

# An Overview of Position Based Routing Protocols

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**Abstract-** Mobile Ad-Hoc Network is remote system comprise of gathering of versatile hubs that changes its topology very soon and correspondence between portable hubs depends on the remote connections. Since the MANET works in powerful condition with no fixed framework and topology, so steering the information bundle between versatile hubs is testing and significant assignment. This paper centers a short outline of the directing conventions that utilize position data to decide the area of goal hub just as its neighbor hub. By the utilization of area administrations and sending techniques, it gives dependable just as productive steering for specific applications.

**Keywords -** Mobile Ad hoc Networks, Position Based Routing Protocol, LAR, DREAM.

## I. INTRODUCTION

A Mobile Ad-Hoc Network is a self-ruling accumulation of versatile hub, that are conveyed through remote connections. It is a transitory system without having any brought together passageway, foundation, or unified organization. It is remote system that perform multi bounce correspondence between versatile hubs, without the dependence on a fixed base station. It is a self arranging, self sorting out, self controlling remote system whose topology changes powerfully. Every hub goes about as switch and as a host. It chips away at five layers: Physical layer, Data connection layer, Network layer, Transport layer, application layer. It is like the OSI Model, however the fundamental contrast lies in the system layer. System layer in MANET is partitioned into 2 sections for example system and specially appointed directing. IP convention is utilized in system part and rest of the conventions like AODV, TORA, DSDV and so forth are utilized by specially appointed directing part. Difficulties in MANETs: • Dynamic topology • Network overhead • Quality of administration • Security • Efficient and Stable steering These systems have different application zones, similar to fiasco alleviation, military, crisis, conferencing, sensor applications.

## II. ROUTING PROTOCOLS

In Manet To course the bundle starting with one end then onto the next end is the essential assignment. The fundamental objective of any steering convention is to set up an ideal and effective way between portable hubs. There are a few steering calculation is proposed for proficient directing. Prior steering convention depends on the topological data, which comprise of way foundation and way support. It uses connect data that exists in the system for parcel sending. However at this point multi day steering conventions are planned which uses position data to find the definite areas of goal hub just as its

neighbour hub It uses position data to give increasingly solid just as productive directing for specific applications.

**1. Classification of Routing Protocols -** In Manet Routing conventions are separated into two classes: Topology based Routing and Position based Routing. Topology based Routing is additionally characterized into Reactive or on-request while others are proactive. When all is said in done, Proactive convention dependably needs to refresh its system topology. It discovers courses ahead of time while a receptive convention discovers courses to the goal until it is requested. It uses flooding procedure to advance the parcels. The significant favorable position of utilizing this convention is that it is intended to spare the data transfer capacity space.

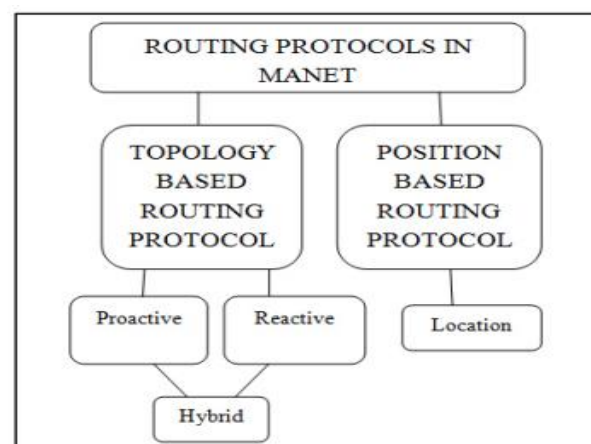


Fig. 1 Classification of Routing Protocols in MANET.

**2. Reactive Routing Protocols -** Reactive convention can't discover its courses to the goal until it is requested. These directing conventions are increasingly proper in light of the fact that they start a course revelation process

just when information bundles should be steered. One bit of leeway of receptive steering conventions is that it doesn't require intermittent directing. Execution of the receptive steering convention gets corrupted as far as control overhead with high versatility and substantial traffic loads. One detriment of this convention is its Scalability since it relies upon visually impaired communicates to find courses. It incorporates flooding for course assurance and long course solicitation delays [14].

