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Efficient Data Transmission Mechanisms for Mobile Ad Hoc Networks

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Abstract:-This paper mainly addresses the efficient data delivery to the destination in MANET'S. Basically in MANET 'S, the nodes will not be positioned at one particular area they can randomly move from one place to another place. Because of this reason reliable data transmission are difficult to the expected destination . In the present mechanisms the data delivery can be done by using position based opportunistic routing protocol (POR). In this routing protocol we have an drawback i.e., Selection and Prioritization of forwarding candidates and Sender Node distance to the next hop node should not exceed half of the transmission range of a wireless node, so that ideally all forwarding nodes can hear from one another. In this paper we propose an amorphous pm algorithm that will overcome the above drawbacks. This Algorithm uses two methods i.e., DV-hop localization method for sending the data and positioning method has been implemented to find the position of the node.

Keywords: **Amorphous pm, DV-hop method, Positioning method, POR, MANET.**

I. INTRODUCTION

MANET'S are highly dynamic mobile networks, where the mobile nodes will be moving from one place to another place. In this paper we consider highly dynamic MANET'S for transferring data in reliable manner[1].MANET'S network is also known as infrastructure less network. Amorphous pm algorithm [6] is an proposed algorithm which consists of two methods they are Dv-hop localization algorithm [2] and positioning algorithm[3].Dv-hop localization is a method for transferring the data from one node to another here all the nodes will act as an node and also a router, so it is also known as multihop concept [4]. Positioning is another method which had been used for positioning the nodes from where to where it is traveling and presently where the data had been located can be traced by using positioning algorithm. Mobile ad hoc networks (MANET's) are networks composed of a set of communicating nodes able to spontaneously interconnect without any pre-existing infrastructure. In addition to that, these nodes are generally mobile ad-hoc network [5].

II. MODULES

A. Sender:

In this module we are just performing the packet forwarding. We have to forward the packets to all intermediate nodes that we are assuming which are the neighbors. The packet forwarding is performed in the basis of Dv-hop localization algorithm technique. If a source node wants to transmit a packet, it gets destination address first and then attaches it to the packet header.

B. Intermediate node:

The packet is transferred from one node to another node, from source to the destination that nodes are known as intermediate node. Because of nodes move from one place to another place the best forwarder may not receive the data accurately due to this the duplicate may occur.

C. Selection of best forwarder:

Here the data packets are transferred in broadcast manner , every packet will be identified with an unique tuple address as(Source_IP,Sequence_NO), in this Source_ip is nothing but the ip address of the Source and Sequence_NO is nothing the sequence number of the packet. if the packet with the same Sequence_no had been received twice or more than that packet will discarded, if not it will be sent to an destination node it may be an receiver (or) node. If any fake_id_node had been detected in the network while sending the data then that node will be ignored and finds the alternate node to transfer the data.

D. Receiver:

Receiver is just receiving the packets from intermediate node. The packets are discarded when the same packets received.

III. PROPOSED METHOD

Amorphous pm method:

In amorphous pm method we uses two algorithms know as;

a) DV-hop localization algorithm

b) Positioning algorithm.

A. DV-hop localization algorithm:

In Dv-hop localization algorithm it mainly uses three steps:

Step 1: Obtain minimum hop count.

Step 2: To calculate estimated distance between the unknown node and anchor node.

Step 3: Calculate the coordinates**.**

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1: Obtain minimum hop count :

- Each anchor node broadcast a beacon message to be flooded throughout the network containing the anchor location with hop count .
- The format of the beacon message is {id,xi,yi,hop count}.
- Each receiving node maintains the anchor node information and minimum hop count value of all beacons it receives.
- Beacon with highest hop count value will be ignored.
- Each receiving node increases the hop count by one before transmitting it to other neighboring nodes,through this all the nodes in the network gets the minimal hop count to every anchor node.

2: Calculate estimated distance between unknown node and anchor node :

- The anchor node gets minimum hop count values to other anchor it estimates the average hop size for one hop by using the formula.

Hopsize=Σ√(xi - xj)2 + (yi – yj)2

- After receiving hop size , distance of all other unknown nodes to anchor node is calculated by multiplying hopsize by its minimum hop count.

