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NDEL based Performance Analysis of Position based Opportunistic Routing Protocols

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Abstract

In opportunistic routing protocol focus on the reliability of sending data packets from source to destination using different methods. Mobility forms an adequate challenge in networks. Generally routing protocols travel along trustworthy path and so problem may be created. A relay form of applicant set is selected for sending information. On each communication the hop which satisfies the selected criteria on receiving the packet will promote the data from source to destination. So we propose an efficient power, speed and link stability protocols that use the property of the location based routing and transmit wireless media. Selecting hops forms basic criteria for sending the data the proposed method will consume more energy and accommodating more hosts. We finally give common approach for accepting the nodes to select a path to destination.

Keywords: Adhoc Network, Magnet, Position based Routing Protocol, Reliability

1. Introduction

A network consists of host that communicates without a fixed infra-structure. Each hub has the capability to communicate with other nodes over a wireless channel. Every host has to regulate its environment when the network is formed. Let us assume each node has a power universal position system so that it makes us to know the position of the node itself. On the unavailability of GPS we measure the distance of adjacent nodes with the help of incoming strength. Manets are classified by the faction of nodes and speed which will modify its topology and successive partition. System depends on routing protocols which always remain an exigent issue.

In network the major issue depends upon Routing. Most probably nodes require the position itself and one hop neighbor. Consequently nearest nodes are aware of distance between them. Within transmission medium it can exchange with correctly bits. The probability of receiving successful depends on the probability of receiving bits successfully. In this paper we consider the routing with acknowledgement and choose hop by hop transmission. Location forms the basic criteria for sending information to destination. Then the following hop information is attached with packet header. The main work of the position based routing is to select the path for forwarding the neighboring nodes. Routing new scheme can be discussed in Figure 1. In usual selection is based on the distance with the neighboring nodes. Here use assortment and prioritization of forwarding is done. Generally protocols follow three types in forwarding that is greedy, hierarchal and restricted. Most location based protocols use greedy forwarding to route packets. We presume that all nodes broadcast with equal transmission power. Therefore all nodes have identical and fixed conduction radius. Now the sender node sends the packet by means of broadcasting. A subset of nodes receives the packet, now it is the duty of a protocol to decide which nodes should be in the subset. The way of broadcasting is by means of neighboring nodes near

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the sender. The node which is closest will be chosen and also check if the nodes lie towards the destination. This process continues until it reaches destination. In this paper we consider with acknowledgement in the hop by hop retransmission model. A packet is retransmitted between two nodes until it is received and acknowledged correctly. The medley pattern is commonly to adopt the adjacent node to the nearest link in the flanking set. The same covetous relaying operations are recurring until the near intersection is reached. This paper we finds a path till it reaches the destination. In the junction of nodes within the transmission range the forwarding area is selected. The nodes in the forwarding area will be explored under some categories such as speed, mobility and link stability. The main contribution of this paper is:

- These research works suggest a position based opportunistic routing mechanism in which the nodes sort out without assorted adjustment to MAC layer. A new opportunistic protocol is found with several forwarding candidate nodes which are selected with criteria basis.
- Finally simulation performance was investigated and verifies the performance when the path is created for sending data.

2. Literature Review

A variety of routing protocols were found by the researchers in MANET. This approach is satisfactory when the strait quality is very good and nodes always obey the rules of the opportunistic protocol.

Shengo Yang, Chai Kiat and Busung Lee proposed resourceful opportunistic routing protocol[4] which broadcast stateless assets of geographical routing. A scheme with void handling is found for link break.

Seshadr, Rozer, et al. proposed a well-being capable opportunistic routing protocol with a stateless property and a problem of path break using void handling procedure. Jiemiu and Fieng Li applied opportunistic routing to a convenience based routing[5] where the liberation of a data packet generates a meaningful value.

Accordingly best centralized algorithm and an approximation disturbed procedure are created to the steering problem. When one path detects an error in transmitting message a retransmission occurs.

Kai Zeng, et al. evaluate one hop throughput of Geographical Opportunistic Routing (GOR) using the one hop throughout metric[6]. An Expected Throughout (EOT) is calculated for finding the best node and the benefit is proposed at any cost to balance the benefit.