**Advantage**

Courses are found on interest premise.

Transmission capacity productive conventions

Less system correspondence overhead

**Disadvantage:**

Extremely high reaction time, as course is required on interest

**3. Proactive Routing Protocols-** Proactive convention dependably needs to refresh its system topology. It discovers courses ahead of time. It occasionally communicated control message so as to have all hub to realize the present course to all goals. This sort of directing uses huge measure of transfer speed to keep up steering. These directing conventions are less reasonable for Mobile Ad-Hoc arranges in light of the fact that it always expend control in the system, paying little mind to the movement of system [14].

**Advantage-** Speedy reaction to application program

**Disadvantage-** It needs to keep up total system chart in current state. Devours part of system asset so as to keep up the system chart.

**4. Hybrid Routing Protocols -** These steering conventions consolidate the best of two methodologies i.e responsive and proactive methodologies. When all is said in done, topology-based are considered not to scale in systems with in excess of a few hundred hubs. It is utilized to discover the harmony between the two conventions. Proactive activities are limited to little space, though receptive conventions are utilized for outside those areas [14]. III. Position Based Routing Protocols In Manet Position based steering convention uses position data to find the accurate areas of goal hub just as its neighbour hub It uses position data to give increasingly solid just as proficient directing for specific applications and this data is by and large acquired through Global Positioning System (GPS) and area administrations.

By the utilization of area administrations and sending procedures its presentation is greatly improved than topology based steering convention. It show better adaptability, vigor against continuous topological changes. These steering conventions are intended to improve proficiency and execution of the system. Steering is done in a jump by-bounce style to advance the information parcels. It is intended to deal with systems that have numerous hubs. One bit of leeway of this sort of steering is that it is completely founded on nearby data to

advance the information bundle, instead of to keep the system wide data. This will prompt much decreased directing overhead and increment the bundle conveyance rate. Position data of every hub is controlled by the utilization Location Services and Forwarding methodologies are utilized to advance the information bundles. A few directing based calculations have been displayed including DREAM (Distance Routing Effect and Mobility), LAR (Location Aided Routing), GLS (Grid Location Service), GPSR (Greedy Perimeter Stateless Routing) [3, 14, 15].

**5. Performance of Position Based Routing Protocol-**

Execution of Position Based Routing Protocol The accompanying presentation of position based steering system of the convention can be as indicated by their significant plan parameters are:

- Loop Free
- Distributed Operation
- Path Strategy
- Packet Forwarding
- Path Selection Metric
- Memory (State)
- Guaranteed Message Delivery
- Scalability
- Overhead
- Adaptive to Mobility

**6. Location services -** An area administration ought to have the accompanying qualities are.

- It ought to effectively and precisely furnish a hub with the area it needs to settle on steering choices.
- It ought to be circulated, and ought not depend on any uncommon equipment or arrangement.
- It ought to act naturally arranging.
- It ought not present an excessive amount of overhead

**7. Forwarding strategies-**There are three primary bundle sending techniques utilized for position-based conventions eager sending, limited directional flooding and various leveled approaches [3].

**8. Greedy forwarding-** conventions don't build up and keep up ways from source to the goal, rather, a source hub incorporates the estimated position of the beneficiary in the information parcel and chooses the following jump contingent upon the advancement criteria of the calculation; the nearest neighbour to the goal for instance. Also, each middle of the road hub chooses a next jump hub until the bundle achieves the goal. All together for the hubs to be empowered to do this, they intermittently communicate little parcels. Ravenous sending can lead into an impasse, where there is no neighbor nearer to the goal.

