# A New Routing Protocol To Minimize The Risk Of Link Failure In MANET

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## ABSTRACT

The utility and diversity of mobile ad-hoc network are increasing day to day. The quality routing is major issue in mobile ad-hoc network. Due to mobility of node and dynamic infrastructure the mobile node lost their path and communication process is failed. For the improvement of link failure prediction various protocol and algorithm are designed by various authors and scientists. In this dissertation modified the AODV routing protocol for the detection of link failure prediction. The modified protocol is called secured efficient routing protocol (SEAODV). The SEAODV protocol is based on two functions one is leader-based function and one is energy-based function. The leader-based function measures the distance of normal node and failure node. Our proposed algorithm is very efficient in compression in AODV routing protocol. For the evaluation of performance our modified protocol tested in different network scenario tested through simulations for different distributions of nodes and path and different connectivity models. Under all the evaluated scenarios, the technique demonstrates excellent detection probabilities with few failures of path during selection process. Our proposed modified scheme "SEAODV" simulate in NS-2 simulator. process we used. The evaluation of performance is measured by packet delivery ratio, normalized load, packet throughputs. Our modified scheme is compared with existing AODV and good results in compare with old method.

Keywords: -MANET, AODV, Link prediction, Leader election, energy-based function.

## 1.INTRODUCTION

The physical connection between networked computing devices is established using either cable media or wireless media. Internet is the best-known computer network. When number of computer are joined together to exchange information they form networks and Share resources. Networking is used to share information like data communication. Sharing resources can be software type or hardware types. It is central administration system or supports these types of system. A network can be wired network and wireless network. Wired network is that which used wires for communicate with each other's and wireless network is that which communicate without the use of wires through a medium. Wireless Networks term is referring to a kind of networking that do not requires cables to connect with devices during communication. The transmission is take place with the help of radio waves at physical level [4]. Wireless Networking is a technology in which two or more computerscommunicate with each other using standard network protocols and without the using of cables [5]. It is also known as Wi-Fi or WLAN. With the help of this network, devices can be joined easily with the help of radio frequency without wires to sharing information. The wireless network offers certain advantages over the wired networks that are as follows[7]:

- It is very easy and fast to set up a wireless system andit eliminates the need for wires and cables.
- Wireless networks can be extended to the places thatcannot be wired.
- It adapt easily and more flexibility to changes in the configuration of the network.

MANET is a mobile ad-hoc network. It is self-configuring network which is infrastructure less in nature. In MANET different mobiles are connected through wireless link [6]. Each mobile are free to move i.e. no central controller available. It is one of the type of ad-hoc network. There are mainly two types of routing protocol available. These are as following:

1.Proactive Routing Protocol (Table-driven)

2. Reactive Routing Protocol (On- demand)

3.Hybrid

There is problem during data transfer using routing protocol which will be discussed in this paper.

## II. LITERATURE SURVEY

The authors in [28] propose several extrema-finding leader election algorithms for broadcast networks and which can tolerate arbitrary process failures. Every message in these algorithms is assumed to be reliably broadcast to all other nodes in the network. In their algorithms, every node that participates in election broadcasts its own identifier to all other nodes. A node upon receiving an identifier smallerthan itself, in turn broadcasts its own identifier to all other nodes. If a node does not receive any other identifier for a time interval, it assumes itself to be the leader. Their algorithm is indeed applicable in a wireless ad hoc network. However, as every message has to be reliably broadcast to every other node, their algorithms can be expected to place an enormous strain on bandwidth in a wireless environment.

In [26], a self-stabilizing leader election algorithm for a completely connected message-passing system has been proposed. In their model, process crashes are assumed to be permanent and no additions take place to the set of processes participating in the election after the election is initiated. The approach of survey of link failure prediction used some reputed journal and conference paper such as IEEE transaction, ACM and IJCA. All the discuss method are motioned there name and title. In this paper[20], author proposed a new best node based fault tolerant protocol for coordinator election. Our protocol declares the new coordinator for the system as soon as the current leader crashes by maintaining the vice-coordinator and a cabinet of elite nodes, called CAGs (Coordinator Advisory Group members). The nodes having better capabilities like battery backup, computation power, etc, have been called 'elite' nodes. However, elite nodes have not been assumed having any special characteristics that may turn the algorithm asymmetric, except they are supposed to maintain an additional data structure. On the occurrence of failure, vice-leader becomes the leader of the system and new vice-leader is elected fromthe elite nodes. Thus, the protocol reduces number of messages and waiting time to elect the new leader. Therefore, the protocol has been named as Elite Leader Finding Algorithm (called ELFA, henceforth). ELFA uses pre-established coordinated MANET. It uses PHASE 1 and PHASE 2 of MELFA [10] for distribution of election message. In this paper [7],