3. Our Proposed Scheme

Selection of nodes inside the assortment area gets the chance to catch the message to next hop. A node located near the source node satisfies these conditions. Positive steps forward makes the node move towards destination. The distance should not exceed ½ the transmission with in the neighboring nodes. Candidate selection Algorithm in Figure 1 shows the procedure to select and sorted forwarding array.

- The Neighbor list is formed.
- Candidate list c is, initialized as empty list.
- N_D be the destination node: Destination node.
- Distance between current Node and N_D is the base.
- Compare N_d with the destination then Next hop.
- A for loop is formed with n as list do.
- List N[i]. dist ←- dist (List N[i].N_D).
- End for.
- Function sort.
- Next hop is initialized to current hop.
- For loop for finding the distance of the hop.
- If dist of source to destination>=neighboring nodes.
- Then Break.

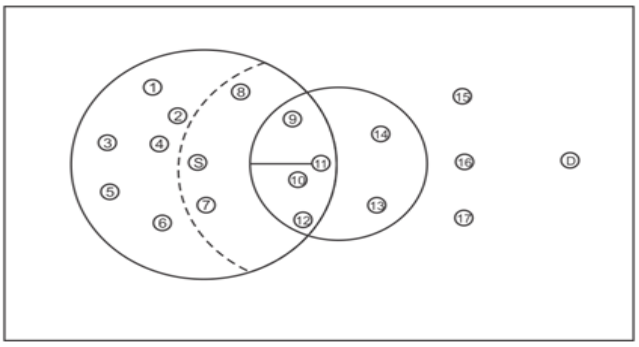

Figure 1. Selecting nodes in POR.

In this algorithm only the nodes near the source is easy to forward the packets. The selection area is determined and the next hop node is fetched. Here an array is preserved. The priority of the assortment nodes are measured by the Euclidean distance. The distance is measured between the node and node which it selects first, then selection is made to the neighboring nodes. We use Euclidean distance Formula. The distance is calculated and arranged in the sorted array. The nearest node to the destination is given higher priority for forwarding. It gets first relay to ahead hop towards the destination which is shown in Figure 1 and update hop by hop. Only the nodes specified in the list will be forwarded.

3.1 Greedy Forwarding Protocols

Greedy method will not maintain or establish the routes. Location of the node is included in recipientof the data packet and optimizes the number of hops. Now let us discuss some of the merits and demerits greedy protocols MFR, GPSR, ARP, POR and linkbased por.

3.1.1 Most Forward within Distance R (MFR)

It is to minimize the hops by selecting the node with biggest distance from the destination. A straight line is strained between the sender and destination. MFR[3] robustness is medium.

3.1.2 GPSR

Greedy perimeter stateless routing which is based on planar graph traversal. It is performed as per packet basis. Transmission range instability means that the area will be inside the selection process. But it guarantees a path between source and destination.

3.1.3 ARP

Angular routing protocols release a hello message on a demand base at the relative to their speed. ARP uses geographic forwarding scheme and no link layer. It avoids the local loop. It use as an angle based forwarding scheme.

3.1.4 POR[4]

Location based opportunistic Routing protocol is created with several arrays of candidates. If the best forwarder is not send properly suboptimal candidate will forward the packets. Broken route can be repaired easily.

3.1.5 Link based POR

Lporis based on the node towards the destination with the link based formula is calculated and considered for forwarding selection. In this length of the path will be minimum.

4. Distance Calculation and Other Metrics

It is based on Euclidean distance

$g=x_1-x_2$; $h= y_1 - y_2$;

$d=\sqrt{(g)^2 +(h^{2})}$ (1)

Where g is x coordinates andh is the y coordinates. Its energy is calculated

Energy level = [metric1*0.5+(0.5* $linksta($cnode, $bestf1)) (2)

Speed = [0.5*(100-nodespeed] (3)

5. Architectural Design

Figure 2 shows the structural design of NDEL deployment of nodes and selection for the forward relay is estimated under energy, speed and link stability is calculated. The values are put in an array and the maximum value for candidate selection is chosen as the best forwarder 1 and best forwarder 2.

