Position Update with Machine Learning In Mobile Adhoc Network Using Modified Gpsr

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Abstract: In geographic routing node needs to send their information to destination node based on the geographic location here location information is used like address of the node. In this way of geographic routing every node knows its own position and its nearby node location. The frequent beaconing update reduce the network performance by increasing traffic pattern it will increase the updates cost and decrease the routing performance. To avoiding of this one in this paper we are projecting the (EAPU) Enhanced adaptive position update with machine learning algorithm. EAPU follow two main principle (i) nodes moments are frequent nature in adhoc network, it is hard to predict the moment and update their position frequently (ii) nodes which is moving towards the destination can update their position more frequently. By implementing machine learning algorithm various node moments frequencies are analyzed. Based on the prediction ML algorithm the optimal path can be chosen. By implementing these scenarios we need to use ns2 simulation using GPSR (Greedy Perimeter Stateless Routing) protocol. This scenario is mathematically compared with GPSR and periodic beaconing schemes shows that EAPU will increase the network performance by reducing update cost, effective delivers of packets and average end to end delay.

Keywords: adhoc network, periodic beaconing,GPSR.

I. INTRODUCTION

We can identify the location of the nodes by localization scheme [1] and GPS (global positioning system).In GPS environment each node mention by its coordinates. It exchanges its position information to its neighbor's node. GPS uses the satellites as reference points to effectively calculate the positions of ground nodes. Some of the real world applications of GPS include location estimation, tracking, navigation mapping and providing timing services. To use GPS, a node must be equipped with a GPS receiver which is responsible for estimating the absolute position of the node in the global coordinate system. Though GPS makes it possible to provide a wide range of positioning services, it is not a completely viable solution for ad hoc networks due to its additional hardware support, cost, and power consumption in localization scheme[3][4] node position can be calculated by sending beaconing signal to it is neighbors' node. Based on the distance calculations the node knows its position.

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The geographic routing protocol[2] can be readily avail because of GPS and other localization scheme .The major concern with this protocol is to select the optimal path by exchange the node information. In adhoc fashion nodes are in mobility stage each node sense their optimal path by transmission signal (beacon) between their nodes .Frequent transmission of beacons can reduce the performance of the network, performance can be reduced because of over utilization of bandwidth. Collision may occur it makes the failure in MAC layer. Due to collision the packet gets retransmitted. A lost data packet does get retransmitted, but at the expense of increased end-to-end delay. Clearly, given the cost associated with transmitting beacons, it makes sense to adapt the frequency of beacon updates to the node mobility and the traffic condition within the network, rather than employing a static periodic update policy.

Nodes which have the high mobility continuously may leads to changing mobility characteristics in terms of speed and heading it may concerns frequent update about their position to neighbors'. The periodic beaconing is wasteful one, only limited nodes are participated in forwarding of node rest of the node even send the beacon signal also wasteful one. In this paper, we propose a enchased beaconing update strategy by applying new algorithm in geographic routing protocol (i) adaptive position updates algorithm (ii) on demand learning algorithm (iii) machine learning algorithm

II. RELATED WORK

In geographic related routing the forwarding always takes place of local topology accuracy it takes one hop neighbors' as the packet forwarding node. The node chooses the one hop neighbors' based on the distance of destination. So the forwarding node should maintain two type of information (i) destination node and (ii) one hop neighbor's node .GLS,Quorum[1][3] system used to maintain the location of the destination .we know the next neighbors by periodic beaconing , beacons are send by the particular time interval . Beacons not received by any node by particular time interval are known as death node. node assume that neighbors which is not send the beacon is out of radio range node remove the neighbor from the neighbor table list

In highly mobility environment periodic beacon leads performance degradation due to loss of packet and end to end delay .the beacons are update by various intervals are (i) distance based beacon (ii) speed based bacon

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(iii) reactive beacon
In the distance-based beaconing, node transmits the beacons when it moves to particular distance D. If the node sends the beacon after k time moment many neighbors are out of the radio range. The issue of this distance based beacons are slow moment node having many out dated neighbors because of in frequent beacons. while crossing of fast moving node by slow moving node ,fast moving node get failure to detect slow moving node because of its in frequent beacons

