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A Brief Review of Mobility Models in MANET for Communication

Saba Khan, Priya Pathak
Department of Computer Science, GICTS, RGPV, Gwalior,
Madhya Pradesh, India

Abstract— mobile ad-hoc network is one of the growing field of research there are lots of work done regarding in this field but moviability still a concerning era for ad-hoc network in this paper we study about network and its application after this we study about different mobility models and there effect at the and we conclude that which mobility model perform best and future work.

Keywords— MANET, RWMM, RDMM, NCMM, RPGM

I. INTRODUCTION

A Mobile Ad-Hoc Network (MANET) is a network where greater than two autonomous mobile hosts (mobile devices i.e. Mobile phone, laptop, device, iPod, PDAs and many others.) can continue communication to one another without any imply of fixed infrastructure. When source (*S*) node need to send some information to destination (*D*), and they are fall within the equal transmission range then they can straightly communicate one another. In any other case with the help of intermediate nodes communication can also be situated. Any node could become a member of and go away the network in any factor of time, for that reason the topology of the network alterations almost always. In this network some rare sources like battery energy of mobile devices, bandwidth of network. The reduction of battery power may affect lifetime of the entire network as good as individual node existence in the network. Because of dynamic topology and particular network constraint routing within MANET is difficult matter. Single path routing is not generally suitable to broadcast information to the destination. So, multipath routing appears to decline the issue of single path routing [8].

A. Mobility Models

This is planned to explain the movement pattern of mobile nodes, and how their position, speed and acceleration vary in particular time. Mobility models are essential for analysis node performance in given environment. Mobility models will also be differentiated in line with their dependencies, limit, motion and so on. *different model* have unusual movement pattern and outline specific characteristics thus need in *analyzing* the presentation of routing protocol within MANET.

1. **Random Mobility Models** These models are free from dependencies and limitations. This model play a main part in reflecting the realistic moving pattern of the nodes by many parameters. The models given below derived within this categories.
2. **Random Waypoint Mobility Model (RWMM)** It is very general model in MANET. When variation in velocity or direction takes position, nodes wait in a location for certain time period. When this period ends, mobile nodes arbitrarily select destination with speed in between [min, max]. Waypoint model includes spatial dependency. Nodes movements are non-uniform. These facts create it hard to create simulation to discover the precise performance study. Nodes timeslots are random for every movement and some nodes may remain stationary for the whole simulation time.

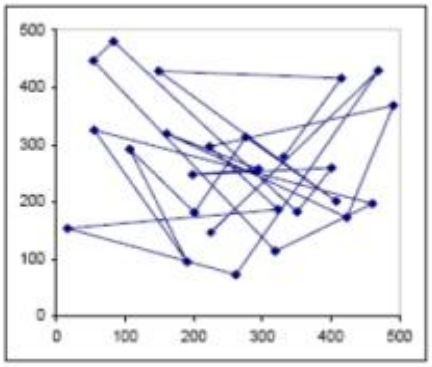

Fig.1 Random waypoint mobility model

3. **Random Walk Mobility Model (RWMM)** Random Walk is a memory-less mobility design. This quality may produce impractical movements for instance abrupt stops and sharp moves. In this model, mobile nodes travel from one station to a further in random path and wit random speed .The new speed must be [min-speed, max-speed] and [0, 2*pi] respectively. All movement within this model is either a constant period or traveled distance; at last of each movement new direction and velocity are calculated. In view that numerous nodes movement in environment is random, this model was planned to cope up with this unpredictable movement. If these moving nodes attain a simulation edge then in line with this model, it jumps off the simulation edge with angle resolute by the incoming direction. Mobility model on a 1-Dimension or 2-dimension surface comes back to the beginning with complete certainty. This represents that this model is utilize to check the nodes mobility around the biginning point without worry about its reachable point.

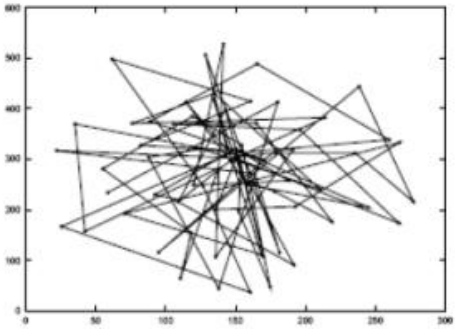

Fig. 2 Random walk mobility model

4. **Random Direction Mobility Model (RDMM)** In RDMM ways of mobile nodes are much similar to RWMM. mobile nodes travels randomly by network however when nodes reach to the boundary it pause there for particular time, later it select some random direction and continue the procedure. To alter way, nodes are not enforced to move to the simulation boundary. The basic intention of RDMM is to reduce with the clustering of nodes in a single part of simulation area. Compare to RDMM, in RWMM cluster arises nearby the center of the simulation region. Within the RDMM, it's not requiring for nodes to pass by midpoint of simulation area. When node chose another target to move then the possibility is maximum in waypoint model.

