Comparative Analysis of Various Issues and Challenges in Design of Position Based Routing Protocol in Manet

DipaP.Bodkhe Dr. R.N.Khobragade Dr.V.M. Thakare.

***Abstract*- Mobility models of MANET have been still research area in mobile computing and in wireless network with lots of mobility algorithms to design the efficient mobility model. This paper is focused on analysis of five different techniques such as ALERT protocol, Impact of Unreliable Positioning in Location-based Routing Protocols for MANETs,Landy routing protocol, Performance comparison of position based routing protocol using different mobility models, Position based multicast routing in manet. But some problems exists in each mobility method To overcome these problems that are given in analysis and discussion and to improve "intermediate node location/position prediction", mobility method for position based routing is proposed using the analysis of the various mobility models.**

***Keywords*- Mobile ad hoc network, Capacity, overhead, throughput, Routing protocols, mobility models and location prediction.**

I. INTRODUCTION

Mobility scheme plays the important role in designing the different mobility models for mobile ad hoc network (MANET). Nodes in manets are vulnerable to malicious entities that aim to temper and analyze data and traffic analysis by communication eavesdropping or attacking routing protocols[1]. Mobility of nodes are important factor in modelling and simulation of Manet. Mobility models classified into many models such as Random waypoint, Reference point, Gauss-Markovand Manhattan models.[2] Each mobility models have their own application with different behaviour to communicate with other nodes in the network. Mostly used mobility models are: Random waypoint mobility model (RWP), Random direction mobility model (RD), Random walk mobility model (RW) and model with temporal dependency that is Gauss-Markov mobility model (GM)[3,4]. This paper, discusses five different routing protocol such as, ALERT protocol, Impact of Unreliable Positioning in Location-based Routing Protocols for MANETs, Landy routing protocol, Performance comparison of position based routing protocol using different mobility models, Position based multicast routing in Manet. These mobility schemes provide the better capacity-throughput-delay tradeoffs, overhead and packet delivery ratio. But these methods also have some problem so to overcome such problems improve version of mobility scheme that is "intermediate node location /position prediction" mobility method for position based routing is proposed here that depend upon the location and direction.

II. BACKGROUND

Many studies on mobility models have been done to develop the mobility scheme in recent past years. Such schemes are: An Anonymous Location-based Efficient Routing protocol (ALERT) is proposed to offer high anonymity protection at a low cost[1].The proposed method in this paper is aimed at filling the gap, by studying the impact of the error in the position of the nodes of two location-based routing protocols: DYMOselfwd and AODV-Line[2].Local area network dynamic routing (Landy) uses a localized routing technique which combines an unique locomotion prediction method and velocity information of mns to route packets[3].The paper is to assess the performance of Local Area Dynamic routing protocol (LANDY) and two major routing protocols under different mobility models. Four widely used mobility models, Random Waypoint, Reference Point, Gauss-Markov and Manhattan have been chosen and tested in OPNET[4].This paper introduces a position based QoS multicast routing protocol (PBQMRP). The main objective of this protocol is to design a lightweight scalable QoS multicast routing scheme irrespective of the number of multicast members and network size[5].This paper introduces five mobility scheme ie.ALERT, Impact of unreliable positioning in location based routing ,Landy routing protocol, Comparative Analysis of Various Issues and Challenges in Design of Position Based Routing Protocol in Manet performance comparison of position based Template for submitting papers to IETE Journal of Research. routing protocols using different mobility models, Position-Based Multicast Routing. These are organizes as follows: **Section I** Introduction. **Section II** discusses Background. **Section III** discusses previous work. **Section IV** discusses existing methodologies. **Section V** discusses attributes and parameters and how these are affected on mobility models.

Section VI proposed method and outcome result possible. Finally **section VII** Conclude this review paper.

III. PREVIOUS WORKDONE

In research literature, many mobility models have been studied to provide various mobility schemes and improve the performance in terms of capacity-throughput-delay tradeoffs, overhead and packet delivery ratio. Haiying Shen et al. (2013) [1] has proposed an anonymous location-based efficient routing protocol (ALERT). ALERT dynamically partitions the network field into zones and randomly chooses nodes in zones as intermediate relay nodes, which form a nontraceable anonymous route. Fabio Perrone et al. (2017) [2] has proposed the studying the impact of the error in the position of the nodes of two location-based routing protocols: DYMOselfwd and AODV-Line. These protocols were selected as they both aim at reducing the routing overhead. A. Macintosh et al. (2012) [3] has proposedLocal Area Network Dynamic routing (LANDY) uses a localized routing technique which combines an unique locomotion. Simulations have been carried out with randomizing the mobility speed and number of nodes. M. Ghavami et al. (2013) [4] has performed to assess the performance of Local Area Dynamic routing protocol (LANDY) and two major routing protocols under different mobility models.It chosen two major routing protocols to compare them against local area dynamic routing protocol. Mohammad M. Qabajeh et al. (2012) [5] has proposed a position-based QoS multicast routing protocol (PBQMRP).The proposed scheme eliminates the duplicate packets between cells and reduces the number of participating nodes.