**9. Restricted Directional Flooding -** In limited directional flooding, the sender communicates the bundle (regardless of whether the information parcel or course demand bundle) to its neighbors towards the goal closes. The hub which gets the bundle, checks whether it is inside

the confined limit that ought to advance the parcel. On the off chance that, yes it will transmit the parcel. Something else, the bundle will be disposed of. In this sort of flooding, a few hubs take an interest so as to advance the parcel. It won't just expand the likelihood of finding the briefest way yet in addition it is strong against the disappointment of individual hubs and position incorrectness

**10. Hierarchical Routing** -The third sending technique is to shape a chain of importance so as to scale to an enormous number of versatile hubs. A few procedures consolidate the hubs area and various leveled system structures by utilizing the zone based steering

#### **11. Location-aided Routing Protocol (LAR)**

This convention depends on the utilization of area data about the portable hubs by utilizing area administrations like GPS and a lot more to lessen the course disclosure overhead, the two areas are characterized for example Solicitation zone and Expected zone. Solicitation zone is the region where the hub advances the course demand just when the hub is inside the zone. At the point when the hubs does not has a place with solicitation zone then it essentially disposes of the message. Expected zone is the zone where there is the most extreme likelihood of finding the goal hubs. Since the goal hub is portable, We can figure its probabilistic position by accepting its normal speed increased by contrast in time interim. We accept the normal zone to be round with the range  $v(t_1 - t_0)$ . Contrast between at time  $t_0$  the area of goal hub and at time  $t_1$  the area of goal hub increased by its normal speed [1].

#### **12. Distance Routing Effect Algorithm for Mobility Protocol (DREAM)**

DREAM convention is proposed by Basagni et al., in which hub area data is resolved from GPS frameworks for correspondence. It is the mix of proactive and receptive convention where the source hub sends the information bundle to the goal hub by specific flooding. The sender will communicate the parcel towards hubs in a constrained part of the system; to all single jump neighbors towards the goal. DREAM calculation is a proactive convention that uses a constrained flooding of area update messages Since DREAM utilizes the limited directional flooding, to advance information parcels themselves, there will be various duplicates of every bundle in the meantime. This builds the likelihood of utilizing the ideal way; in any case, it diminishes its versatility to huge systems with a high volume of information transmissions and makes it increasingly reasonable for applications that require a high dependability and quick message conveyance for rare information transmissions [4].

#### **13. Adaptive Location-aided Mobile ad hoc Network Routing Protocol (ALARM)**

This convention utilizes input for adaption and area data for development the presentation. It is a cross breed,

versatile to portability convention 'which uses LAR and coordinated flooding. It acquaints the quantity of jumps with be overwhelmed past the versatility problem area by the flood skyline. It utilizes the connection the term of the input at every hub to decide the proper sending technique and it adjusts the task on the present system portability conditions and it will builds the versatility of the parcel overhead [6].

#### **14. Greedy Perimeter Stateless Routing Protocol (GPSR)**

This convention utilizes the area of the hub to specifically a sent the parcels dependent on the separation. The hub nearest to the goal by sending is done on the premise by choosing the eager methodology. This procedure will proceed until the goal is come to. This convention utilizes two techniques for information sending: ravenous sending and edge sending. A hub sends the bundle to its neighbor hubs shut to its area of border. In the course revelation the states are gathered and stored in the hubs after the district of border sending. For the investigation of versatility, we utilized an irregular waypoint model [5].

#### **15. Grid or Geographic Location Service Protocol (GLS)**

based an area administration for the geographic areas. We can be mimicked with the straightforward geographic directing and the GPSR. It separates the system territory into a progressive framing of the arrangement of squares a quad-tree, where every n-request squares contain four (n-1) request squares. It will make utilization of the area data and it tends to be a one of a kind, changeless and irregular distributed hub IPs, the neighborhood first request square that every hub stores a table all things considered. it utilization of the intermittent communicates as the area which updates increment with the system measure [7].

Table 1 Comparison of Position Based Routing Protocols in Mobile Ad hoc Networks.

