Review on Development of Secure and Reliable Multipath Routing Mechanism for MANET using Improved AOMDV Protocol

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ABSTRACT
Mobile ad hoc network is the multi-hop wireless network, MANET does not require any kind of cellular infrastructure, and provides node mobility frequently. Due to the mobility of the nodes made changes frequently in a network topology, and to manage such changes is challenging task in MANET. The advantage of multi-path routing in MANETs is not obvious because the traffic along the multiple paths will interfere with each other. In this paper, the Ad Hoc On Demand Multipath Distance Vector (AOMDV) routing protocol is used for mobile ad hoc networks has been trying to improve the protocol to provide availability of path, and this proposed work suggested three changes in MANET one on a protocol based and two on topology based changes if we made some changes in it may change the definition of Ad-Hoc network and MANET. This is a totally new approach for ad-hoc and MANET, because in ad-hoc network is infrastructure less.

Keywords— AOMDV, Fixed Node System , ad-hoc network and MANET

1.INTRODUCTION
A Mobile Ad Hoc Network (MANET) is a dynamic wireless network that can be formed without the need for any pre-existing infrastructure in which each node dynamic topology of mobile ad hoc networks, But here something change with it , because here trying to make a change in topology. A mobile ad hoc network (MANET) consists of wireless mobile nodes dynamically forming a self-organized System and all nodes work as both hosts and routers. Because of open working environment, there is less security than infrastructure based network. A MANET can exist and work well only if the nodes in the network behave cooperatively. [5] Due to malicious node and failure node transmission path fails many times and because of the unavailability of path routes break down. Because of battery backup problems nodes get's shut down and then changed in topology and this made changes in the backup paths. If there is no any node present in the transmitter's node range then data transmission get fails.

AOMDV is the ad-Hoc on demand multipath distance vector routing protocol, it is the Extension of AODV protocol. AOMDV is the reactive routing protocol which provides multiple paths in the network. In the route discovery process find multiple routes between Source and destination. It is using alternate routes on a router failure. When all routes fail then new route discovery needed. In the AOMDV fewer number of route discoveries required. AOMDV is a popular studied protocol. It achieves promising performance under various conditions.

Many studies have proposed improved protocols based on AOMDV focusing on different aspects in order to achieve better performance metrics in one or more fields Compared to many other improving protocols based on AOMDV. [1] Zhenyu Chen, Lin Guan, its proposed Backup Route Update Mechanism for AOMDV in Ad-hoc Networks (AOMDV-BU) in 2012 focusing on the packet loss ratio and average delay. [2] Bhushan Manjre and Veena Gulhane , proposed Secure and Reliable AOMDV protocol , focusing on the identification and removal of misbehaving nodes. [3] N. T. Javan, B. Hakhamaneshi, etc. proposed Zone-Disjoint Ad hoc On demand Distance Vector (ZD-AOMDV) in 2009 focusing on developing a method to reduce the interference. [6] Mohamed Tekaya , Nabil Tabbane, etc. proposed Delay Remaining Energy for AOMDV routing protocol in Ad-hoc Networks (DRE-AOMDV) in 2011 focusing on solution to find the maximal nodal remaining energy of each route in the process of selecting path with respect of the end-to-end constraint. They concentrate especially on route failures due to lack of energy. [4] Mazda Salmanian, etc. proposed Enabling Secure and Reliable Policy for AOMDV in Ad-hoc Networks in 2013 focusing on collection of metrics in a TRT as well as mapping other unique routes to destinations of interest. And select a route having the best Trust and Reliability parameters. [7] Fubao Yang, Baolin Sun proposed Path Selection Entropy in Ad-hoc Networks (AODVM-PSE) in 2011 focusing on assigning the construction of multiple paths for AOMDV in Ad-hoc Networks (AOMDV-BU) in 2011 focusing on the identification and removal of misbehaving nodes.