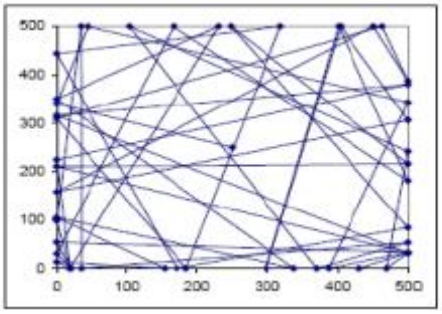

Fig. 3 Random direction mobility model

B. Group Mobility Models

1. **Referential Point Group Mobility Model (RPGM)** RPGM is design as a cluster of similar nodes. Every cluster has a cluster head i.e. group leader which decides the groups movement. originally, every node is consistently disbursed round their group leader. Other group leaders arbitrarily derive velocity and path for each node means resolve group mobility. Entire nodes depending on group leader to travel. This model has high special dependence. The movement within group mobility may be featured as below: a) Vmember (t) = Vleader (t) + random () _SDR_max speed b) member (t) = leader (t) + random () _ ADR _ max perspective the situation zero < (SDR, ADR) < 1, SDR= Speed Deviation Ratio and ADR = Angle Deviation Ratio. ADR and SDR are utilized to manage the speed deviation of group nodes from that of the leader. Angle and speed like a max speed and max angle are utilized to specify the maximum deviation a group member can hold.

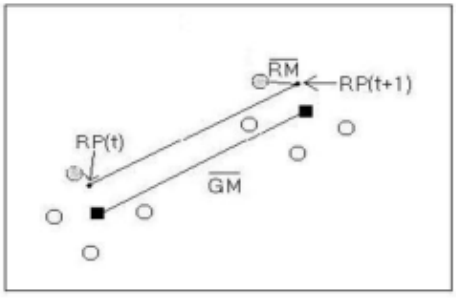

Fig.4 Referential point group mobility Model

2. **Nomadic Community Mobility Model (NCMM)** the NCMM is utilized to symbolize the group movement state where nodes move randomly from one station to another. It is based on reference grid which is resoluted by movement of group nodes. Inside the group, all node can offset some random vector to its predefined reference point. Formally,

$$new\_pos = ref\_pos + random\_vector$$

Where is little random vector utilized to offset the action of mobile nodes. Nomadic team Mobility mannequin shares the equal reference network. Also, the action within Nomadic community Model is random.

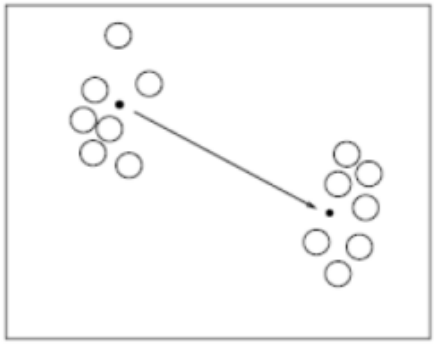

Fig. 5 Nomadic community mobility model

3. **Column Mobility Model** In this model nodes are moving forward randomly in group around a line. Nodes movement is random around the grid and new grid is moved by predefined offset which is equal for all nodes computed with the random distance and angle. This model determines the nodes movement pattern in two forms one is perpendicular and another is parallel. Column mobility model is like NCMM with the exception of that in this every column has its own particular reference point. The nodes movement is constant in NCMM. New reference grid is achieved from equation Formally, New_grid =old_grid + advance vector Here development vector is the predefined grid.

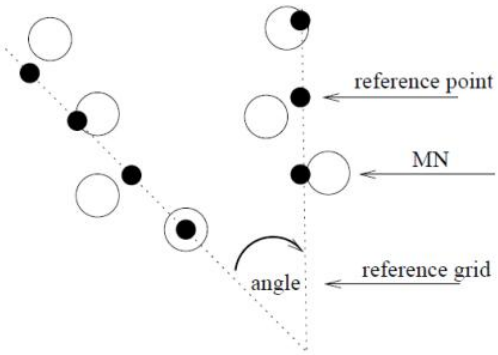

Fig. 6 Column mobility model

4. **Pursue Mobility Model** This model follows situations where node is capture through many other nodes. Node movements are depending on the RWMM, however, the uncertainty is restricted to monitor the target node proficiently. Seeker nodes transfer toward the target node with equal speed. Additionally it is a part of group mobility model where nodes group motion is taking position. Formally, new_position =old_ position+ vt (position target-old_position) + random vector

