# Adpative Routing Aware Optimal Geographical Position Prediction in MANET

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***Abstract-*** **One of the significant and demanding problems in the design of ad hoc networks is the improvement of an efficient routing protocol that can provide high-quality interactions among mobile hosts for that propose new protocol to appraise the node lifetime and the link lifetime utilize the dynamic nature, such as the energy drain rate and the relative mobility estimation rate of nodes. Integrate these two performance metrics by using the future route lifetime-prediction algorithm select the smallest amount dynamic route with the highest lifetime for unrelenting data forwarding and based on quadrant. Our predictable route Adaptive Routing aware optimal position prediction protocol in an explore dynamic nature routing for manet procedure environment based on Adhoc on demand distance vector routing (AODV).**

***Keywords: Mobile ad hoc networks (MANETs), node lifetime, route discovery, Proactive/reactive routing protocol, performance analysis.***

## I. Introduction

A mobile ad hoc network (MANET) consists of many mobile nodes that can commune with each other openly or through middle nodes. Often, hosts in a MANET operate with battery and can travel freely, and thus, a host may drain its power or move away, giving no notice to its nearest nodes, causing change in network topology. A key feature of this scenario is the dynamic performance of the involved message partner.

Message protocol will have to deal with an often changing network topology. However, many application require secure connections to assurance a certain level of QoS. In right of entry networks, access point handover may disturb the information move. In addition, service context may need to be transfer to the new right of entry points, introduce extra slide and delays to the connection. In ad hoc networks, mobile services enable peer-to-peer connections for voice or data traffic. Using steady associates is vital for establish stable path between association upper class. Rerouting is especially expensive in these networks without communications, since it usually marks in (at least partly) flood the network. The steadiness of a link is given by its chance to continue for a certain time distance, In MANETs, a route consists of several links in sequence, and thus, its life span depends on the life span of each node, as well as the wireless links between

neighbouring nodes. The main payment of this paper is that we combine node lifetime and LLT in route lifetime-prediction algorithm, which explore the lively nature of mobile nodes the energy drain rate of nodes and the relative mobility assessment rate at which adjacent nodes (shift apart) in a route-discovery stage that predict the life span of routes discovered, and then, we select the greatest life span route for constant data forward when making a route choice. The future route lifetime - prediction algorithm equipment our proposed algorithm in an exploring dynamic nature routing (LEDNR) protocol huge size surroundings based on quadrant based dynamic source routing.

## II. Problem Definition

1. Any one of the nodes in the way dies because of partial battery energy
2. Any one of the relations is out of order because the matching two adjacent nodes move out of each other's message range. Thus the lifetime of route P is spoken as the smallest amount value of the lifetime of both nodes and associations involved in route.
3. By considering the power state of nodes, such as remaining energy and energy drain rate, the node lifetime routing algorithms often select a path consisting of nodes that may stay alive for the greatest time among several paths.
4. The power drain rate of a node is exaggerated not only by its own but by its nearest data flows as well.
5. Aimed to protect network connectivity by choosing a route according to the outstanding battery.
6. Existence of nodes along the route future selecting a trail with least amount total transmission power when there live some possible paths, and all nodes during these paths have sufficient outstanding battery power
7. Selecting a path that has the biggest packet transmission ability (the outstanding energy divided by the predictable energy spent in dependably forwarding a packet) at a "dangerous" node among multiple paths. The dangerous node is the node that has the minimum packet transmission capacity in a path. Each node attempts to estimate its battery lifetime based on its outstanding energy and its past activity

all of them unnoticed the mobility of mobile hosts, and thus, it seems that they are more suitable for static networks

## III. THE PRINCIPLE OF LEDNR

*Methodology:*

The future algorithm consists of the following three phases**: Route detection, information forwarding, and Route preservation**.

There are seven main differences between the LEDNR and the AOD. **First,** in the LEDNR protocol, every node saves the established signal power and the received time of the RREQ packet in its limited memory and adds this information into the RREP packet header in a piggyback manner when it receives the RREP for the corresponding RREQ packet to assemble the obligation of the connection lifetime-prediction algorithm. **Second,** node agent need to renew their predicted node lifetime throughout every period.