Protocol	Path Strategy	Path Selection	Scalability
LAR	Multipath	Hop Count	Medium
ALARM	Multipath	Link duration	High
DREAM	Multipath	Hop Count	Medium
GLS	Multipath	Hop Count	Medium
GPSR	Multipath	Hop Count	Medium

#### **16. Dynamic Route Maintenance for Geographic Forwarding (DRM)**

Chou et al. propose a dynamic beaconing plan to be utilized in geographic sending calculations in MANETs. In reference point based conventions, every portable hub transmits intermittent signals to its neighbors to refresh

and keep up its steering table. The reference points are for the most part sent at fixed interims of time. During low versatility, a more extended interim would be the best as it would diminish control overhead while giving precise area data. In any case, in instances of higher portability, deciding a fitting guide interim is fairly troublesome. In DRM, signal interim and course data are done powerfully. In view of the hub's portability data, its signal interim is processed while the course the executives capacity refreshes the directing table passages. The DRM calculation is connected to GPSR sending calculation [10].

**17. A Region-Based Routing Protocol For Wireless Mobile ad hoc Networks (REGR)-** The REGR The REGR convention, proposed by Liu et al., powerfully makes a pre-directing locale between the source and the goal, subsequently control the flooding of course demand bundles inside this district. The right determination of the district, which ought not be excessively little, is significant for the disclosure of the ideal courses [11].

**18. Location aided Knowledge Extraction Routing for Mobile ad hoc Networks (LAKER)-** The LAKER convention limits the system overhead during the course disclosure process by diminishing the zonal region in which course demand bundles are sent. During this procedure, LAKER removes learning of the nodal thickness dissemination of the system and recall a progression of "significant" areas on the way to the goal. These areas are named "managing courses" and with the assistance of these controlling courses the course revelation procedure is limited [12].

#### 19. Most Forward within Distance (MFR)

Some avaricious position-based steering conventions, for example, Most Forward inside separation R (MFR), attempt to limit the quantity of bounces by choosing the hub with the biggest advancement from the neighbors, where advancement is characterized as the projection of the separation of the following jump from the sender on the straight line between the sender and the goal. As other eager sending conventions,

MFR has the weaknesses of either not ensuring to discover a way to the goal or finding a way which is any longer than the most limited way. In addition hubs intermittently should communicate reference points to report their positions and empower different hubs keep up a one-bounce neighbor table. MFR is the main advancement based calculation focused as far as jump tally. However, picking the hub with the biggest advancement as the following bounce will expand the likelihood that the two hubs detached from one another before the bundle achieves the following jump. Thus, the parcel drop rate increments extraordinarily, particularly in exceedingly portable situations. Such a circumstance is extremely basic because of neighbor table irregularity.

**20. Secure Position Aided Ad-Hoc Routing (SPAAR)-** It uses position data so as to improve the effectiveness and security of versatile Ad-Hoc arranges. It was intended for ensuring position data in oversaw threatening condition where security is an essential concern utilizes geological data to settle on sending choices, bringing about a noteworthy decrease in the quantity of steering messages. It utilizes uneven cryptography to ensure against noxious hubs (unapproved hubs that endeavor to disturb the system) and endeavors to limit the potential for harm of assaults from bargained hubs (approved hubs those have been surpassed by an enemy) [13].

**21. Sociological Orbit Aware Location Approximation Routing (SOLAR)-** Ghosh et al. first proposed a full scale level versatility structure named circle. It was a deterministic orbital development example of portable clients along explicit spots called center points. The development example depended on the way that most versatile hubs are not genuinely arbitrary in their developments but rather really move around in a circle from center point to center. Every center point might be a square shape and development may happen either inside a center point or in the middle of center points. Model orbital models talked about are arbitrary circle, uniform circle, confined circle, and overlaid circle [9].

## III. PROPOSED CLUSTER BASED ALGORITHM

As appeared in detail in Algorithm 1, a vehicle in SE state first endeavors to interface with the current groups so as to limit the quantity of bunch heads.