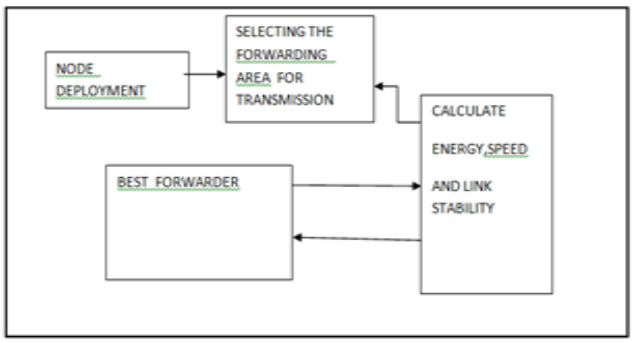

Figure 2. Architecture of NDEL.

5.1 Routing Mechanism

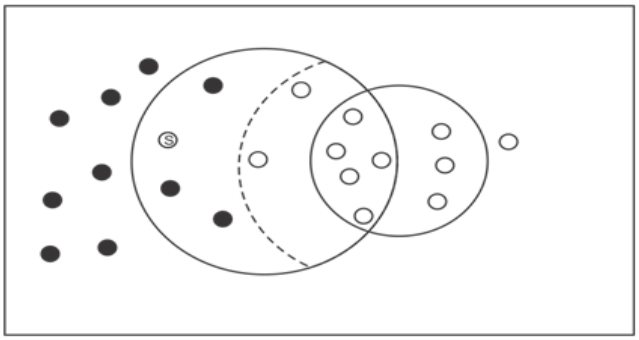

Figure 3. Best forwarder and candidate selection.

From the source node which get the neighboring nodes as the next relay. Energy is limited for all the nodes. Secondly nodes moves unrestrained manner. So link failure occurs. Hence wireless has more variable bandwidth. So energy efficient protocol is needed for forwarding. Minimum energy may make failure node attempt. So the entire path it should consume energy. After energy the according to

the transmission range energy is considered and speed of the node is also extended. Packet forwarding will fail due to node mobility and speed. We calculate from 100 as initial state and node up-to-date level will reduce from 100. Path length is seen for high energy and speed nodes with their neighbors. So the node first analyzes the sender node to the neighboring node in time. Totally all the nodes get the message and their time is calculated. Then Message Successive Rate with link stability is investigated for all the neighboring nodes. Now the sender sends the packets, in the first iteration nodes which are all neighbors are brought into focus.

Nodes expend energy while sending and receiving the packets. In node mobility information about node neighbors are always up-to-date.

Table 1.

The node 3 sending the data to 2 in time 2.8000000000000012
The node 3 sending the data to 4 in time 2.9000000000000012
The node 3 sending the data to 5 in time 3.0000000000000013
The node 3 sending the data to 7 in time 3.1000000000000014
The node 3 sending the data to 9 in time 3.2000000000000015
The node 3 sending the data to 10 in time 3.3000000000000016
The node 3 sending the data to 11 in time 3.4000000000000017
The node 4 sending the data to 1 in time 3.5000000000000018
MSR as ink Stability of 3 from the sender
0 = 0.69062500000000004
Analysis with node 0 to the node 5 for MSR
MSR as ink Stability of 5 from the sender
0 = 0.69374999999999998

The sender node send message to their neighboring nodes and their MSR is calculated and their values are given in Table 1. Each neighboring node with energy level, number of neighbors is measured and investigates the link stability. With this measure value the highest metric (speed, energy and link stability) is chosen as best forwarder.

The node calculates the energy, density and link stability and given the values of three iteration how sender forwards the packet by selecting the hop node in Table 3.

5.2 Forwarding Node Selection

In Figure 4 node S is the source node and D is the destination node. Select all the neighboring nodes near S. The dotted lines show the transmission area. The black dotted circle shows it is not included in the list. The inner circle shows next relay transmission for the next source node.

Table 2.

