

# Efficient Dynamic-Power AODV Routing Protocol Based on Node Density:A Review

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**Abstract:** Mobile Ad-Hoc Network ( MANET) is a group of wireless mobile users creating a temporary network without the assistance of any stand-alone infrastructure or centralized administration. Regardless of the versatility of the nodes in the network, these nodes are self-organizing and self-configuring. Not only do they serve as hosts, but they also work as routers. They pass data to or from other nodes on the network. In MANETs, routing protocols are required to find different paths between the source and the destination. The main objective of any ad-hoc network routing protocol is to address the demands of dynamically evolving topology. An effective route between any two nodes with minimal overhead routing and bandwidth usage should therefore be built. Due to the versatility and complex existence of mobile ad-hoc networks, the development of these routing protocols is difficult. The routing protocols of MANET are classified into two types: proactive and reactive. The paper highlights the features and applications of the MANET. In addition, the types of routing protocols listed above, both proactive and reactive, are discussed. In addition, a distinction is made between three protocols, namely DSDV, DSR and AODV, both in terms of function and efficiency. Eventually, a crucial review is carried out on some of the papers that addressed routing in MANET.

**Keywords:** *Adhoc Network , MANNET , WSN ,Routing protocols*

## I.INTRODUCTION

An ad hoc network is a group of nodes that do not have to rely on a predefined infrastructure to keep the network connected. Ad hoc networks may be formed, merged together or divided into different subnets on the fly, without necessarily relying on a fixed infrastructure to manage tasks. Ad-hoc networks are mostly mobile, which often means that they use wireless communication to establish connectivity, in this case they are called mobile ad-hoc networks (MANETs) [1]. Mobility is not, however, a necessity for nodes in ad hoc networks, static and wired nodes that occur in ad hoc networks, which can allow use of services provided by fixed infrastructure. Ad hoc networks can be somewhat unique from one another based on the nature of operation.

The Mobile Ad-hoc Network ( MANET), also known as the Ad-hoc Network (MANET)[2], is a set of portable, mobile devices that communicate with each other and distribute parcels without any infrastructure. Without a network, mobile devices take care of routing packages to one another. Ad-hoc networks are important fields for conflict and natural disasters. MANETs can also be useful where there is no connectivity and infrastructure for remote and rural areas.

MANET Nodes are supported by MANET routing protocols. MANET protocol classes such as Constructive and Reactive have various levels. Proactive protocols continuously recommend issues to the topology and explore the required details only when needed in reactive protocols [1].

Some of the concepts of MANET routing protocols are similar to wired networks. There are several variations that facilitate efficient MANET protocols challenging.

Some of the differences are:

- In Mobile nodes resources are challenged;
- Dynamic changes of routes and Links; and
- Some mobile routers (nodes) may be operated by attackers unlike in wired networks.

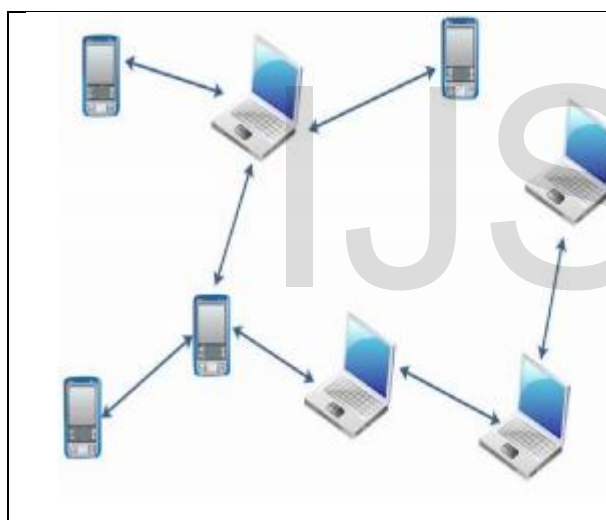


Figure 1: A Typical Mobile Adhoc Network[3]

## II.Applications of MANET

MANET is easy to implement due to the absence of any communication infrastructure. These networks are mainly required in military operations and emergency rescue operations. Even MANETs gradually entered the sectors of sports, sensing, conference and interactive computing [4]. This complex network has not seen many commercial applications. Investigation aims in this direction, so that the MANET can be easily used for data

communication in any area where a faster and less expensive network can be set up.