Algorithm 1: State Election (SE) Algorithm

```

1 for all the CH  $\in$  V IB do
2   if TRY_CONNECTCH == false then
3     if MEMBERCH < MAXMEMBERCH then
4       Send JOIN_REQ;
5       if JOIN_RESP received then
6         Vstate = CM;
7         Exit;
8       else
9         TRY_CONNECTCH = true;
10 for all the CM  $\in$  V IB do
11   if TRY_CONNECTCM == false then
12     if MEMBERCM > MAXMEMBERCM then
13       if HOPCM < MAX_HOP then
14         Send JOIN_REQ;
15         if JOIN_RESP received then
16           Vstate = CM;
17           Exit;
18         else
19           TRY_CONNECTCM = true;
20 if Not exists SE  $\in$  V IB then
21   Vstate = ISO - CH;
22   Exit;
23 else if AV_GREL_SPEEDcurr = MinSE  $\in$  V IB (AVGREL_SPEEDSE) then
24   Vstate = CH;
25   Broadcast CH_ADV;
26   Exit;
```

#### Algorithm 2: IEEE 802.11p CM Algorithm

```

1 On DATA_PACKET generation or receipt:
2 Extract IDDATA and SEQDATA;
3 if (IDDATA, SEQDATA) ∈ VIB then
4   if DATA_PACKET is from PARENTcurr then
5     Multicast DATA_PACKET to CHILDRENcurr;
6   else
7     Unicast DATA_PACKET to PARENTcurr;
8 Update VIB;
```

#### Algorithm 3: IEEE 802.11p-LTE CH Algorithm

```

1 On DATA_PACKET generation or receipt:
2 Extract IDDATA and SEQDATA;
3 if (IDDATA, SEQDATA) ∈ VIB then
4   if DATA_PACKET is from eNodeB then
5     Broadcast DATA_PACKET into cluster;
6   else
7     Broadcast DATA_PACKET into cluster;
8   Put data in DATA_PACKET and forward it to eNodeB;
9 Update VIB;
```

Notation	Description
IN	Initial State
SE	State Election
CH	Cluster Head
ISO - CH	Isolated Cluster Head
CM	Cluster Member
VIB	Vehicle Information Base
VIB_TIMER	VIB Timer
IN_TIMER	Initial State Timer
SE_TIMER	State Election State Timer
CH_TIMER	Cluster Head State Timer
CM_TIMER	Cluster Member State Timer
JOIN_TIMER	Join Response Packet Timer
MERGE_TIMER	Merge Timer
V <sub>state</sub>	Vehicle's Current State

Notation	Description
AVGREL_SPEED <sub>i</sub>	Average Relative Speed of Vehicle i
MEMBERCH	CH's Connected Member Counter
MEMBERCM	CM's Connected Member Counter
MAXMEMBER_CH	Max. Member CH can serve
MAXMEMBER_CM	Max. Member CM can serve
MAX_HOP	Max. Hop Between CH and CM
HOPCM	Number of hops between CM and CH
CH_ADV	CH's Advertisement Packet
JOIN_REQ	Join Request Packet
JOIN_RESP	Join Response Packet
CH_ADV	Cluster Head Advertisement Message
HELLO_PACKET	Periodic Hello Packet
DATA_PACKET	Data Packet
CLUSTER_INFO	Cluster Information Packet
TRY_CONNECT <sub>i</sub>	Try Connect Flag for Vehicle i
MERGE_REQ	CH's Merge Request
MERGE_RESP	CH's Merge Response
IDDATA	Data Packet Generator Identifier
SEQDATA	Data Packet Sequence Number
PARENT <sub>i</sub>	Vehicle through which vehicle i is connected to the cluster
CHILDREN <sub>i</sub>	Vehicles that use vehicle i to connect to the CH

## IV.CONCLUSIONS

This paper principally centers around a concise diagram of different position based steering conventions in MANET. Under what condition they should advance the parcel is likewise depicted here. In this paper, the position based steering conventions can be arranged into an area administration, geographic and progressive. The steering convention must be effective to improve the presentation of the system. The position based calculations for both specially appointed and remote sensor systems, works in both dynamic and static situations.

This paper demonstrates that the errand of steering parcels from a source to goal can be separated into the two particular ways: First to find the situation of the goal and its neighbour hub by the utilization of area administration and another way is the bundle sending procedures. The shared objective of any sort of steering convention is to lessen the control parcel overhead, augment throughput and limit the start to finish delay. The primary factor to separate between various conventions is the method for finding and keeping up the courses between the source and the goal sets. We trust that the taken scientific categorization of the convention introduced in this paper will be useful in picking the best steering convention..

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