Where the expected position of node is targeted node being followed at time t and is a minimum random vector utilized to offset the mobile node movement. The major object of this node is in target monitoring and law implementation [1]

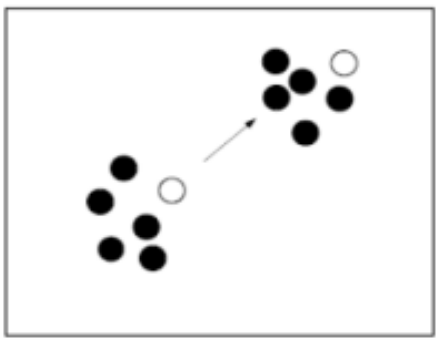

Fig. 7 Pursue mobility model

II. LITERATURE SURVEY

Ming Zhao [2] et al. A smooth mobility model that can describe the genuine moving performance of mobile phone users as per physical law of smooth movement Also, we execute the smooth model to measure the routing performance and network connection of MANETs. Contrasted the most ordinarily utilized mobility model, random waypoint (RWP) model, It is discover that the routing performance and network connection valuation depending on the RWP model is positive. To show the utilizations of smooth model, we show the simple form of this model to geographic limitations and group mobility. Considered four mobility circumstances: RWP, Group Mobility, and Manhattan & freeway models. These Models are chosen to show possibility of useful application in future. Performance correlation has been derived over variable node densities and an amount of hopes. Tentative results demonstrate that presentation of routing protocol differs across various mobility models, distance of data paths and node densities.

Sandeep Kaur [3] et al. shows the effect of the mobility model on the execution of a particular network protocol or application. The outcomes show that various mobility designs influence the different protocols in various ways. In particular, the positioning of routing algorithms is impacted by the selection of mobility pattern.

Lahouari Ghouti [4] et al. An Environment-Aware Mobility (EAM) model that simulations a more sensible development of mobile nodes. Environment questions, for example, Route and Hotspot are reffered to show the atmospheric elements which are rendered by Scalable Vector Graphics (SVG). It is thought to be a complex model with an assortment of existing routine mobility models and network situations. This paper demonstrates that different MANET enviornment can be modeled depending on this work. A sample enviornment is also simulated and the outcomes demonstrate that the intrinsic features and properties of the enviornment impact the performance of MANET protocols.

Gang Lu [5] et al. considered the impacts of several mobility models over execution of two routing protocols Dynamic Source Routing (DSR-Reactive Protocol) and Destination- Sequenced Distance-Vector (DSDV-Proactive Protocol). For trial, we have measured four mobility circumstances: RWP, Group Mobility, and Manhattan & Freeway models. These Models are chosen to show the opportunity of real application in future.

Performance comparision has been conducted over variable node densities and an amount of hopes. Test results shows that routing protocol performance changes crosswise over various mobility models, distance of data paths and node densities.

Bhavyesh Divecha [6] et al. Considered Random waypoint, Random Direction and Probabilistic RWMM for Performance examination of AOMDV protocol. The outcome shows that PDR reduces with enhancing node mobility for whole mobility models. Furthermore, average end-to-end delay is differ with variable node speed, primarily upto 20 nodes in whole mobility models delay is minimum.

Indrani Das [7] et al. offer a smooth mobility model (SMM) that can portray the genuine moving performance of mobile phone users as per the physical rule of smooth movement. Also, we perform this model to assess the routing performance and network connection of MANETs.

Compared with the normally utilized mobility model, RWP model, we discover that the routing execution and network connection assessment in perspective of RWP model is over positive. To show the uses of SMM, we show the simple adjustment of the SMM to geographic limitations and group mobility.

III. SIMULATION AND RESULT

Simulation perform on MATLAB and took random way point model because of after discussion all models we came to know that RWMM.

Table : Simulation Table

Tool	MATLAB
Nodes	20
Simulation time	500ms
Pause interval	0,1
Speed interval	0.2000,2.2000
Walk interval	2,6
Initial postion of nodes X	10,30
Initial postion of nodes y	10,30
Direction interval	-180,180
Time stamp	0.00001

By helping these simulation parameter we came to know that with different time scenario nodes postion update randomely in given area by using random way mobility model. Nodes are moving frequently and get position so that communication take place.