IV. EXISTING METHODOLOGY

Many mobility schemes have been implemented over the last several decades. There are different methodologies that are implemented for different mobility models i.eEnhanced mobility-based Opportunistic Routing protocol, hybrid routing scheme, General-order Linear Continuous-time mobility model, impact with Opportunistic Routing Algorithm and three-hop store-carry-accelerate-forward scheme.

4.1 ALERT: An Anonymous Location-Based Efficient Routing Protocol: ALERT is dynamically partition a network field into zones and randomly chooses nodes in zones as intermediate relay nodes, which form a nontraceable anonymous route. In each routing step, a data sender or forwarder partitions the network field in order to separate itself and the destination into two zones. Given area can be horizontally partition it into two zones A1 and A2. Then vertically partition zone A1 to B1 and B2. After that, it horizontally partition zone B2 into two zones. Such zone partitioning consecutively splits the smallest zone in an alternating horizontal and vertical manner. This called partition process hierarchical zone partition. ALERT uses the hierarchical zone partition and randomly chooses a node in the partitioned zone in each step as an intermediate relay node (i.e., data forwarder) [1].

4.2 Impact of Unreliable Positioning in Location-based Routing Protocols for MANETs: This used two protocol DYMOselfwd and AODV-Line. In DYMO with selective forwarding (DYMOselfwd) is a protocol based on another one named DYMO. DYMO is a well-known reactive routing protocol when a source node wants to send a packet to a destination node, it firstly issues a route request (RREQ) packet towards the destination node. Upon receiving the RREQ, each intermediate node 1) records (or updates) a route to each of the nodes traversed by the RREQ packet; 2) updates the traversed path with its own information so that further intermediate nodes are aware of the new visited node and 3) rebroadcasts the RREQ to its neighbors. In AODV-LAR and AODV-Line are LB routing protocols derived from the AODV protocol. Both protocols define a request region, i.e. an area where RREQ are allowed to be forwarded. Thus, the tighter the request region the less the control traffic (e.g. RREQ or RREP packets). In AODVLAR, the request region is defined as the rectangular-shaped area that includes both the source node (at one corner) and the position where the destination node is expected to be (in the opposite corner) [2].

4.3 Local Area Network Dynamic (LANDY) routing protocol: A position based routing protocol for MANET: The position based routing algorithm has two advantages over the topology based routing algorithm; first, the routing algorithm does not require route establishment or maintenance. Second, the geographical information is distributed only in the local region. While the position based routing protocols (e.g. GPSR) eliminate some of the limitations of the topology based routing protocols by using geographical information to make decisions about routing packets, they don't take into account the locomotion of the nodes. LANDY will use locomotion information and the velocity of MNs, to route packets. It is assumed that nodes will have access to a location service [3].

4.4Performance comparison of Position based routing protocols using different mobility models: LANDY is a location based routing protocol for MANET. LANDY uses a localized routing technique which combines an unique locomotion prediction method and velocity information of

MNs to route packets. The protocol is capable of optimizing routing performance by reducing the control overhead and improving the data packet delivery. If routing problems occur with the forwarding strategy, the algorithm will include a recovery mode which will operate when the protocol recognizes that this problem has occurred. In the recovery mode, the protocol navigates the planar graph to the desired destination. Also, It is assumed that the routing area is a two dimensional plane. The entire network is divided into several non overlapping triangular cells, and each cell has CCID (Cell Code Identifier)[4] Template for submitting papers to IETE Journal of Research.

4.5.position-based multicast routing in mobile ad hoc networks: This strategy is based on partitioning the network into hexagonal cells and each cell is represented by one powerful node. This protocol exploits nodes' positions in gathering information about subscribers and searching for routes that satisfy the QoS constraints. Furthermore, a hierarchical construction of the multicast members has been proposed to improve forwarding efficiency and scalability. Each cell has a Cell Leader node elected to maintain information about all nodes in its cell till they join a new cell. Also, each cell has a Cell Leader Backup (CLB) node to replace the CL node when it fails or leaves the cell. Details about the election process are found in[5].