- **Military Services:** Army services are one of the most widely discussed, most common applied in enemy territory of mobile ad hoc networks or inhospitable areas in which no fixed infrastructure can be established. Through this context, the communication process shall in no time be carried out by MANET. The soldiers here are called hand-held nodes. The network will also be connected to the free movement of military personnel. The MANET is providing this assistance. The coordination of military objects and people on the battlefield can be another role in this region.
- **Emergency services:** these arise as a result of natural disasters where all signals are sent..

- **Education:** Digital classes, ad hoc collaboration in meetings or seminars, colleges and campuses.

- **Sensing and Gaming:** The Sensor Network is an unique case of an adhoc network that does not normally consider mobility. However, the key factor is the power of the battery in the sensors. Each sensor comes with a transceiver, a small microcontroller and an energy source. The sensor sends data from other devices to the central transport monitor. Sensor conditions for sensors such as temperature, sound, humidity, etc. It developing an adhoc network to collect information in this situation. The characteristics of storms can be found in the sensor network or in the actions of hospital patients checked.

## III. ADVANTAGES & CHARACTERISTICS OF MANET'S

Following are the advantages of Manet[5]

- 1) A free modem connection to the Internet without a wireless router is a key advantage of the use of an ad hoc mobile network. It makes it more possible to run an ad hoc network than a traditional one.

- 2) Fault MANET Tolerance recognizes connection failures as routing and transmission protocols are built to manage these circumstances.
- 3) The ad hoc mobile network contains a range of mobile and stand-alone devices, such as laptops, smartphones, computers, tablets, computers and PDA devices.
- 4) Mobile nodes can be adaptively self-organized in arbitrary, temporary network topology.

#### IV.LITERATURE SURVEY

**Tiwari et al.,(2017)** Focused on the AODV routing protocol, which is one of the widely used routing protocols in MANET. Energy consumption is a critical point in the Ad-hoc network, which is spiced up by today's attention. AODV routing protocol is not considered be energy of the nodes during the route discovery phase. If there is less node energy between the path, it leads the packet to drop. It contributes to the issue of link-failure. After that, restart the RREQ message from the source node again. That is why it creates more energy use. To address this issue, suggest a new approach depend on the existing AODV routing protocol without route disconnection after link failure. This scheme does not cause a connection failure problem and prevents the rebroadcast message from the source node yet. This results in a significant enhancement in node energy. The simulation result shows that the suggested approach will improve network energy. The findings of the contrast between the suggested AODV and the current AODV routing protocols are seen in terms of various QoS parameters, such as throughput, energy expended, end-to - end latency and packet delivery ratio. This simulation work is evaluated as an operating system using the NS-2 simulation tool (NS-2.35) under Ubuntu 14.04 LTS [6].

**Malnar et al.,(2018)** Random Waypoint (RW) and Gauss-Markov (GM) mobility models are analyzed in a comparative manner in the Ad Hoc On Demand

DistanceVector (AODV) protocol of Network-Simulator 3 (NS-3). Contrast of latency simulation efficiency, packet loss rate, overhead routing, mean end to end delay and jitter. In models, different node speeds and traffic charges are used. A new software patch for NS-3 simulators is established and used in this paper to acquire these network parameters[7].