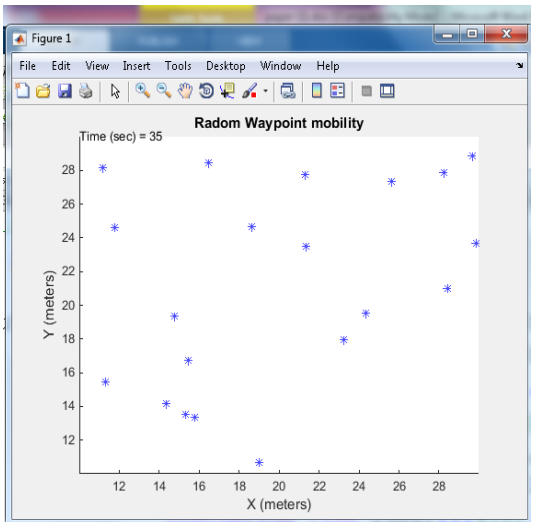

Fig 8: node position at time25ms

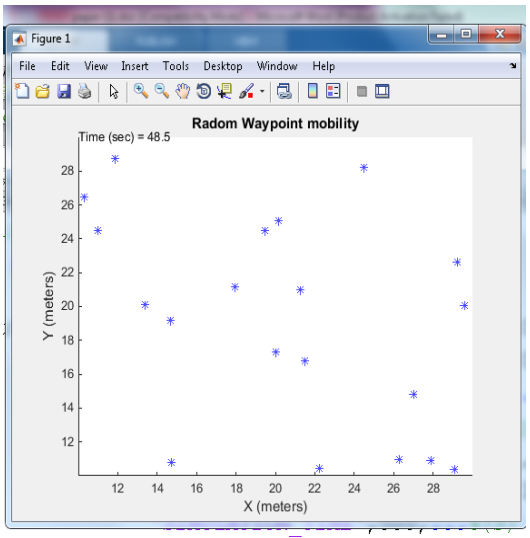

Fig 9: node position at time 48ms.

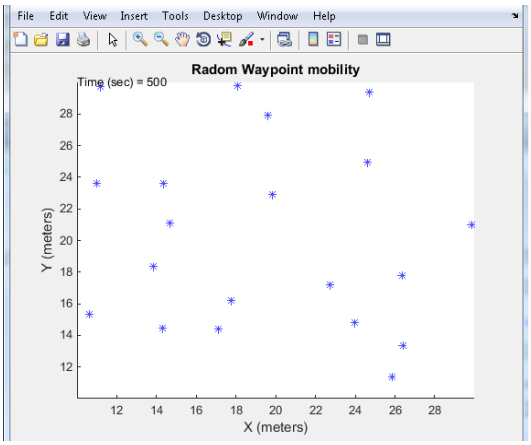

Fig 10: node psotion at time 500ms

IV. CONCLUSION

Mobile ad-hoc network is one of the growing field where lots of work done regarding security and routing for better efficiency, mobility is also concerning because of if moves of nodes is random so that communication between nodes going to be easy and faster in our future work we apply k-means in random way mobility model.

REFERENCES

[1] Tarkeshwari kaul and R.K.kapoor," Mobility Contrast Effect on Environment in Manet as Mobility Model", IOSR Journal of Computer Engineering (IOSR-JCE), Volume 13, Issue 3 (Jul. - Aug. 2013), PP 59-67.

[2] Ming Zhao and Wenye Wang," Design and Applications of A Smooth Mobility Model for Mobile Ad Hoc Networks",

[3] Sandeep Kaur, Harpreet Singh , Taranjit Singh and Yadvinder Singh," Mobility models in adhoc networks", Journal of Global Research in Computer Science, Volume 3, No. 11, November 2012, pp: 58- 64.

[4] Lahouari Ghouti," Mobility prediction in mobile ad hoc networks using neural learning machines", www.elsevier.com/locate/simpat 2016.

[5] Gang Lu, Gordon Manson and Demetrios Belis," Mobility Modeling in Mobile Ad Hoc Networks with Environment-Aware", Journal of networks, VOL. 1, NO. 1, MAY 2006, pp: 54- 63.

[6] Bhavyesh Divecha, Ajith Abraham, Crina Grosan and Sugata Sanyal," Impact of Node Mobility on MANET Routing Protocols Models", IEEE, pp:1-11.

[7] Indrani Das, D.K Lobiyal and C.P Katti," Effect of node mobility onaomdv protocol in manet", International Journal of Wireless & Mobile Networks (IJWMN) Vol. 6, No. 3, June 2014, pp: 91-99.

