Abstract—Mobile Ad Hoc Network (MANET) is a temporary network that can be dynamically formed to exchange information by wireless hosts which may be mobile. The system can implement security based Mobile Ad Hoc network by routing the packets in a more secured way. Security challenges of MANET are also a very important area which should be taken into consideration. Mobile Ad Hoc networks are easy to tap, have limited capacity, and are dynamic in nature and prone to attacks from the third party. These issues also have to be resolved. With increasing number of applications to harness the advantages of Ad Hoc Networks, more concerns arise for security issues in MANETs. Mobile ad-hoc network (MANETs) has many challenges due to its dynamic nature. One such challenge is susceptibility to attacks. Mobile Ad-hoc Network (MANET), a flexible and rapidly deployable communication network is widely being used. The route discovery and the successive route maintenance is performed by the routing algorithm. In order to determine an efficient, robust and scalable routing in MANET, there is a need to develop a routing algorithm that is fully aware of the current network topology and available resources. This paper explains related research works and observations derived from it.

Keywords—MANET, Network Routing Protocols, Energy Efficiency, Location Tracking, Efficient Communication, DMR, MTMR, ABC Techniques, TBMR, DSRA, ARA.

I. INTRODUCTION

The rapid evolution in the field of mobile computing has derived a new alternative way for mobile communication, in which mobile devices form a self-creating, self-organising and self-administering wireless network, called a Mobile Ad Hoc network. Mobile Ad-hoc NETWORK (MANET) is extensively used in crisis management services such as military operations and disaster rescue programs, and also in satellite communication and Personal Area Networks. The performance characteristics of MANET such as security and reliability, Quality of Service (QoS), inter-networking, power consumption and multicasting have attracted more attention. Since MANET consists of mobile nodes, the mobility characteristics and the residual power of the nodes that form a communication link have significant impact on the link characteristics.

Mobile Ad hoc network consists of a set of mobile nodes. This network does not have any infrastructure or central administration, hence it is called infrastructure less network. As the nodes are mobile, it is very difficult to find the path between two end points. Routing is a mechanism that takes the data from source to destination nodes in a network through a loop-free path with minimum computational time, memory overhead using an optimal routing strategy. Routing is a process of finding an efficient, reliable and secure path from a source node to a destination node via intermediate nodes in a network. Routing in MANET is a challenge due to dynamic topology in network as mobile nodes can move in any direction in the MANET. Energy efficiency is a way of managing and restraining the growth in energy consumption. It is more energy efficient if it delivers more services for the same energy input or the same services for less energy input. The routing algorithms used in MANET should be energy efficient. Energy efficiency has proved to be a cost-effective strategy for building economies without necessarily increasing energy consumption.

Routing algorithms in MANET are categorized as follows:

- Proactive routing algorithm: It maintains routes to destination even if they are not required. Proactive routing algorithms maintain up-to-date routing information on every node in the network periodically.
- In Reactive routing algorithm: The routing tables are not updated up-to-date. Instead, a node tries to find a route only when it wants to send a packet.

Hybrid routing algorithm: This combines the advantages of both reactive and proactive routing algorithms. Initially proactive approach is used to have route information then reactively demand of the route is served to the node that is in need.

Dynamic routing is used when some links in a network have new weights; dynamic routing algorithms are more efficient than static routing algorithms.
This is because the dynamic routing algorithms reduce redundancy by re-computing only the affected sections of the network with the changed links. In dynamic routing algorithms, more computation time is required for one node than the static routing algorithms; however, the dynamic algorithms can reduce the computation time as they decrease the number of nodes that must be computed. The dynamic algorithms require less computation time for the shortest paths than that required by the static routing algorithms.

In the following chapters all the related research works are presented.

II. RELATED RESEARCH WORK

Santhi G et.al, An Energy Efficient Cluster Based Routing and Localization in MANET for Emergency Scenario, 2015 [1]. In this paper they have used the localization technique in which the location of the data can be obtained in Wireless Sensors Networks. A localization method with few anchor nodes in the sensor network that knows its position and assists the un known nodes in identifying their positions. It also specifies that the Clustering of the sensor nodes helps in localization of the sensor nodes and it is proven to be one of the best methods to reduce the energy consumption in the wireless sensor network since it reduces the time delay, the transmission distance and time. The proposed work is compared with AODV routing algorithm and found to be efficient than it. An Energy Efficient Cluster Based Routing Protocol is used for routing and localizing unknown nodes in a wireless sensor network. The routing in the proposed work is done quickly, because routing is depended on the address of cluster heads. In failure of any node in the route, its Cluster Head (CH) may use another node to forward packets in the network. This causes the error tolerance to be enhanced. The performance of proposed system has been evaluated through extensive simulation with network topologies of various sizes. The proposed approach is scalable in that it has linear complexity in the number of neighbours and constant complexity in the total number of nodes.