**Third** the node-lifetime information in the RREP packet is updated when the RREP packet is return from a target node to the source node. **Fourth** The position information of the source and target nodes is piggy-backed in the route request (RREQ) packet and then broadcast. Upon receiving the RREQ, middle nodes will contrast using a easy mathematical link based on the coordinate of source, target and the present node that direct the packet towards the target once the decision to transmit has been made. **Fifth** the middle node will put in its location by replacing the source node coordinates and add on its address and series number at the end of the RREQ packet. It will then transmit the packet. **Sixth** The procedure will do again at each middle node until it reaches the target. The substitute of the source node position information with the middle node coordinates will make the packet more directed towards the target since the contrast now is based on the preceding node. **Finally** Upon in receipt of the RREQ, target node will send a route reply message (RREP) back to source via the path taken to arrive at the target that was appended in the RREQ as it traverses across the network. There is no need for the route detection to the source node. Figure1 shows the arrangement of the RREQ packet in Q-DIR where the source and target nodes location information are inserted are highlighted.

### *A. Node Lifetime Prediction Algorithm:*

A connection is composed of the two nodes in a connection and the connection itself, and the LLT includes both the node lifetime and the connection lifetime.A link $Li$ consists of a connection $Ci$ and two nodes ($Ni-1$,$Ni$).

where $Ci$ represent the connection between nodes $Ni-1$ and $Ni$ and it is maintain until the neighboring nodes ($Ni-1$,$Ni$) move out of each other's message range under the statement of no energy problem in both nodes $Ni-1$ and $Ni$. We bring in connection lifetime $TCi$ to stand for the estimated lifetime of the connection $Ci$, and it only depends on their relative mobility and detachment of nodes $Ni-1$ and $Ni$ at a given time. The term $TNi$ denotes the predictable battery lifetime of node $Ni$. Then, the life span of the link $Li$ is expressed as the smallest amount value of ($TCi$, $TNi-1$, $TNi$ ),

$$TLi = \Psi \min(TCi, TNi-1, TNi)$$

The life span of route P is spoken as the least amount value of the life span of both nodes and associations involved in route P. Take for granted that Ω represents the set of all nodes in route P and that Ψ is the set of all the associations in route P. Thus, the life span $Tp$ of route P can be spoken as

$$Tp = \min(TNi, TCi)$$

We use an **Exponentially Weighted Moving Average Method** to estimate the energy drain rate *ev* appraise the node lifetime that is based on its current outstanding energy and its precedent activity.

Where

**Eu/v** = energy used up at node u due to node v

**ETack** = energy exhausted for broadcast of an ACK packet

**ETpck** = energy used up for broadcast of a data packet

**ERack** = energy used up for greeting of an ACK packet

**ERpck** = energy spent for response of a data packet, 1 if p is true, 0 otherwise.

The whole energy used up at a node is the amount of the energy exhausted at it due to all the nodes in the greeting and intrusion area of this node. Thus, in this model, the broadcast and response costs are included if the node belong to a flow, and greeting costs are included if it is near the flow. From end to end the cost value we can forecast the best path in dynamic nature and approximation the dependable path for the great scale network. Steady value with a range of [0, 1] the present condition of node $i$ well, we grant a top priority. The path lifetime (PLT), RREQ time, and RREQ signal strength, is added to the ordinary header of an RREP packet.

The PLT represents the predicted lifetime of the source route in this packet title and can be updated when RREP packets are forwarded from the target node to the source node in the route-discovery stage.

### *B. Connection Lifetime Prediction Algorithm:*

Hold the relations that are in an unbalanced state and may only last for a short period mainly for ignoring the steady one for simplicity. The reason is given as follows: First, we are only worried with the smallest amount node lifetime or the connection life time in a route. Since two nodes of a constant association are within the message range of each other, the connection lifetime may last longer, and they are not a blockage from the route to which they belong. It is easier to replica the mobility of nodes in a short period during which unbalanced associations last. We can presume sensibly and basically that the nodes move at a stable speed toward the similar direction in such a short period calculate the distance between nodes $Ni$ and $Ni-1$.

We use Global-Positioning-System-based location in order to calculate the conventional signal strength. Presumptuous that senders broadcast packets with the same power level a handset can measure the conventional signal power strength when getting a packet and then calculates the distance by openly applying the radio broadcast model. If the conventional signal power strength is lower than a threshold value, we regard this link as an uneven state and then compute the association time we combining this metrics with Nodes which are positioned within the message range are known as neighbors. In manet each nodes start to send beacon packet to its neighbor nodes to find the location and location of its neighboring coordinates. By this way each node identifies its neighbor by distribution beacons. Thus a exacting node will set up a list of nodes that are neighbor to it and starts communicating to other nodes and exchanges the messages.

