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# A Survey on Best Path Selection Approaches in Mobile Ad-Hoc Network

**Surbhi Sharma*[1], Prof. Harsh Mathur[2]**
*[1]M. Tech. Scholar, Department of Computer Science and Engineering, IES Collage, Bhopal, Madhya Pradesh, India
[2]Assistant Professor, Department of Computer Science and Engineering, IES Collage, Bhopal, Madhya Pradesh, India

## ABSTRACT

Mobile ad hoc network is one of the complex communication network. In this technology an ideal communication style realizing communication anytime, anywhere and with anyone. In mobile ad hoc networks The availability of a path depends on the number of links and the reliability of each link forming the path. Because of connectivity richness in mobile ad hoc networks, there often exist multiple paths between a source and a destination. Since many applications require uninterrupted connectivity of a session, the ability to find long-living paths can be very useful. In this sense, a promising approach for addressing efficient stable path problem is to use multiple redundant paths between the source and the destination. This paper presents through overview of MANET based routing and different techniques based on best path selection by which enhance network performance against multiple inefficient path exist in network.

**Keywords:** MANET, Network Nodes, stable route, routing protocol, path selection

## I. INTRODUCTION

As advancement is growing rapidly, it requires numerous handheld gadgets like workstation, cell phones et cetera. Which are produced by extending circle space, control utilization and memory estimate [1]. This require advances of progressive approach for betterment contribution in network quality of service for improvements.

The wireless networks have become increasingly popular in communication industry since 1970. These networks rapidly increased in recent years this type of networks provide mobile users with ubiquitous computing capability and information access regardless of the users' location. All nodes are capable of movement and can be connected dynamically in arbitrary manner. The responsibilities for organizing and controlling the network are distributed among the terminals themselves. The entire network is mobile, and the individual terminals are allowed to move freely. Mobile Ad-hoc Networks are supposed to be used for disaster recovery, battlefield communications, and rescue operations when the wired network cannot work there [2].

With recent performance advancements in computer and wireless communications technologies, advanced mobile wireless computing is expected to see increasingly widespread use and application, much of which will involve the use of the routing protocols. The vision of mobile ad hoc networking is to support robust and efficient operation in mobile wireless networks by incorporating routing functionality into mobile nodes [3].In the recent years, wireless

technology has enjoyed a tremendous rise in popularity and usage, thus opening new fields of applications in the domain of networking. Without using any fixed structural support the information is exchanging in the network of mobile devices. Such networks are termed as ad –hoc network. [4].

The main objective of this paper is: To present various aspect of mobile ad hoc network and their protocols; to review some late and existing procedures of best stable path selection; to give generalize problem formulation in the aspects of available existing procedures.

*The remainder of paper is organized as follows. Section II describes the background scenario on MANET and relevance terminology. Related work is described in section III. Problem statement is in section IV and finally the summery of whole review is summarized as conclusion in Section V.*

## II. BACKGROUND

The background of a study is an important part of our research paper. It provides the context and essential terminology of the study. Hence there is need for background study that contribute to prepare of the overview of this survey paper:

### A. About MANET

Wireless communication has many pros over the wired networks. People must be able to communicate if even they are mobile. With the advancement in communication technology devices have become smaller yet more powerful and cheaper. Thus, users can exchange information with their devices while traveling through the large area. To maintain such communications over a large area, there is a need for some fixed infrastructure like access points, transceivers. Mobile Ad-hoc Network (MANET) has gained lot of popularity over wired networks due to their unique characteristics [5].

A MANET is a self-organizing collection of wireless mobile nodes that form a temporary and dynamic wireless network without any infrastructure. MANETs are self-configuring; there is no focal administration framework with arrangement obligations. All the portable hubs can impart each other specifically, in the event that they are in other's remote connections radio range. Keeping in mind the end goal to empower information exchange they either convey through single jump or through various bounces with the assistance of moderate hubs. In versatile specially appointed system (MANET), a host may debilitate its energy or move away without giving any notice to its agreeable hubs. It causes changes in organize topology, and in this manner, it altogether debases the execution of a steering convention [6].A Mobile Ad Hoc Network (MANET) typically undergoes constant topology changes, which disrupt the flow of information over the existing paths. Figure 1 depicts the example of mobile ad hoc network.