In a literature review, it is found that there are lots of algorithms are developed but unable solve the packet drop and average delay and no one system not to be designed to solve this problem. There is no any guaranteed of data transmission. When all parts fail then the new route discovery is required and this new route discovery consumes the time which increases average waiting time and required more CUP cycles, traffic load increases motivated to build such system and tried to resolve this problem.

The proposed system's objective to improve the performance of MANET and made it secure and reliable because MANET does not require lots of investment than infrastructure based network. Due to this we can get the benefit of the MANET. The proposed algorithm is to maximize the benefit of multipath routing, to attain better performance metrics in both packet loss ratio and average delay, trying to find out misbehaving node.

The remainder of the paper is organized as follows: Section II original AOMDV; section III proposed plan; subsection A. Proposed plan for AOMDV Routing protocol; subsection B

Fixed node System; in section IV. Discussion; and section V. Conclusion and future work

2. ORIGINAL AOMDV

2.1Multipath

This is the multipath algorithm; multiple paths are established between source to destination in a route discovery process. New route discovery is only performed when no one path is available for data transmission. AOMDV is based on the distance vector concept and uses hop-by-hop routing approach to find routes on demand by calling down a route discovery process. [1] Route request (RREQ) propagation from the root towards the destination establishes multiple reverse paths both at intermediate nodes and the destination. Multiple route replies (RREP) traverse these reverse paths back and form multiple forward paths toward the terminus at the origin and intermediate nodes. AOMDV also provides intermediate nodes with the possibility of forming alternate paths as they could be useful in reducing route discovery frequency. AOMDV routing process can be divided into three stages: route discovery, route maintenance, and data packet forwarding.

2.2 Route Discovery

When two nodes want to communicate or any source node needs to send data to other node then the source invoke a route discovery process by generating a signal RREQ. A node may receive several copies of the same RREQ, and all duplicate copies are examined for potential alternate reverse paths, but they are formed only using those copies that preserve loop-freedom and disjointness among the resulting set of paths to the source. When an intermediate node obtains a reverse path via a RREQ copy, it checks are there is at least one valid forward path to the destination? If yes, then a RREP is generated and sent back to the source along the reverse path and this node does not propagate the RREQ further.

When the destination receives RREQ copies, it also forms reverse path(s) but generates a RREP in response to every RREQ copy via the reverse route. When an intermediate node receives a RREP, it attempts to form a forward path to the destination following route update rules including the previously introduced mechanisms of ensuring loop-free and Disjointness of the route; otherwise, the RREP is dropped.

2.3 Route Maintenance

This is the multipath algorithm; multiple paths are established between source to destination in a route discovery process. New route discovery is only performed when no one path is available for data transmission. AOMDV is based on the distance vector concept and uses hop-by-hop routing approach to find routes on demand by calling down a route discovery process. [1] Route request (RREQ) propagation from the root towards the destination establishes multiple reverse paths both at intermediate nodes and the destination. Multiple route replies (RREP) traverse these reverse paths back and form multiple forward paths toward the terminus at the origin and intermediate nodes. AOMDV also provides intermediate nodes with the possibility of forming alternate paths as they could be useful in reducing route discovery frequency. AOMDV routing process can be divided into three stages: route discovery, route maintenance, and data packet forwarding.

2.4 Data Packet Forwarding

For data transmission there are multiple path to transmit message due to availability of number path it uses the first route in the routing table until it fails and then swaps to an alternative route. When all paths get fails then start the new route discovery process

3. PROPOSED PLAN

3.1 Proposed Plan for AOMDV Routing Protocol

By using the idea [1], the basic idea of such improvement is trying to keep at least one valid backup path for any route, thus when the active path breaks down, there is always a backup path waiting. This is achieved by revoking route discovery when the number of paths for that route is less than two, in contrast To the original AOMDV, which only revokes route discovery when there is no path available, By applying this new rule, backup path can be established while the active route is still Working, and this practice without interrupt the working of the active route. In this proposed work if any path fails down then it required new path for data transmission then. It will be used backup path and check is it second last path or not if yes then start new route discovery and simultaneously transfer the data. While using this method we can avoid waiting time and traffic jam problems.