Srinath Perur, Abhilash P. and Sridhar Iyer ,they described about the Link failure caused by node mobility is a common feature of multi-hop, wireless ad hoc networks. With a reactive routing protocol such as AODV (Ad hoc On-demand Distance Vector),leads to increased delay and routing overheads while route repair procedures are carried out. They present a strategy called Router Handoff wherein a node that detects one of its links weakening, preemptively hands off routing information to a suitably situated node. This results in routing around the weak link and prevents the route from being broken. The simulation results show that this approach leads to increased throughput and reduced routing overheads in most cases. In this paper they presented a preemptive route repair strategy for AODV called Router Handoff. They found that in most cases tested it reduces routing overhead and improves throughput. They are currently in the process of refining the criteria for performing handoff and assessing the impact of Router Handoff on network latency and average path length. They also believe that the concept of handoff could be used in contexts other than link failure. For instance, a node that is low on power, or a node that knows it is going to switch off could handoff without affecting the rest of the ad hoc network. It might also be interesting to incorporate Router Handoff into other ad hoc routing protocols.

## III. LEADER ELECTION TECHNIQUE AND ROUING PROTOCOL

The information leader election algorithm is used extensively in mobile ad-hoc systems, several algorithms have been developed for the problem in various mobile ad hoc networks. We should note that many of these algorithms were not explicitly developed for the MANET network, but rather as self-stabilizing leader election algorithms for dynamic asynchronous networks. In a dynamic network, links may go up and down arbitrarily, but nodes are not mobile

### **3.1** LEADER ELECTION

The coordinator election is a classical challenge in static as well as dynamic networks. Therefore, it is an extensively studied problem in distributed systems to coordinate and monitor various applications runningin the network. In fact, our contemporary literature includes a large number of leader election protocols for static environment. However, leader election in MANETs is comparatively a less explored area of research. In order to monitor ad hoc applications, it is necessary for MANET to possess a coordinator. In the following section.

### 3.1.1 PROCESS OF LEADER ELECTION ALGORITHM

Electing a coordinator is a basic challenge of distributed computing environment in order to coordinate many applications among nodes. Say, there are N nodes in the network, each with a unique identity. Initially, all processes are in the same state, called the candidacy state and any one may initiate the election protocol. After the termination of protocol, exactly one node is chosen as a coordinator by all N processes based on some features like id, battery power, computing power, etc, and rest N-1 remain ordinary node. The word 'leader' and 'coordinator' have been used interchangeably throughout this dissertation. In general, the protocols for electing a coordinator in MANET have the following assumptions:

- Each node has a unique identifier.
- All nodes are connected by a bidirectional link.
- The communication channel is not necessarily FIFO.
- A node only knows the IDs of its neighboring nodes.
- The nodes remain static during election process.
- All nodes must agree and use the same election protocol.
- Election message has higher priority than any other messages.

No central controller is considered for initiation of algorithm

### 3.1.2 APPLICATION OF LEADER ELECTION

Coordinator election protocol is used in various scenarios in MANET as following:

Inter-node Communication and Data Exchange: Monitoring communication is the basic responsibility of leader. The leader provides privilege to some mobile node to communicate with each other or to exchangedata with other host or with coordinator by allocating channel among them, refer below Figure