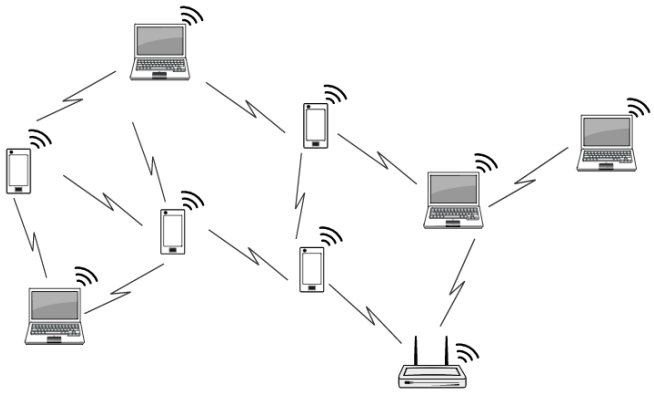

**Figure 1.** Example of Mobile Ad-hoc Network

### B. MANET Routing Protocols

Routing Protocols in Ad hoc networks handle communication between nodes. They maintain information that helps nodes to find routes to required destinations. Routing algorithms set up the path, and also routes the packets on that path from source to destination. It also takes into account the error in communication that might arise. Hence, the effectiveness of communication depends upon the efficiency of the routing algorithm. In order to facilitate communication within the network, a

routing protocol is used to discover routes between nodes. The essential objective of such an impromptu system steering convention is right and proficient course foundation between couples of hubs with the goal that messages might be conveyed in a timely manner [7].

One of the most popular methods to distinguish mobile ad hoc network routing protocols is based on how routing information is acquired and maintained by mobile nodes. Using this method, mobile ad hoc network routing protocols can be divided, into proactive routing, reactive routing, and hybrid routing. Following figure shows the categorization of routing protocol and their sub-categorization in ad-hoc network. According to the mode of operation, these protocols are classified in three broad categories in figure 2:

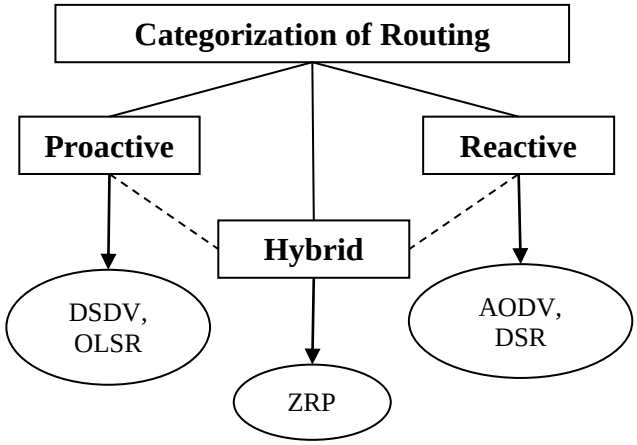


**Figure 2.** Classification of Routing Protocol

### (1) Table-Driven Routing Protocols (Proactive)

These conventions are likewise called as proactive conventions since they keep up the steering data even before it is required [8]. Every single hub in the system keeps up steering data to each other hub in the system. Courses data is for the most part kept in the steering tables and is occasionally refreshed as the system topology changes. Huge numbers of these steering conventions originate from the connection state directing. There exist a few contrasts between the conventions that go under this classification relying upon the steering data being refreshed in each directing table. Moreover, these steering conventions keep up various number of tables. The proactive conventions are not reasonable for bigger systems, as they have to keep up hub passages for every last hub in the steering table of each hub. This causes all the more overhead in the steering table prompting utilization of more data transfer capacity [8].

### (2) On Demand Routing Protocols (Reactive)

These conventions are additionally called receptive conventions since they don't keep up directing data or steering movement at the system hubs if there is no correspondence. In the event that a hub needs to send a bundle to another hub then this convention scans for the course in an on-request way and builds up the association so as to transmit and get the parcel [9]. The course revelation more often than not happens by flooding the course asks for bundles all through the system.

### (3) Hybrid Routing Protocols

Hybrid directing conventions are proposed to join the benefits of both proactive and responsive steering conventions and defeat their inadequacies. Ordinarily, half and half steering conventions for portable impromptu systems misuse various leveled organize structures. The best possible proactive directing methodology and responsive steering approach are abused in various progressive levels, separately. In this section, as cases of cross breed steering conventions for versatile specially appointed systems, the Zone Routing Protocol (ZRP), Zone-Based Hierarchical Link State (ZHLS) Routing Protocol, and Hybrid Ad Hoc Routing Protocol (HARP) [10].