The process 2, 5, 7, 12 are the neighboring nodes
The Neigh 2 with energy 7.219474 and density as 9 and metric as 4.054869
The Neigh 5 with energy 90.151594 and density as 10 and metric as 25.037899
The Neigh 7 with energy 23.283323 and density as 6 and metric as 7.320831
The Neigh 12 with energy 31.240982 and density as 7 and metric as 9.560245
Theconnectivity and energy level of 0 to 5, connectivity = 10 energy = 90.151594 and its metric as 25.037899
The connectivity and energy level of 0 to 2, connectivity = 9 energy = 7.219474 and its metric as 4.054869
The link stab of 0 to 5 = 0.69374999999999998 with metric = 13.432912250000001
The link stab of 0 to 2 = 0.90937500000000004 with metric = 34.241061000000002
The speed (86) based metric of 0 to 5 = 7.0
The speed (34) based metric of 0 to 5 = 33.0
The selection criteria of 0 to 5 = with metric 13.432912250000001
The selection cretieria of 0 to 2 = with metric 34.241061000000002
The node 0 selectsthe node 2 with its metric as 34.241061000000002
The node 0 sending the data to 2 in time 110.64999999999998

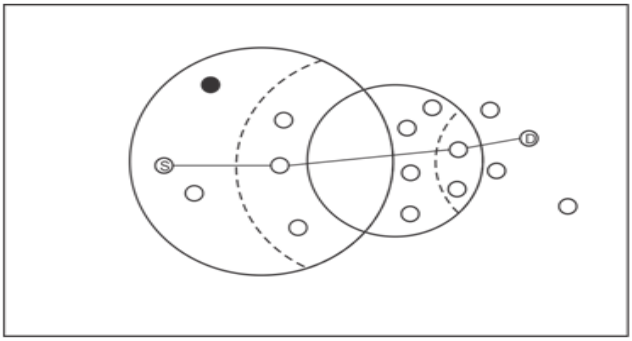

Figure 4. Through best forwarder packet send forms to d.

The node in the area enclosed within the dashed line and make positive progress towards the destination. From these nodes the one with maximum energy, speed and

link stability is calculated and selected as best forwarder and the packet is transmitted to the destination. Now let us see.

4. Algorithm 1: Best Forwarder and Candidate Nodes Selection

Step 1. See whether Destination node is in the Neighbour node.
Step 2. If yes set the next hop as Destination node and exit.
Step 3. All the nodes in the Neighbour List will follow subsequent steps:

- The distance between the destination and source node is checked with the distance of the neighbouring node.
- Break if it true. Else, list to an sorted array.

Step 4. Calculate the METRIC VALUE for all the nodes in the array Metric = $W_{energ} + W_{speed} + W_{lstab}$
Step 5. Select the node having the greatest metric value as the top forwarder.

Here in this algorithm we propose a new method of selecting best forwarder among the nodes array with energy, speed and Link stability as the criteria. The selection candidate chooses the best forwarder by measuring the distance between neighboring nodes and destination. In our proposed system the best forwarder is selected in the sorted array by selecting maximum energy, maximum speed and link stability are calculated with common value and investigated and select the best node with maximum energy, speed and link stability. So the nodes select the node which has maximum density energy and linkstability and other nodes are suppressed and best forwarder is selected and message is send through relay node. Now next hop node will follow the same procedure and relay node is selected.

6. Results and Discussion

6.1 Recital Valuation

Recitial valuation is seen with NDEL protocol which simulate with various topology in NS-2. Table 2 summarizes the simulation limitation. For simulation the network is modeled with 100 nodes. Both the L_POR and this possible protocolare measured and recital metrics are assessed.

Table 3. Simulation parameters

Parameter	value
Nodes	100
Tranmission	225 m
Speed	10,30, 50,100 m/s
Nework Topolgy	800x800
Anteena model	Omni anenna
Transmiter antenna gain	1dbi
Receiver antenna gain	1 dbi
System loss factor	1.0
Tranmission	0.28watts
Propagation model	Two way ground
Time	200 sec

6.2 Performance Metrics

6.2.1 Packet Delivery Ratio

Number of packets received by the destination to number of packets sends.

