International Journal of Precious Engineering Research and Applications (IJPERA)
www.ijpera.com ISSN: 2456-2734,
Volume 7, Issue 2 (Jul. – Aug.) 2022), PP 31-34

A Survey Of Routing Algorithms For Manet Without A Traffic Loads

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ABSTRACT : *Mobile ad hoc networks (MANETs) have achieved extensive usage in the commercial, military, and private sectors due to rapid advancements in wireless communication technology. Networks of mobile hosts linked by wireless connections without a base station are known as MANETs. When making such networks operational, the major concern is how to efficiently choose routing pathways, given the dynamic nature of the system and the limited knowledge of the network topology. In recent years, designing efficient routing protocols for efficient MANET operations has been a major focus. Unexpected traffic increases in a particular routing route can occur during the functioning of MANETs, resulting in local traffic congestion. When there is excessive traffic, a load balancing approach may help ease the situation. Load balancing in MANETs ensures that network resources are evenly distributed throughout the network's various nodes to alleviate excessive traffic loads.*

I. INTRODUCTION

A mobile ad-hoc network (MANET) is a collection of wireless mobile nodes that actively construct a network without the assistance of a central management system. Due to limited bandwidth, battery limits, routing costs, an asymmetric connection, speed, scalability, packet loss, and quality of services, routing in a mobile ad hoc network is very challenging. Existing routing systems are intended to meet the demands of self-organizing networks. The selected protocol should cover all network states, and protocol overhead traffic should never be permitted to consume too much network resource. Routing is finding a route from a source node to a destination node that is efficient, reliable, and secure inside a network. The dynamic architecture of the MANET makes routing difficult since mobile nodes may move in any direction. MANET nodes must determine their network's topology because the ad hoc network's topology is dynamic rather than static. New mobile nodes must declare their arrival and presence whenever they join an ad-hoc network; they must be aware of other mobile nodes' announcement broadcasts.

Mobile ad-hoc networks are more popular than wired networks because of their ease of deployment and configuration. Instant network setup is the primary benefit of MANET, and MANET can be particularly useful when there is no or few access to a telecommunications network. This can be achieved by using mobile nodes to set up an initial resource-sharing network. A MANET is a wireless communication system that relies on self-configuring mobile nodes to connect through radio in an environment with little network infrastructure. Each node acts as a router in a MANET by forwarding data to other nodes. Existing routing algorithms for mobile ad hoc networks are discussed, along with their functioning mechanisms, benefits, and drawbacks.

II. LITERATURE STUDY

The routing issue in Manet was examined, and several methods for improving Manet's QoS were laid forth. However, newer IoT devices had been examined to facilitate routing assistance. Real-time secure route analysis (RSRA) was proposed in this research to secure routing in Manet. The trustworthiness of the IoT devices was determined by the amount of support they had given to the network in the past [1]. Manet's QoS was an important thing to notice when selecting a single route based on the data forwarding support (DFS) metric.

Mobile Ad Hoc Networks (MANETs) and Social Networks, particularly the social features, were used to make routing algorithms run faster in Opportunistic Mobile Social Networks (OMSN). Users in OMSNs communicate with each other to share and distribute data to achieve the needs of a wide range of applications [2]. Comparative analysis of routing methods in OMSNs was the focus of this article. Finally, they discuss some of the difficulties in designing routing in OMSNs and suggest some potential future research avenues to pursue.

Several intermediate nodes in MANET must be traversed before data reaches its final destination. Genetic Algorithm with Hill Climbing (GAHC) would be a hybrid GA-Hill Climbing algorithm that selects the best path in multipath [3]. An improved fuzzy C-means algorithm based on density peaks and anticipated cluster heads (CHs) was first developed and implemented. The selective packet dropping attack was used to test the effectiveness of the described strategy.

Multiple portable consumer electronics could be used in MANET, a self-configuring and dynamic wireless network. A scalable network, multi-protocol label switching (MPLS) was employed in the MANET. Particle swarm optimization (PSO) and fuzzy logic controller-based routing (FLCR) will be used in this study to optimize routing over MPLS-based MANET [4]. It was evaluated in terms of live nodes, dead nodes, energy consumption, throughput, and bandwidth of the FLCR-MPLS-MANET approach.