## C. Best Route Selection Routing

In Mobile Ad-hoc network single way directing may bomb in the vast majority of the cases because of successive hub portability. Thus, Multi way directing plan has been utilized. Various ways between the source hub and the goal hubs could be discovered utilizing Multipath directing convention. These

various ways make the transmission more solid and more proficient. To transmit information just best way is chosen among the accessible ways in view of some metric, for example, delay, data transfer capacity accessibility, conveyance proportion, course security and so forth [11].

Steering in MANET has been a testing errand on account of high level of hub development inside indicated run. Utilizing elective way may resolve this issue. Various ways amongst source and goal are dictated by course revelation. Directing convention chooses an elective way in light of a few measurements, for example, jump tally, speed of way, time to convey content, way unwavering quality, and its transfer speed. Directing conventions in regular wired systems for the most part utilize either remove vector or connection state steering calculations, both of which require intermittent steering notices to be communicated by every switch. The Traditional most brief way calculations work effectively just when all hubs keep up courses to all goals. Be that as it may, in on-request steering conventions, a hub require not keep up courses to all goals. To conquer the issues related with the connection state and separation vector calculations various on request steering conventions have been proposed for WSN (Dynamic Source Routing (DSR) protocol and Ad-hoc On demand Distance Vector (AODV) routing protocol etc.) [12].

## III. LITERATURE SURVEY

Several researchers have investigated the area of multipath routing for improvement of network performance in mobile ad hoc networks. In this section, some examples of their works are discussed.

**Table 1.** References of survey

| S.No | Author's Name | Title | Approach Work | Resemblance |
|---|---|---|---|---|
| 1. | K. Kumaravel and S. Geetha, | "Performance Analysis of Obat_Aomdv with Swarm Intelligence Technique in MANET" | PDR, Delay, Energy, Throughput | End to end delay, PDR |
| 2. | Sh. Samadi and H. Beigy, | "An Adaptive Multipath Ant Routing algorithm for Mobile Ad Hoc Networks" | PDR, Delay, Overhead | PDR |
| 3. | Mansour Sheikhan, | "PSO-Optimized Hopfield Neural Network-Based Multipath Routing for Mobile Ad-hoc Networks" | Link disjoints and node disjoints | Average throughput |
| 4. | Manickavelu, Devi, and RhymendUthariaraj Vaidyanathan, | "Particle swarm optimization (PSO)-based node and link lifetime prediction algorithm for route recovery in MANET" | Average PDR ,Delay ,Energy , Overhead | End to end delay, PDR |
| 5. | Deepa, O. and J. Suguna, | "An optimized QoS-based clustering with multipath routing protocol for wireless sensor networks" | PDR, Average residual energy, total energy consumption, throughput, delay, normalized overhead | PDR, Average throughput |
| 6. | C. Priyadharshini and K. ThamaraiRubini, | "Predicting route lifetime for maximizing network lifetime in MANET" | PDR, energy | PDR |

K. Kumaravel et al. [13] proposed a novel steering convention in light of A* way discovering calculation and crossover BAT calculation to tackle the group issues There are five stages in particular revelation, bunch arrangement, group head determination, way choice and course upkeep. In way disclosure, the most limited way between the portal and different hubs is discovered utilizing A* way discovering calculation in view of AOMDV where in excess of five courses have been found. In second stage, the group development can done on cross breed BAT calculation in third stage chooses the CH in view of elements like versatility, capacity to deal with hubs, correspondence range, data transmission and vitality . The calculation ascertains the normal weight of every hub in view of the gave factors. The hub with the base weight is chosen as a group head. In fourth stage the best way is chosen for information transmission by considering load adjusting as an essential factor utilizing half breed BAT calculation based AOMDV. In last stage amid the joining of new hubs or hub disappointments or hubs that are moving constantly in course is kept up through the other. Creators assess this proposed technique through reenactment in NS2 and contrast and existing conventions.

Sh. Samadi et al. [14] proposed a calculation for directing in versatile specially appointed systems. Directing assignment makes them challenge issue in MANETs, in view of having dynamic and impromptu nature. For looking with these difficulties creators propose an Adaptive Multipath Ant Routing calculation (AMAR) by joining thoughts from computerized reasoning (AI) and multipath directing in this calculation for enhancing the system execution. In a broad arrangement of recreation tests, creators contrast this calculation and AntHocNet and AODV and OLSR which are three reference calculations in this exploration zone.