V. ANALYSIS AND DISCUSSION

ALERT protocol shows how to offer anonymous protection at low cost. It also hides the data initiator among many initiator to strengthen sources and destination anonymity protection [1].This shows impact of error in position of the nodes of location. This protocols in this are reduced the routing overhead AODV-Line builds less reliable routes than DYMOselfwd in case of position information thus increasing the routing overhead[2]. Two simulations were selected to evaluate performances of LANDY and is compared to other protocols. In Throughput, rate of packet throughput decreased gradually according to increasing number of nodes in all protocol. Control overhead is determined what effect is per packet and the number of path searches [3]. In this LANDY and two other protocols are used mobility models, random way point, references point, etc. And performance varies over different mobility protocols and movement of nodes reduce number of control packets,[4].In this scheme eliminates the duplicate packets between two cells and reduce number of participating nodes. Its simulation shows higher packet delivery ratio with low overhead [5].

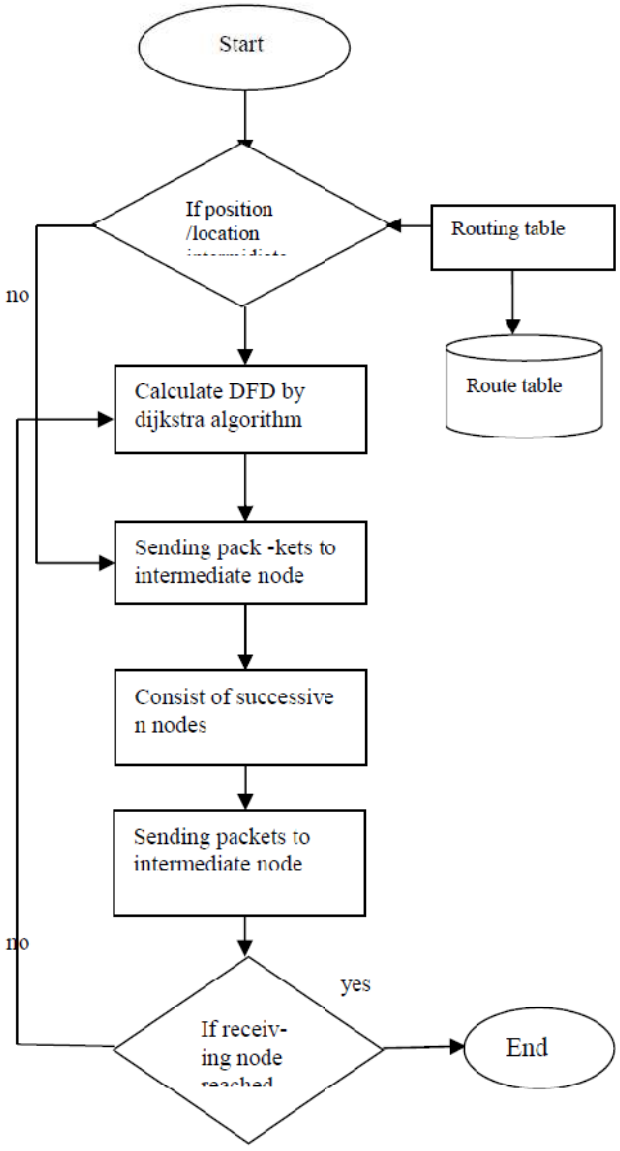
Mobility scheme	**Advantages**	**Disadvantages**
ALERT protocol	ALERT provides route anonymity, identity, and location anonymity of source and destination. ALERT mainly uses randomized routing of one message copy to provide anonymity protection.	ALERT is not completely bulletproof to all attacks.
Impact of unreliable positioning in location-based routing protocols for Manet.	Recovery with LANDY is much faster than with other location protocols which use mainly greedy algorithms, (such as GPRS). It is using only local Locomotion to determine a packet's next hop. This increases the scalability of the routing protocol.	In this Landy can't be extended to support more forwarding strategies. Landy will not adjust to allow high throughput of data traffic
Landy routing protocol	Recovery with LANDY is much faster than with other location protocols which use mainly greedy algorithms. LANDY is using Locomotion instead of current position to find the mobile node's Locomotion trajectory to predict the future position of mobile	Landy can't be extended to support more forwarding strategies. Landy will not adjust to allow high throughput of data traffic.