6.2.2 End to End Delay

The time taken for a packet send from the source to destination.

6.2.3 Path Length

The average end to end number of hops for packet delivery.

6.2.4 Packet Forwarding Times Per Packet

Time taken to send number of packets successfully.

6.3 Comparative Analysis

The concert of opportunistic routing is compared with NDEL. A graph is drawn from existing one with new NDEL. It is shown in Figure 4 when the performance is checked against the graph and analyzed with number of hops.

It delivers many packets at low delay. The best forwarder is found with maximum energy, speed and link stability. Even if it fails the next optimal node forwarder in the array will be selected as best forwarder2. Packet loss is eradicated. The candidate node can be accounted for such an extra investigation. Figure 6 shows comparison of

path length with unpredictable path length and hop count is reduced. We ought to minimize the hops and energy consumption is less?

As summary our NDEL-POR achieves high than L-POR. So energy is retained with small amount of time. The packet from the source node sends the data to the destination with less time.

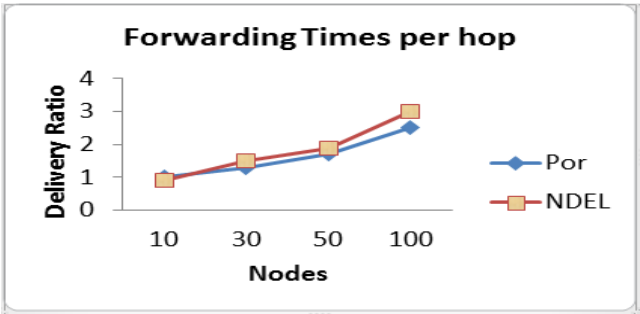

Figure 5. Comparison graph for forwarding.

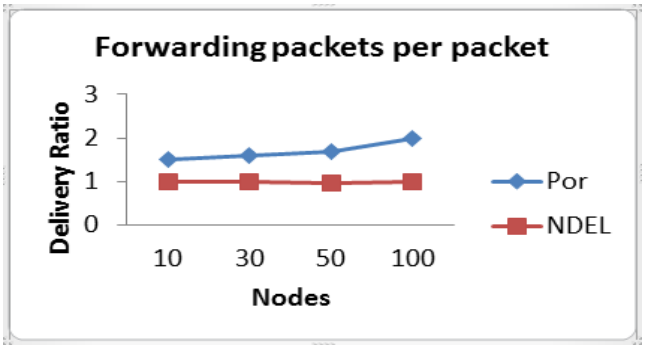

Figure 6. Comparison graph for FTP.

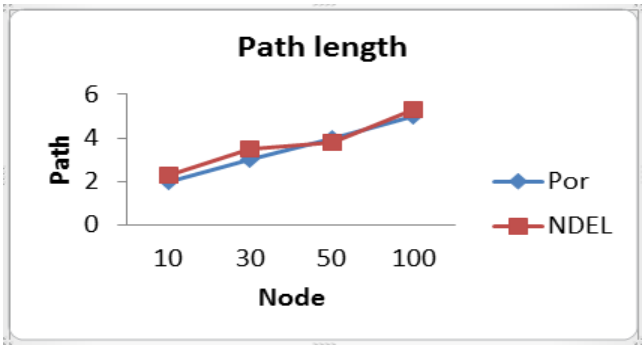

Figure 7. Graph for path length.

7. Conclusion

In the research work the problem of trustworthy data is analyzed, minimize the hop count and energy consumption is maintained. Relentlessly changing network topology makes predictable changing network performance with acceptable performance. The node density, energy and link stability gives the selection criteria for routing the packets in Manet. We design a new location based routing protocol which takes best of chattels of geographical routing and relay factor for this Adhoc network. When we propose the incoming hop forwarding candidates that are unequivocally specified will lead to path break. Simulation result in packet delivery ratio which is found little bit better in NDEL.

NDEL reassurance through best assortment sorting based on the link parameters of node. Still the hops can be reduced by finding a new frame work for forwarding area. So that number nodes can be scrutinized and time complexity maybe less.

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