### *C. Mobility Prediction (MP) Rule*

Combination of the mobile nodes is called clustering, in which a head node is chosen to manage the whole network and which is responsible for resource allocation. Mobility causes the network instable, which leads to connection failure. We have projected a mobility prediction based clustering algorithm in which the mobility prototype of the nodes is experimental and given significance in electing cluster head. Simulation study is carried out and the presentation of the planned work is compared with the WCA and proved that the planned model performs more than the WCA.

The Node is triggered when there is modify in the position of the node. The modify in the location of the node is cannot be predicated because it moves in the chance direction. So the beacon packet is drive when the deviation is better than the threshold condition and it is known as Acceptable Error Range (AER). It act node to send the beacon packets to the neighboring nodes. The present location and velocity is stored in the beacon transmitted by the nodes. In actual time scenario, the nodes will approximation their positions occasionally by given that linear kinematics equations based on the factors that parameterized from the lat announced beacon. When there live a change from real location to predicted location, distribution of new beacon will be send to the neighbors about the changes that have been encountered based on the mobility individuality.

### *D. On-Demand Learning (ODL) Rule*

On-demand a node distribution a beacons i.e., in a exacting area the node will involves in the forwarding activities in reply to the data. This regulation states that whenever a node intellect a data broadcast from a new neighbor (i.e., overhears a beacon with a data packet) a beacon will be broadcasted as a reply such that we imply a new neighbor who is controlled in the neighbor list of the node. In practical, to stay away from crash with other beacons a node waits for a small chance time interval before responding with the beacon. The data packets are piggybacked from their place updates and thus it entered into the promiscuous mode where all nodes are operated which allows them to grab all the data packets transmitted in their area.

Our future method requires simply two sample packets, and we apply piggyback information on route-request (RREQ) and route-reply (RREP) packets through a route-discovery process with no other manage communication overhead, and thus, it does not add to time complexity. It searches for the route whenever there is a need. In addition to the above three, DATA packet is also there and it is unicast/transmit. RERR communication will be assigned unqualified overhearing. The cause is that the connection failure should be knowledgeable to all the nodes, so that the nodes will not use it for the after that time until it gets prepared RREQ is a transmit and here comes the chance values. Based on the chance of overhearing and rebroadcast, it is set. Provisional overhearing is done for the RREP. RREQ is set to overhear under a condition. This avoids redundancy in distribution.

*Algorithm:*

**Predict** Its lifetime

**If** its lifetime > Min-lifetime

**Replace** Min-lifetime with its lifetime

**If** Sequence Number exists

**Compare** Min-lifetime of current RREQ with Minlifetimeof existing one.

**If** new Min-lifetime <= old Min-lifetime

**Discard** new RREQ

**If** new Min-Lifetime >old Min-lifetime

**Replace** old Min-Lifetime with new Minlifetime

## IV. EXPERIMENTAL SETUP

Our execution is based on network simulator ns2.34. The mobility of nodes follows a chance way-point model. The source–destination association patterns are generated using cbrgen.tcl in NS-2. The first energy is the 1000 joules and simulation time is set to 100 s In the simulation, we consider a total of 1000 nodes at first arbitrarily distributed over a square network of size1000m × 1000m. Each node moves at a speed $V$ and transmit at consistent power of reporting of radius $R$ under certain traffic load. Three different broadcast ranges $R$ {150, 200, 250} $m$ are enclosed, all within the reporting. Four different speeds $V$ {5, 10, 15, 20} $m/s$ are simulated, from lesser mobility to higher mobility scenarios. Traffic, supplied from a CBR source with fixed packet size of 1000 Bytes, is arbitrarily generated with consistently circulated sources and destinations. Dissimilar number of traffic flows $F$ {5, 10, 15, 20} are simulated, covering low and modest flow pattern.

### A. *Packet Delivery Ratio*

Packet Delivery Ratio (PDR) is intended by dividing the number of packets received by the target from end to end the number of packets originated by the source.

$$\frac{\text{TOTAL NUMBER OF PACKETS SUCCESFULLY DELIVERED}}{\text{TOTAL NUMBER OF PACKETS SENT}} \text{X100\%}$$

Fig. 1 this effect also shows us that LEDNR has a add to the packet delivery fraction than the other protocols