Mobile ad-hoc network (MANET) is a dynamic gathering of portable PCs without the requirement for any current foundation. Hubs in a MANET go about as hosts and switches. Outlining of vigorous steering calculations for MANETs is a testing errand. Disjoint multipath directing conventions address this issue and increment the dependability, security and lifetime of system. In any case, choosing an ideal multipath is a NP-finish issue. Mansour Sheikhan et al. [15] proposed, Hopfield neural system (HNN) which its parameters are enhanced by molecule swarm streamlining (PSO) calculation as multipath steering calculation. Connection termination time (LET) between every two hubs is utilized as the connection dependability estimation metric. This approach can discover either hub disjoint or interface disjoint ways in single stage course revelation. Reenactment comes about affirm that PSO-HNN directing calculation has better execution when contrasted with reinforcement way set choice calculation (BPSA) as far as the way set unwavering quality and number of ways in the set.

Devi Manickavelu et al. [16] proposed a molecule swarm advancement (PSO)- based lifetime expectation calculation for course recuperation in MANET. This strategy predicts the lifetime of connection and hub in the accessible data transfer capacity in light of the parameters like relative portability of hubs and vitality deplete rate, and so forth. Utilizing forecasts, the parameters are fuzzified and fluffy guidelines have been framed to settle on the hub status. This data is made to trade among every one of the hubs. Along these lines, the status of each hub is confirmed before information transmission. Notwithstanding for a powerless hub, the execution of a course recuperation system is made such that relating courses are occupied to the solid hubs. With the guide of the reenacted comes about, the minimization of information misfortune and correspondence overhead utilizing PSO expectation has been talked about in detail.

O. Deepa et al. [17] proposed Optimized QoS-based Clustering with Multipath Routing Protocol (OQoS-

CMRP) for WSNs decreases the vitality utilization in sink scope territory by applying the Modified Particle Swarm Optimization (PSO)- based grouping calculation to frame bunches to choose group heads in the sink scope zone and to take care of vitality opening issue. The Single Sink-All Destination calculation is utilized to discover close ideal multi-jump correspondence way from sink to sensors for choosing the following bounce neighbor hubs. The Round-robin Paths Selection calculation is utilized for exchanging information to sink. As per QoS measurements, the execution of the proposed correspondence convention is assessed and contrasted and other existing conventions specifically EE-LEACH and EPSO-CEO. The reproduction result demonstrates that Optimized QoS-CMRP for WSN accomplishes unmistakable information correspondence with sensible vitality protection. It additionally diminishes transmission postponement and correspondence overhead based on guaranteeing the result of the whole system.

Because of this absence of vitality, correspondence between two hubs gets blocked and their topology may likewise differ as these hubs are hindered from its own correspondence way. This may definitely influence the execution of steering convention and furthermore influence the system lifetime. A few looks into have gone so far for foreseeing hub lifetime and connection lifetime. C. Priyadharshini et al. [18] address this issue and built up another calculation which uses the system parameters identifying with dynamic nature of hubs viz. vitality deplete rate, relative versatility estimation rate to anticipate the hub lifetime and connection lifetime. At that point the minimum dynamic course has been chosen for sending the information bundles. At long last, this course lifetime forecast calculation is actualized in the new convention condition which depends on DSR convention which investigates the dynamic nature. This new convention beats than the current convention for instance Lifetime prediction routing (LPR) and Dynamic source Routing (DSR) protocol in terms of Throughput, Routing failure, Routing overhead, Packet loss Ratio and Packet delivery ratio.

## IV. PROBLEM STATEMENT

Routing plays an important role in various types of networks. There are two main ways to route the packets. One is unicast and the other is multicast. Unicast refers to one-to-one communication between a source and a destination. Multicast refers to one-to-many communication where the same source sends the same packets to a set of destinations. In the network different time intervals have many scenarios of finding path. Whenever, new connection established between source and destination there is need for selection of best path for improving network performance if there is many path available. Therefore to discover optimal/best path which is ensure high stability for a long time that maintain the all communication session during each simulation of network.Selecting the best path from all the available paths is the main issue for multipath routing in MANET.

## V. CONCLUSION

Ad hoc-networking is becoming increasingly important in today's world. And its importance is recognized by both the research and industry community. A MANET requires dynamic updating and configuration of links in the network. As we have seen a great development in the field of wireless networks and in the field of Mobile ad hoc network. The dynamically changing topology of mobile ad hoc networks motivated us to identify optimal path resistance to failures or path reliability as the criterion for selecting a set of available paths that can support end user ad hoc networking applications. In this paper, a brief survey on best path selection has been introduced. Additionally, we studied about routing in MANET and protocol categories. Hence, throughout this survey paper we have successfully

concluded different literature on optimal route selection approaches.

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