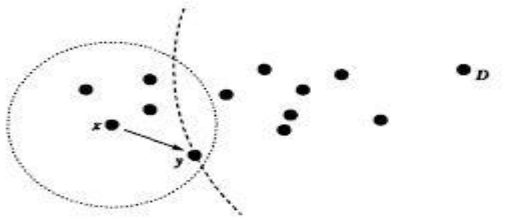


Figure 1 greedy forwarding

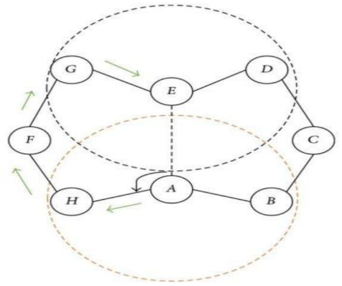
In speed based beaconing the node send the beacon depends up the speed of the node. When node moving in the particular range (a,b) it send its time interval to its neighbors node. Along with beacons the time interval also updated to its neighbors. Node which receives the time interval from other node can compared with their own time interval. The shorter time interval chosen as the next hop node. So slow moment node get a short time interval the problem for slow moving node in distance based beacon get solved here. Still it have the problem fast move node may not detect slow move node
In reactive beaconing, leads to excessive beacon broadcasts by requesting beacon for broad casting of packet and receiving the beacon as the respond. It increases the load of the network the EAPU is used to adjust the beacon update based on the mobility of the node. It increase the performance of the network by solving the issues of SB, DB,RB.

III. MATH

In our work we have some assumption(1) every node known its own position and its neighbors' position(2) nodes are in bi directional way of communication (3) beacon updates include position and velocity .

A. GPSR Protocol

GPSR is very advanced protocol which is used in the mobility environment. This is mainly used in the wireless environments the main advantage of this protocol is to forward the packet as efficiently. it takes two approaches for making the forwarding decision in routing environment each node known it location and one hop neighbor location by GPS(Glopal Position System) . It work on two mode (i) greedy forwarding and (II) perimeter forwarding Greedy forwarding is working on only radius of its actual distance of the destination node. It broad cost the packet to its one hop neighbor which is closest to the source of the node. The one hop node which is received the packet will search the next node which is closest to their nearby and also it forms one transmission region which radios measured by distance of packet forwarding node and the destination node Assume that in fig 1 node A forwards packets to node E. A sense the nearby nodes which is optimally closer node for the destination as chosen as next packet forwarding node. Greedy modes also fail when no nodes are avail in this radius range. When the greedy forwarding fails it moves to the perimeter forwarding it transfer through the clock wise direction is well known as right hand rule When greedy mode fail perimeter mode transmit the packet through the edges of the void in this fig 2: node A need to transmit the packet to next hop node but there is no node in radius rage of A. A transmit the packet by edge of the void (A-H-F-G-E)



B. MP Algorithm

Each and every node in a network having particular threshold value. Threshold value is maintained by the transmission range of the protocols. Each node updates their position to its neighbors' node. Node moment is high then its update their position immediately to their neighbors'. Slow moment's node no need to update their position as frequent as fast moving node if node moving more dynamically is obliviously crossing the limit of the threshold value. The node which is crossing the value is known as the death node. Node moment is predicted by the velocity and heading. The node known its neighbors' location by using this parameter it is calculated by some liner kinetic motion equation. This algorithm avoid all the node periodically update their position information. Assume that in fig3 node i send their location information to its neighbors by current position and velocity. The distance is calculated by simple liner kinetic motion equation. Based on this equation node check whether node i is in the transmission range or not. If next beacon received from the node is estimated by grater threshold value is known as death node. The death node within the mobility environment is not a stable one.