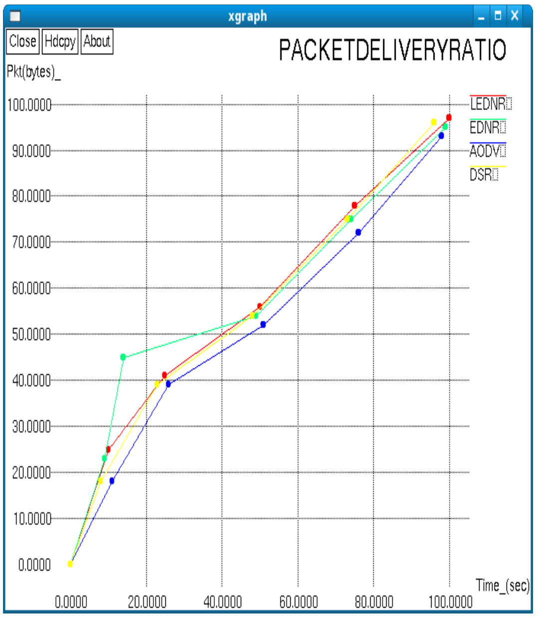


Fig 1: Packet delivery Ratio

### B. *Energy Consumption*

These events the energy expended per delivered data packet. It is expressed as

$$\frac{\sum \textit{ENERGY EXPENDED BY EACH NODE}}{\textit{TOTAL NUMBER OF PACKETS DELIVERED}}$$

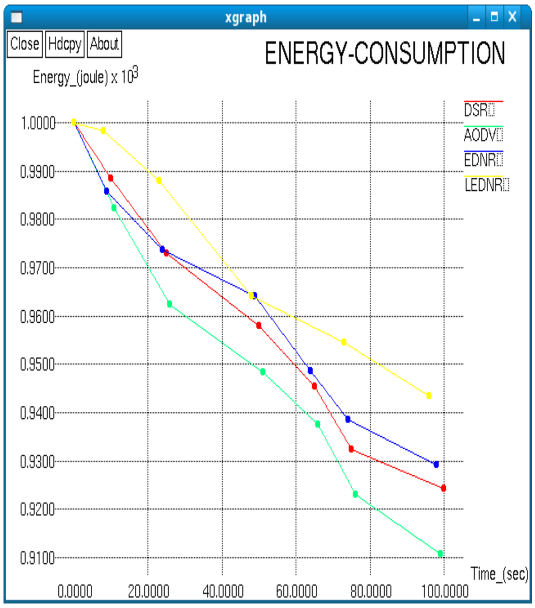


Fig2: Comparison of AODV DSR and EDNR protocols with LEDNR

Fig. 2 this effect also shows us that LEDNR has a lesser energy expenditure than the other protocols.

### C. *End-End Latency:*

**End-End latency** events the average time it takes to route a data packet from the source node to the target. It is expressed as

$$\frac{\sum \text{INDIVIDUAL DATA PACKET LATENCY}}{\text{TOTAL NUMBER OF PACKETS DELIVERED}}$$

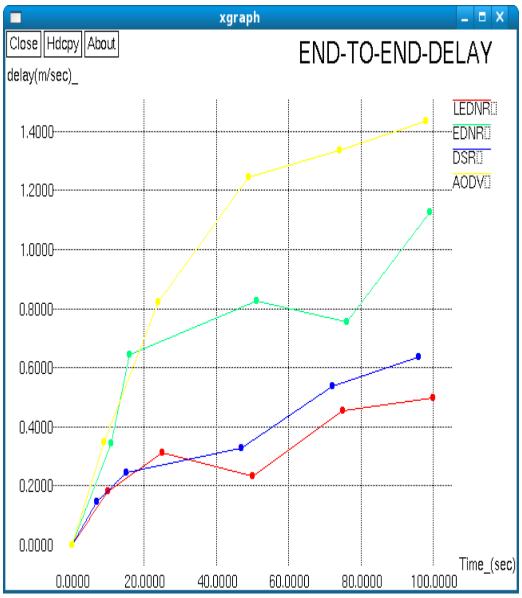


Fig3: this result also shows us that LEDNR has a lesser Delay than the other protocols

The benefit of the LEDNR protocol in conditions of the numeral of routing failures delay, energy consumption. To adapt to energetically varying network topology environments, the EDNR, AODV and DSR protocols do their best to find a more steady route.

## V. CONCLUSION

In MANETs, a connection is shaped by two neighboring mobile nodes, which have limited battery energy and can roam freely, and the connection is said to be out of order if any of the nodes dies because they run out of energy or they move out of each other's message range. In this paper, we have measured both the node lifetime and the LLT to predict the route lifetime and have planned a new algorithm that explores the lively nature of mobile nodes, such as the energy drain rate and the relative motion evaluation rate of nodes, to evaluate the node lifetime and the LLT. Combining these two metrics by using our future route lifetime-prediction algorithm we can choose the smallest amount dynamic route with the best lifetime for constant data forwarding. Finally, we have evaluated the contrast performance of the proposed LEDNR protocol based on the DSR and AODV.

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