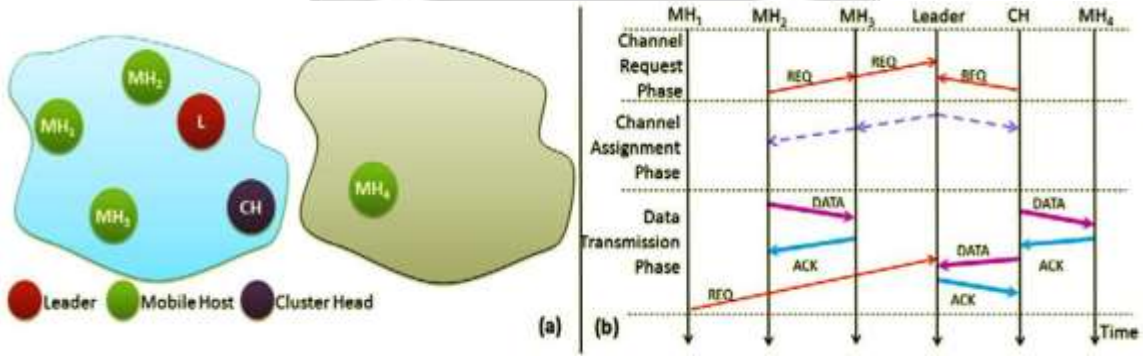


Figure 3.1 Inter-node Communication and Data Exchange. In figure (a), two MANETs

are shown with mobile host, cluster head and leader. In, the figure (b), channel request phase, mobile hostMH2 and MH3 and cluster head CH request the leader, L, for channel assignment. In response, leader assigns channel to cluster head CH (for inter-cluster communication) and mobile host.

Subsequently, mobile node, i.e., MH2, MH3,and CH exchanges the data. It is worth noting that channel request is queued at leader after channel assignment phase till the next channel allocation.

## IV PROPOSED METHODOLOGY

Link failure prediction is a new area of researcher area in mobile ad-hoc network. The failure of link decease the performance of routing protocol in mobile ad-hoc network, for the improvement of quality of service in mobile ad-hoc network various authors proposed a different model and method for prediction of link. The prediction of link deceases the failure rate of mobile node during communication. The leader election algorithm plays a major role in link failure prediction algorithm the process of link failure prediction implied in form of distributed node distribution. Proposed a new link stability prediction method based on current link-related or user-related information in shadowed environments. A more realistic user mobility model and a realistic propagation model are taken into consideration. According to the numerical and simulation results, it is found that the proposed method can accurately predict the link stability for different environment and mobility conditions. The prediction results can be regarded as a measure of the link stability, and can be applied to the applications, such as link performance prediction, system performance analysis, service quality prediction and route search.

## V. EXPERIMENTAL RESULTS

The simulation has been done on NS-2 platform.

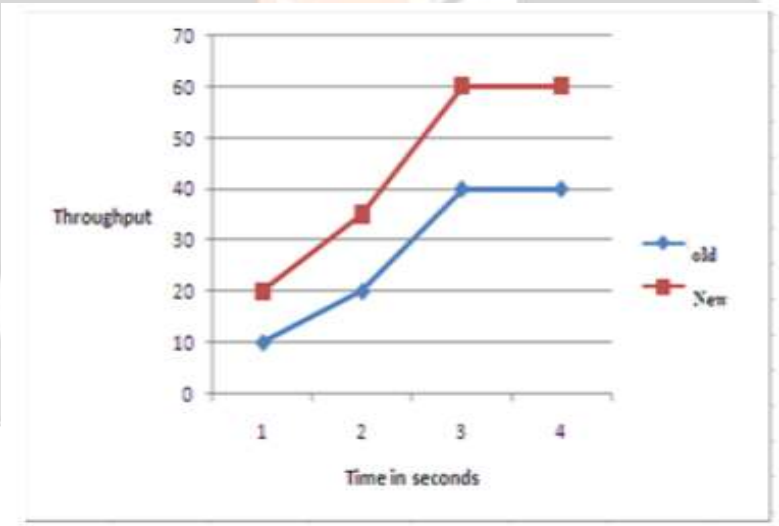


Fig. 3: Throughput graph

In throughput graph as the figure illustrated the throughput of the new and previous technique. X axis shows time in second and y-axis shows throughput. The blue line shows the throughput of then network in previous technique. The throughput of the new technique is shown in red line. The efficiency of the enhanced AODV increases with the help of signal strength. The through put the network is enhanced through the use of new proposed technique because the packet loss in then network is reduced. The results help to improve the performance of the system.