Bodhy Krishna S et.al, An Overview of the Existing Routing Protocols and Trust Based Algorithms in Mobile Ad-hoc Networks, 2015 [2]. The important routing protocols designed for MANET among which DSR (Dynamic Source Routing) is considered in detail. In this paper it proposes a trust-based framework for improving the security and robustness of ad-hoc network routing protocols.

The popular and widely used Dynamic Source Routing (DSR) protocol as a representative candidate for constructing our trust framework. The goal is to find shortest paths using DSR and then select paths with increased level of security and reliability to transmit the information. In this paper three routing algorithms are presented namely disjoint multipath routing (DMR), trust based multipath routing (TMR), and message trust based multipath routing (MTMR). All the three routing protocols have their own way in order to establish the trust and transmit packet securely. In this paper an exhaustive survey about the Mobile Ad Hoc Network (MANET) and it protocols is done. In this paper, they made it clear that not one routing protocol can adapt to all environments. Whether it is Table-Driven, On-Demand or Hybrid routing protocols, they all are limited by the network characteristics. So, the choice of routing protocol should be done carefully according to the requirements of the specific application.

LinZhigui et.al, An Energy-efficient Mobile Routing Algorithm in Wireless Sensor Networks, 2015[3]. It proposes an energy efficient mobile routing algorithm in order to extend the lifetime of wireless sensor network and also to avoid network premature invalidation caused by local emergency. The energy efficient mobile routing algorithm mainly comprises network clustering, mobile sink moving and mobile relay moving. Each sensor node, before information transmission, needs to judge whether the mobile relay arrives. If it arrives, the transmitted information is forwarded to the mobile relay for further transmission; otherwise the node transmits the data by itself. This approach overcomes the disadvantages of high energy consumption and energy consumption imbalance in routing protocols with mobile sink of wireless sensor network.

Prof. S. D. Chavan et.al, An Efficient Routing Algorithm for Lifetime Enhancement in Wireless Sensor Network using Artificial Bee Colony Algorithm,2015[4]. The main objective of this paper is to provide technological solutions for managing disaster using wireless sensor networks (WSN) via disaster detection and alert for the immediate rescue operation for significant improvement of disaster management. Artificial Bee Colony (ABC) Algorithm is used for maintaining connectivity even in disaster conditions. An Artificial Bee Colony algorithm combined with the network simulator NS-2 is proposed for managing a disaster. Artificial Bee Colony (ABC) is a probabilistic technique for solving computational problems which can be reduced to finding good paths through graphs.
Artificial Bee Colony is used because they are more strong, consistent, and scalable than other conventional routing algorithms. A NS2 based simulation study has been done to investigate the performance of proposed method by using Dynamic State Routing protocol. In wireless sensor networks where nodes operate on limited battery energy efficient utilization of the energy is very important. Network lifetime is highly related to the route selection is one of the main distinctiveness of these networks. It proposed an Artificial Bee Colony algorithm with some modifications. After implementation of this approach the results of various parameters based on the performance of wireless sensor network are stringently enhanced.

Sunghyuck Hong. Hybrid Routing Algorithm on Mesh Network based on Traffic Records, 2015[5]. This research paper proposed for determining shortest paths for hops, which are in the middle of the source and destination. The shortest path means the fastest path between the source and destination. The fastest paths between the source and the destination which is based on using the record of the network traffic history. The network traffic information can be predicted by the history of network traffic information by using mathematical prediction methods such as the linear least squares fitting technique if there is a linear relationship between two factors: time and network traffic information in a local area network without using too much routing information protocol every 60 seconds. It will be helpful to improve the network traffic and contribute efficient packet transferring on network. It also focuses on reducing unnecessary information and improvement of network traffic by using the linear least squares fitting technique, which is required to the linear relationship between factors. There are many algorithms to find the shortest path but they always pick the same path if their algorithms are correct. The only difference between the existing routing algorithms and the proposed algorithm is the efficiency.

D. Jinil Persis and T. Paul Robert, Ant Based Multi-objective Routing Optimization in Mobile AD-HOC Network, 2015[6]. AODV protocol converges to shorter routes and gives high bandwidth utilization with low data drop in the simulation study. The additional information such as reliability of the link and energy of the nodes are required for effective and reliable routing. By using this it minimize the frequent route maintenance and thereby effectively minimize the overhead. It proposes a multi-objective version of the existing Adhoc on Demand Vector (AODV) protocol to incorporate the multiple routing criteria in the routing process.