All MANET security experts were focused on locating and isolating the malware node that was causing the assault to restore a safe routing environment. Multidimensional multi-attribute system (MDMA) was a more sophisticated technique that encompasses both direct and indirect trust mechanisms and the use of risk measurements based on a credibility factor [5]. MDMA would be a versatile generic solution since the qualities considered while calculating trust could be changed according to changes in the application environment. The outcomes were better, and they could adjust to changing conditions.

Although the MANET architecture provides trust and security, there was no central monitoring procedure for routing in MANETs in terms of trust and security. For the trust-aware routing protocol, this paper introduces the atom whale optimization algorithm (AWOA), which was the trust-based secure routing protocol [6]. It was used to determine the best possible path based on trust variables such as the average encounter rate (AER), the successful cooperation frequency (SCF), the integrity factor, and the forwarding rate. The AWOA would combine the atom search optimization (ASO) and the whale optimization algorithm (WOA) that inherits the quicker global convergence.

MANET's lack of permanent access points enables it to be deployed in the most remote locations. Each node in the network includes routing capabilities to communicate with other nodes. In the case of a connection loss, the most reliable path was selected by Dynamic source routing (DSR), and a backup path was stored to speed up route finding [7]. A modified DSR that uses hop count and connection stability to determine the route was presented. DSR operates better when the number of nodes exceeds a specific threshold, whereas modified-DSR performs better when the network was low to moderate.

Mobile Ad-hoc Networks (MANETs) often use the Multipath Routing (MR) technology to overcome the constraints of single-path routing. In this study, the primary focus would be on the direct and indirect trust of nodes and pathways, with the secure multipath chosen and the victim nodes being detected and separated based on these trust values [8]. A secret key-centered hybrid honey encryption (SH2E) technique had been used to safeguard the data packets (DPs) against data transmission (DT) assaults later on in the process. Levy Flight-centered Shuffled Shepherd Optimization Algorithm (LF-SSO) then discovers the best route from multipath. As well as considering energy-efficient and secure routing, this study considers route maintenance.

Many academics have focused on the routing issue in Mobile Ad hoc Networks (MANETs) because of the necessity of routing protocols in dynamic multi-hop networks. A novel routing technique for MANETs based on the Cuckoo optimization algorithm (COA) was proposed in this study [9]. This algorithm aims to discover more reliable routes. Based on the development of the Markov chain model, researchers could show that the cuckoo search convergence was consistent with global convergence in a random search method. Experiments demonstrate that the suggested technique outperforms the widely used AODV algorithm.

Wireless networks in real-time systems were self-organizing in nature, and therefore, the security of data transmission was a major concern. Consequently, a Novel Energy Efficient Trust Aware Routing (NETAR) for the traditional AODV protocol was proposed to improve the three levels of trust between nodes in MANET using neighbor-node trust rate estimation [10].Bandwidth calculation, energy, and malicious behavior forecast with certain performance measurements to improve the Network Link Life Time (NLT) like Packet Delivery Ratio (PDR), end-to-end delay, random error, and throughput. The suggested NETAR protocol outperforms the current protocols according to the simulation findings.

In MANETs, the mobility of nodes causes several problems, including path preservation, battery life, safety, dependability, and unexpected connection characteristics. This study assessed the multipath routing protocol in terms of Quality of Service (QoS) [11]. The Ad hoc On-demand Multipath Distance Vector (AOMDV) had updated its ways to transmit data better. Heuristic algorithms were used to find the best possible path in a multi-constrained network. An AOMDV-QoS system met the quality of Service criteria in MANETs with reduced latency and increased dependability.

Mobile Ad Hoc Networks (MANETs) rely heavily on routing technologies to provide QoS and enhance network performance. Machine learning techniques (MLT) were used in this study to choose optimum routing parameters and protocols based on the regression of parameters in a particular network situation [12]. An algorithm's accuracy in regression circumstances was measured using the root mean squared error (RMSE) and mean absolute error (MAE). Routing protocols could be modified depending on their performance.

MLT approaches could be used to forecast QoS parameters to determine the best variation that achieves a considerable increase in performance.

