on node connectivity to reconstruct the missing link between origin and destination. Increases in the network's buffer size are used to enhance link quality. Network simulator version 2 is used to test the proposed technique and its effects on PDR, packetloss, and latency are studied. All of the defined parameters are compared to the current technique, and the areas in which the suggested technique excels are discussed.

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