An Ant system that uses a positive feedback from the previous iteration for the computations in the current iteration has been developed. The ant’s behaviour is encompassed in the routing protocol for MANET. The routing approach considered the QoS, power and energy constraints yields better output with minimum delay and maximum throughput and Packet Delivery Ratio. The multi objective vector enables the proposed routing algorithms to converge to better routes.

Gaurav Kumar Nigam and Chetna Dabas, A Survey on Protocols and Routing Algorithms for Wireless Sensor Networks, 2015 [7]. Wireless Sensor Networks (WSNs) are networks of small and tiny lightweight nodes that are randomly deployed in a large area where it is not possible to monitor continuously. Wireless sensor nodes perform three operations: event sensing, event Processing and communicating with neighbouring nodes. The routing protocols based on the basis of two criteria: layers and architecture. Most of the algorithms illustrated in this paper and it assume that the nodes are static. Some changes may be proposed in case of non-static nodes and some algorithms are designed.

Banwari et.al, Routing Algorithms for MANET: A Comparative Study, 2013 [8]. It presents a comparative study of existing routing algorithms for MANET. It also makes an list of advantages and disadvantages of existing routing algorithms in mobile ad-hoc network. In this paper the routing protocols like (Destination Sequenced Distance Vector (DSDV), On-Link State Routing (OLSR), Adoc on-Demand Vector (AODV), Dynamic State Routing (DSR), Local Aided Routing (LAR), Zone Routing Protocol (ZRP) are analysed. It also compares these routing algorithms on the basis of dynamics in number of nodes, pause time, end-to-end delay, and throughput.

Taehwan Cho and Sangbang Choi, A Multi-path Hybrid Routing Algorithm in Network Routing, 2012 [9]. A multi-path hybrid routing algorithm is presented that uses multi-path information to create the shortest path tree when some links have new weights. Comparisons are made with other routing algorithms, such as Dijkstra, Dynamic Dijkstra, and Hybrid Shortest Path Tree (HSPT), and it also demonstrated that the multi-path hybrid routing algorithm provides better performance as the execution time decreases. The Multi-Path Hybrid Shortest Path Tree (MP-HSPT) algorithm has been proposed and it offers an efficient shortest path decision that can be used to reduce the total execution time using the multi-path information. The decreased total execution time also leads to reductions in packet losses.
Sharvani G S et.al, Adaptive Routing Algorithm for MANET: TERMITE, 2009 [10]. This paper deals with the development of on-demand ad-hoc network routing which can achieve load balancing for packet switched network. The algorithm is adaptive, distributed and is inspired by swarm intelligence. According to this algorithm, a group of mobile agents builds path between pairs of nodes by exchanging information and updating routing tables. Termite routing algorithm was studied, it is a novel adaptive routing algorithm technique for data networks based on mobile agents. Nodes in a mobile ad hoc network involve high degree of mobility; therefore the network topology may change frequently. If the topology changes and the optimal path may change, then the packets take alternate paths discovered by route discovery phase.

From the above references the conclusion drawn is, there is no security provided for the communication system during Disaster using Mobile Ad Hoc Networks.

The routing in MANET was done using Reactive routing algorithm like Ad hoc on-demand Distance Vector (AODV) and Dynamic source routing algorithm (DSR). It is mainly proposed for wireless networks and based on the idea that the source sends a message to the geographic location of the destination instead of using network address.

III. CONCLUSION

The focus of the study from the above related research work is to propose an extension of the existing conventional routing protocols which will be better in terms of security, throughput, efficient utilization of limited resources and quality of service.

In our proposed work, we are planning to use Geographic Routing algorithm for routing in MANET. Geographic routing is a routing principle that relies on geographic position information. It can also be called as location-based routing. Geographic routing provides a comprehensive solution to eliminate situations during emergency crisis, by either automatically routing the caller to the closest location so that it helps to serve the people in need. High scalability is the factor that we consider geographical routing as an important and essential routing method in consideration to ad hoc networks. We propose, the data routing mechanism of the framework which will be able to quickly adapt to the changing topology.

During emergency crisis an emergency communication network is setup based on location of the nodes. We make use of an access point and control station. The access point will send a message to nearest node; it might be either the access point which is closer to the control station or directly to the control station based on the location.

REFERENCES