Underwater networks were supposed to provide high QoS in transmission efficiency and network longevity. This article provides an optimal and energy-efficient framework for cluster communication based on a routing protocol (OEEFCP) for Underwater Wireless Communication Networks (UWCNs) [13]. The NS2 simulator compared the proposed OEEFCP to other existing protocols, such as OC-TARE-TOPSIS and TARE-TOPSIS. OEEFCP was capable of delivering a longer network lifetime, throughput, energy-saving, and a maximized PDR, according to the research.

As part of a High-Fidelity MANET simulator with cognitive nodes for specialized applications, this study examines the features of a MANET with dynamic spectrum management (DSM). It discusses the design and construction of a novel traffic engine [14]. The user's profile had statistical qualities that describe the duration and unpredictability of traffic production, and these statistical properties were used to estimate how the service is used. The model was created in the Matlab environment and then tested in the MAENA simulator for sophisticated, operational situations. According to the findings of this study, MANET networks with complicated traffic performed better when both central and distributed DSM were being used.

Mobility and battery life were the two main concerns of MANETs. Advances in MANET energy efficiency and network life expectancy were critical. To extend the life of a network, clustering was among the most often used approaches [15]. Using a hybrid Particle Swarm Optimization-Genetic Algorithm (PSO-GA) for clustering head (CH) selection, the MANET network's energy efficiency and longevity were improved. The NS-2 platform was used for the analysis of the suggested technique. The Hybrid PSO-GA strategy was more efficient than the other approaches tested.

In the large-scale Mobile Ad Hoc Network (MANET), clustering was the most used routing strategy. This research offers a unique method for MANET clustering based on the traffic produced in each cluster using Modified Elephant Herding Optimization [16]. This Traffic-Aware Clustering with Modified Elephants Herding Optimization (TAC-MEHO) creates robust, empirically verified communication clusters using well-known clustering algorithms. It was possible to monitor metrics such as the number of cluster-heads (CHs), the network's longevity, and the pace at which it reclusters using a variety of parameters such as the network's size and transmission distance.

III. CONCLUSION

Mobile ad hoc networks have gained a lot of attention due to recent developments in wireless technology and the availability of mobile computing devices. The major problem for these networks is establishing routing pathways that can accommodate a wide range of needs. Mobile ad hoc networks are a kind of decentralized network in which mobile nodes may relocate at any time without losing their connection. A variety of active and passive attacks are possible, and each one has the potential to have a detrimental influence on network performance. Several techniques for separating harmful nodes are explored in terms of particular parameters in this paper, including the number of separated nodes. From the scenario, it's clear that MANETs will continue to operate similarly, with no significant modifications to their path. When it comes to communicating, wireless is their go-to tool; there is no substitution or alternative for it. This pattern is expected to continue unless and until new improvements are introduced into the marketplace. A system's security is a unique challenge. Assaults that are new and inventive are constantly being developed. Because of this, MANET's security must be improved continuously. The location and recovery of disruptions are critical concerns for system security experts. Even while most interruption placement frameworks and systems seem appealing and compelling on paper, they are not always successful when enacted. Adaptive ad hoc routing algorithms will benefit from our approach in the future. The metaheuristic technique, in particular, can be expanded to enable data services that are sensitive to delays. Another fascinating area for study in highly mobile ad hoc networks is adaptive online algorithms.

ADVANTAGES

a) Using reactive routing algorithms decreases the amount of traffic that must be sent. The reactive routing method creates a delay when the initial packet is transmitted to a host because the route is not immediately accessible.

b) Additionally, MANETS are more scalable and less expensive to administer than fixed-topology networks.

c) Proactive and reactive routing methods both have their drawbacks. There is no route setup delay for short-distance connections, and routing overhead is reduced due to reactive routing for destinations that are more than a few hundred miles distant.

DISADVANTAGES

a) The reactive routing method creates a delay when the initial packet is transmitted to a host because the route is not immediately accessible.

b) The primary drawbacks of these algorithms include a long time to locate a path, and network blockage may be caused by excessive inundation. AODV and Dynamic Source Routing are the primary pillars they may depend on.

c) Testing techniques cannot guarantee a faultless solution, no matter how rigorously they are applied.

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