| Time in seconds | OLD | NEW |
|---|---|---|
| 4.000 | 10 | 20 |
| 6.000 | 20 | 35 |

| | | |
|---|---|---|
| 7.000 | 40 | 60 |
| 8.000 | 40 | 70 |

Fig.3.1 Throughput parameter

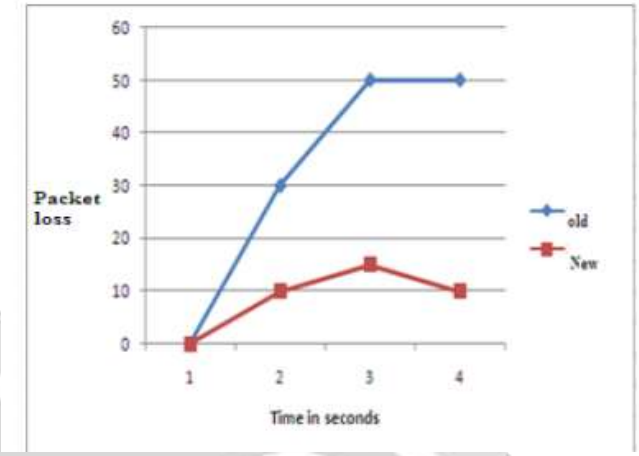


Fig. 4: Packet loss

During link failure problem packet loss occur in old AODV. X axis shows time in seconds. Y axis shows packet loss. But this problem can be overcome signal strength in enhanced AODV. Here x-axis represents time and y-axis represents no. of packets. Red line shows new AODV and blue line old AODV. This shows that packet loss is less in new AODV as compared to old AODV.

| Time in seconds | Old Technique | New Technique |
|---|---|---|
| 2.000 | 0 | 0 |
| 3.000 | 30 | 10 |
| 7.000 | 50 | 15 |
| 10.000 | 50 | 10 |

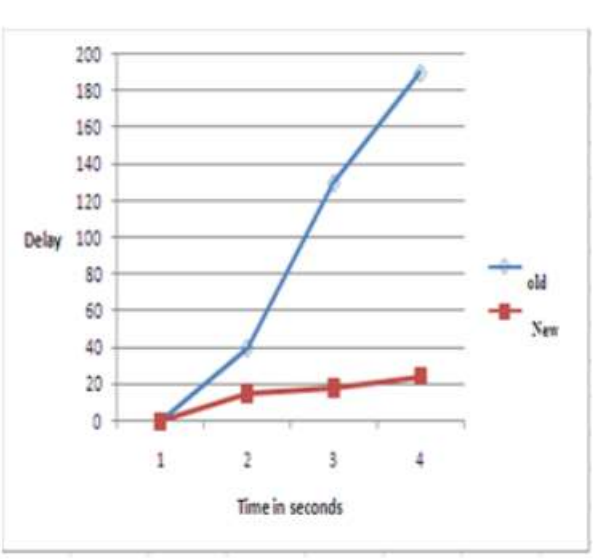


Fig. 5: Delay

Delay graph represents that old AODV has more delay than new AODV. X axis represent time

in seconds and y axis represents delay in seconds. Thus transmission is fast in new AODV which helps to improve performance. Red line represents new AODV and blue line represents old AODV.

| Time in seconds | Old Technique | New Technique |
|---|---|---|
| 4.000 | 0 | 0 |
| 5.000 | 40 | 15 |
| 7.000 | 130 | 18 |
| 8.000 | 190 | 24 |

Fig.5.1 Delay parameter

## VI. CONCLUSION

AODV is used to find out the path of the data transfer. But simple AODV has the problem when the nodes move. Enhancement in AODV is required so that to overcome the problem of link failure during data transfer from host to destination. First of all mutual authentication is required between the mobile nodes to prevent the various inside and outside attacks. When the mobile nodes are mutually authenticated, it leads to the reliable data transmission between the mobile nodes. But the main problem occurs during the failure of the link. Due to link failure packet is lost easily. In proposed work, enhancement in AODV concept is important. This protocol is designed to provide best path according to signal strength. The path which has maximum signal strength will choose as a final path. This work will helps to reduce the problem occur in link failure and packet lost problem. Now the performance degradation problem will also improve. In new AODV, route selection is based upon the signal strength. The maximum signal strength nodes are considered as final routes.

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