	nodes.	
performance comparison of position based routing protocols using different mobility models	In RWpM is Simple to implement and easy theoretical analysis. In GMM the movements are totally random, linear, and to avoid the edges, it changes direction when near to the simulation edge. In MMM is high realistic motion.	In RWpM , Highly impractical in real world networks, Average speed decay problem, and long journeys at low speeds. In GMM , trip duration depends on the chosen path. The MMM is complex to fully implement.
position-based multicast routing in mobile ad hoc networks	Awareness of location information has been utilized to improve capability and efficiency through restricting the broadcast region	PBQMR protocol provides efficient solutions to nodes' mobility and failure to maintain a stable structure.

TABLE 1: Comparisons between different mobility schemes.

VI. PROPOSED METHODOLOGY

Mobility scheme is important and difficult task to analyse and discuss about various methods based on different parameters i.e accuracy, packet delivery ratio, time, overhead, throughput, delay, capacity ,etc.. There are still problems which trouble in this field. New mobility method called "intermediate node location/position prediction" mobility model for position based routing is propose here to overcome the problems of this model. As this model is depend upon the location of current node and Template for submitting papers to IETE Journal of Research. direction and current value is calculated using the previous values of location and direction. As MANET has the dynamic topology so mobile node moves anywhere anytime out off the network. When source node has a packet to send to destination node but the destination node is moves out off the network. So by applying appropriate method that is intermediate node location prediction when mobile node is moves out of the network. Then this method will apply some mathematical equation on intermediate nodes direction to gives the location prediction of mobile node that moves out the network. One buffer is required to store the location prediction of the movable node. With the help of this buffer source node checks the location of the movable node and then sends the packet to the destination node. In this way, when node moves out off network, then with the help of this method it is easy to send the packets to movable nodes without having any delay. Diagrammatic representation of proposed method is shown as



Step1: It checks for position/ location intermediate node route request.

Step2: If yes then calculates Dynamic Forwarded Delay by dijkstra algorithm which assigns cost to edge from routing table.

Step3: If no then directly send packet to intermediate node consist of n successive nodes.

Step4: Sending packets to intermediate nodes checks if receiving nodes is reached if yes then end the process.

Step5: If not then go to step2.

VII. OUTCOME AND POSIBLE RESULT

In this way the proposed method is perform for the intermediate node location/position prediction when node moves out of network. With the help of the location and direction the proposed method calculates delay of movable node if exist and send the intermediate node to destination node in less time.

VIII. CONCLUSION

This paper focused on the study of various mobility scheme i.e. ALERT protocol, Impact of Unreliable Positioning in Location-based Routing Protocols for MANETs, LANDY Protocol, performance comparison of position based routing protocols using different mobility models, position-based multicast routing in manet. But there are some problems in routing packets so to improve this "intermediate node location/position prediction" mobility method for position based routing" is proposed here. When node moves out off network then the propose method provide the location of movable node in less time to send the packets.

IX. FUTURE SCOPE

From observations of the proposed method the future work will include exact accuracy of location/position prediction with the help of more close form of mathematical expression.

REFERENCES

1.Haiying Shen, Member, IEEE, and Lianyu Zhao, Student Member, IEEE,"ALERT: An Anonymous Location-Based Efficient Routing Protocol in MANETs",IEEE TRANSACTION ON MOBILE COMPUTINGVOL. 12, NO. 6, 1079-1093,Month, Year: JULY 2013.

2. Israel Martin-Escalona , Fabio Perrone , Enrica Zola , Francisco Barcelo-Arroyo,"Position-Based Multicast Routing in Mobile Ad hoc Networks",IEEE,978—1-5090-4372,SEPTEMBER 2017.

3. A. Macintosh, M. Ghavami, M. F. Siyau,S. L. Ling,"Local Area Network Dynamic (LANDY) routing protocol: A position based routing protocol for MANET",European Wireless,ISBN 978-3-8008-3426-9,APRIL 2012.

4. A. Macintosh, M. Ghavami, M. F. Siyau,"Performance comparison of Position based routing protocols using different mobility models",European wireless,ISBN 978-3-8007-3498-6 APRIL 2013.

5. Mohammad M. Qabajeh, Aisha H. Abdalla, Othman O. Khalifa, Liana K. Qabajeh,"Position-Based Multicast Routing in Mobile Ad hoc Networks", International Conference on Computer and Communication Engineering,978-1-4673- 0479,JULY 2012.