**Rozy, et al.,(2019)** A PF-based FDPF algorithm depend on the HMM switching mode has been suggested. This algorithm has been used to enhance ROV navigation, which involves malfunction and fault diagnosis in navigation sensors and engines. The idea was tested in a complete ROV sea test for which a comprehensive summary of the development process and the test result was given. Experimental findings indicate the generally great result of the failure analysis and that a reliable and efficient ROV state estimate has been made in various combinations of failure modes, signal artifacts and disturbances by the introduced algorithm [8].

**Ismail et al.,(2019)** Performance development calculation of three MANET routing protocol types has been implemented where the node density or set of nodes differs. The protocols covered were the Time-Ordered Routing Algorithm (TORA) and the Dynamic Source Routing (DSR), Ad Hoc On-Default Distance Vector (AODV). The experimental and actual studies were carried out with the help of the Integrated Network Engineering Software (OPNET). The performance calculations were evaluated using OPNET Modeler: packet delivery ratio, end-to - end latency, packet drop, load routing, and end-to - end transmission [9].

**Diab et al.,(2019)** ) Proposed a robust BP-AODV MANET routing protocol to address SAODV security violations with the original AODV protocol. The BPAODV is also able to protect itself against a joint black hole attack initiated during the routing process and guarding against a black hole attack during the

transmission. The BP-AODV is generated by the design of the AODV protocol along with the use of chaotic map functions. The experimental results indicate that the BP-AODV protocol is more reliable than the SAODV protocol and can effectively counter the black hole attack triggered by a malicious node or collaborative malicious node during the routing process. The results also show that the BP-AODV can strongly protect against the black hole attack that happens during the forwarding procedure[10].

**Hazzaa et al.,(2019)** The wireless networks are the most important network in these days. These networks have a number of roles and functions. For example, mobile ad-hoc networks ( MANETs) are a set of mobile nodes linked to radio connections. The MANET network architecture is not developed and unified management is not feasible. Adhoc multi-voice traffic node network has been modeled and various results have been acquired to improve the impact of node density on QoS. These simulation are conducted and tested in each scenario to calculate the delay. All of these examples show the QoS parameters [11].

**Roy et al.,(2018)** Our proposed Relative Density Aware Routing (REDEAR) process assumes that only selected nodes serve as packet forwarders depend on relative node density in relation to neighbors. To attain energy efficiency the amount of Redundant Route Request (RREQ) posts is slowly reduced. In order to further improve energy efficiency, also considering a variant of the suggested MANET higher node density algorithm. The proposed algorithm works efficiently for low to extremely high-speed MANETs. Comprehensive simulation studies confirm the energy efficiency of the solution [12].

**Kumekawa et al.,(2017)** In this paper , suggested a QLAODV routing protocol that uses a distributed Q-Learning algorithm to infer network status information and transfer to a more reliable and efficient bandwidth

route before connection failure. QLAODV can lower the quantity of path errors and path discoveries effectively. QLAODV also improves the transmission ratio of packets when making the usage of bandwidth between nodes. By simulation, show that QLAODV has major performance benefits [13].

**Zhang et al.,(2017)** Based on this definition, present a set of formulas for the programming of node-interference, link-interference and path-interference, and then introduce an Interference-aware routing protocol selecting paths with a minimum average link-interference between the source and the source and Destination. Paths identified in our protocol tend to avoid areas with Large interference, reducing the number of collisions, and Retransmission of packets, resulting in higher network performance and a better life. here implementing our average connection Interference-aware routing protocol (ALIR) for dynamic source routing (DSR). The results of the simulation show that our protocol is capable of achieving higher efficiency than the DSR[14].

## V.CONCLUSION

Mobile ad hoc network is an advanced approach where nodes / stations are linked to each other via wireless connections. There is no limit on nodes to join or exit the network, so nodes can join or leave freely. Mobile ad hoc network topology is complex that can shift rapidly because nodes move freely and can organize themselves at random. This property of the nodes makes ad hoc mobile networks unstable from the point of view of scalability and topology. This paper highlights the introduction and literature survey of MANETs (Mobile Ad Hoc Networks).

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