Di= Avg Hop Sizei X Hop Counti

3: Calculate the coordinates:

The coordinates are calculated by using formula shown below

$$\begin{bmatrix} \sqrt{(x-x_1)^2+(y-y_1)^2}=d_1 \\ \sqrt{(x-x_2)^2+(y-y_2)^2}=d_2 \\ \dots \\ \sqrt{(x-x_i)^2+(y-y_i)^2}=d_i \\ \dots \\ \sqrt{(x-x_M)^2+(y-y_M)^2}=d_M \end{bmatrix}$$

where (x_i, y_i) represents the location coordinate of anchor node i; (x, y) represents the location coordinate of the unknown node; d_i represents the computed distance between the unknown node and the anchor node i.

It can be paraphrased in the following format:

$$2\begin{bmatrix} x_1-x_M & y_1-y_M \\ x_2-x_M & y_2-y_M \\ \dots & \dots \\ x_i-x_M & y_i-y_M \\ \dots & \dots \\ x_{M-1}-x_M & y_{M-1}-y_M \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix}=\begin{bmatrix} x_1^2-x_M^2+y_1^2-y_M^2-d_1^2+d_M^2 \\ x_2^2-x_M^2+y_2^2-y_M^2-d_2^2+d_M^2 \\ \dots \\ x_i^2-x_M^2+y_i^2-y_M^2-d_i^2+d_M^2 \\ \dots \\ x_{M-1}^2-x_M^2+y_{M-1}^2-y_M^2-d_{M-1}^2+d_M^2 \end{bmatrix}$$

or written as:

$$HX=b$$

B. Positioning algorithm:

Positioning algorithm is a inbuilt algorithm in NS2 simulator has been used to locate the position of the current node where the data can move from one node to another node.

IV. EXPERIMENTAL RESULTS

In this section the experimental steps and results are discussed by using NS2 simulator.

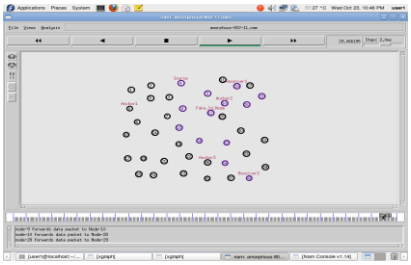
A. We are initializing 40 nodes in the network and we are taking 3 static nodes as an anchor nodes located in fixed places. These anchor nodes will estimate the distances between the neighboring nodes from the anchor node and also will keep all the nodes information like the distances between the nodes, the hop count and the hop size etc will be estimated.

B. We are selecting one input node and two destination nodes can be initialized and select the best optimal path from source node to destination node for successful transmission of the data .if fake node was identified by the anchor node then path will be changed and select the another best optimal path and sends the data to the destination node.

C. The anchor node identifies the change in the destination node then automatically change optimal path for delivering the packets to the destination node.

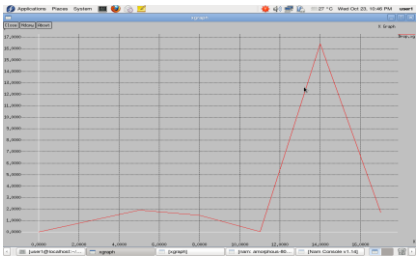
V. SIMULATION RESULTS

A.Data delivery:



In the above result we can see the source node, two destination node and the fake_id_node ,three anchor nodes are visualized easily, by using all this nodes the successful transmission of data had taken place.

B. Packet Drop graph:



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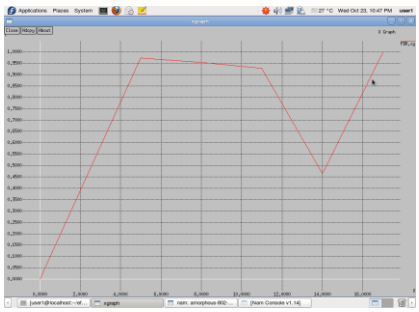
The above graph shows the packet drop graph, we can locate the node where the packet loss had occurred and at which time the alternative path chosen for delivery of data.

C. Packet Delivery ratio:



In the above graph we can see the packet delivery ratio that can be calculated by taking into consideration of the ratio of the number of data packets received at the destination(s) to the number of data packets sent by the source(s).

VI. CONCLUSION

In this paper the proposed algorithm is amorphous pm algorithm. By using this algorithm the range based problem that has been found in the previous methods of data delivery will be overcome and the accuracy of data delivery has been increased. In future work the anchor nodes can take dynamically based on number of nodes and distance, increase the efficiency of data and speed so that we can minimize the data transmission time.

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