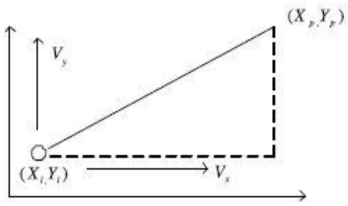


Figure 3

$$x_p^i = x_l^i + (t_c - t_l) * v_x^i$$
$$y_p^i = y_l^i + (t_c - t_l) * v_y^i \qquad (1)$$

This equation 1 is used to find out the position of i. here velocity is v in x,y direction is estimated by node speed from source to destination. Here tc is node current position and tl is last updated position location (after the moment) .xl and yl is the coordinates of node i in the time of tl we can find out the Accepted Error Rate by equation 2

$$D^{i}_{devi}=\sqrt{(x^{i}_{a}-x^{i}_{b})^{2}}+\sqrt{(y^{i}_{a}-y^{i}_{b})^{2}} \longrightarrow (2)$$

Let (xa, yb), denote the actual location of node i and (xb,yb) known as last updated location of the node we can find the error of the node by computing the difference of both location

C. ODL Algorithm

Two node need to make the communication between them if any of the node existence from their particular region the other node may not receive the packet. Topology accuracy is major impact factor for efficient forwarding .Now assumes that node A send the beacon to node B when it is in p1 position. When A moves in a constant velocity it moves away from the vicinity of B node position. The existence of a node from p1 position to p2 position may causes higher AER(accepted error rate) so avoiding of this issue on demand learning algorithm gives the local topology accuracy. If no node in the transmission region leads failure of packet forwarding. So topology accuracy is the major concern in dynamically moving nodes.

In on demand learning algorithm the packets are transmitted based on the on demand basis. Data packet gets forwarded to all the nodes which are in the transmission range of source node. Node which is overhear the packet will send the beacon as the response .location update and final destination information are transmitted along with the data packet .Each node maintain the neighbor list. new node which overhear the data packet respond as beacon signal while sending the response it wait for random amount of time to avoid the collision of the list of neighbors node

Node A starting to forwarding of data to node P .Both the end of node aware about each other as A-B-P. The packets forwarded by A can be sensed by D,C . According to ODL rule it send back beacon to A. AC and AD path can be discovered. If node B transmits the packet can discovered the path of BC and BD .E and F receive the beacon but it is not respond them because it is not in the forwarding path. ODL rule provide the enriched topology accuracy

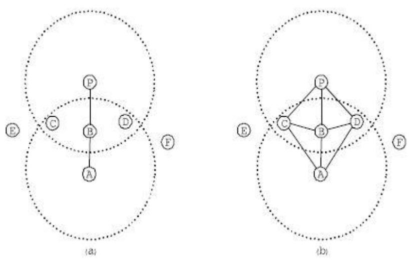


Figure 4

D. ML Algorithm

In mobility environment all the nodes are not in mobility stage some of the nodes are moving fast, some is slow someone is idle. All nodes moving velocities are compared using the ML algorithm.

This algorithm follows the principals of Classification, Regression,

Forecasting. It is also store with neighbors' list of each node which is forwarding the packet. The comparison between all the nodes produces the outcome as shortest travelling time for each packet. The slowing moving node and idle node may not produce more changes in the network performance. We can use the ML algorithm for idle node and slow moving node. The success full transmission of packets through the slow moving node and idle node are in the higher priority to forwarding the packet compare with fast moving node. In fig 4 node A forwards the packets to node P. We have to sent beacon each time to discover neighbor to take the forwarding decision .in ML each node know its nearby idle node and slow moving node. A node gives the priority to packet forwarding to next hop node which moving velocity is minimal.

IV. ANALYSIS OF ENHANCED ADAPTIVE POSITION UPDATE

In this proposed beaconing strategy performance of the network can be improved by the 1)update cost 2)local topology .we can evaluate the network performance by analyzing unknown neighbor and false neighbors ration. Unknown neighbors which new neighbors but not awarded by other node. False neighbors which are already exist from the network. The total beacon overhead can be analyzed by measuring the overhead of 3 algorithms

Oeapu= Omp+Oodl+Oml

V. SIMULATION RESULTS

In this section we performs the simulation in NS2 .This simulation is performed between existing scheme as(i)Distance based Beaconing (ii)Speed based Beaconing EAPU have less delay compare with existing position updates. It also have highest signal strength and highest throughput.

VI. CONCLUSION

In this paper we applied enhanced beaconing update algorithm. The EAPU provide three mutual algorithms. MP algorithm is used to regularize the beacon update and used to predict the location estimation. ODL algorithm used to provide the accurate local topology by exchange the beacon at the visibility nodes. We mathematically analyze the overhead for the entire algorithm finally EAPU have increased the network performance by previous beaconing scheme.

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