Following are the Steps for Proposed Work

- Start route discovery (sending RREQ signals to all disjoint nodes)
- Route Discovery for Node-Disjoint Path Set.
- Broadcast packets over all paths in route cache.
- Received multiples Route Replies
- Destination checks for missing or delayed packets and the ID of their paths.
- Sends packet back to the source containing the ID of failure paths and attack identifier.
- The source will avoid failure paths and triggers Behaviour Check mechanism over failure paths.
- Every node keeping the backup route in the table.
- During data transmission, if any part fails then required new path then check is this second last backup path? Then simultaneously start the route discovery process, without interrupting active process.
- If the backup route more than three avoids long distance route using simulation scale.

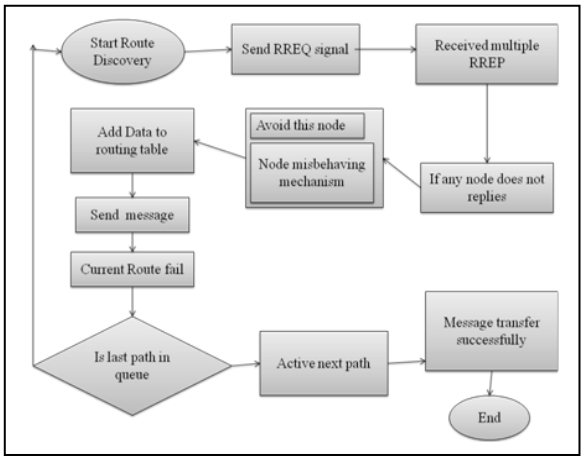


Fig 1 Guaranteed path -AOMDV

3.2 Fixed Node System Module I.

This is a new approach for the MANET to provide some infrastructure concept. Fixed nodes are same as the others node ,which having continues power supply and high range capacity of it.

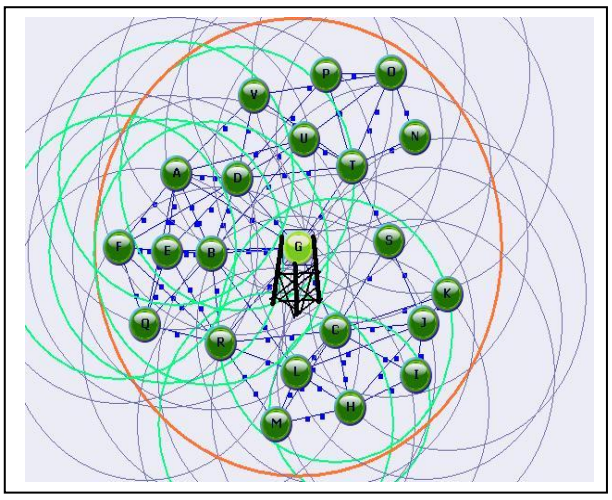


Fig 2 Fixed point node.

This fixed node is used to provide service to other node as retransmission of the signal. This node made available path for data transmission due to this possible to provide 100 percent path back up. This may give guaranteed data transmission.

In figure 2, at point G there may be one or more nodes available as a fixed node with a continued battery backup which having high range and does not give chance to shut down the node that can break the path this infrastructure suggested in this proposed system for MANET and Ad-Hoc wireless network. This infrastructure made Ad-Hoc network More powerful and most preferable system.

1.1 Fixed Node System Module II.

In fig. 3 shows some fixed point which is interconnected to each others. As per organization requirement there may be numbers of mobile nodes present. We can configure this infrastructure (fixed nodes) While configuring this node maintained a proper distance between these fixed points. This fixed system is fully wireless ad-hoc in nature assembled with the firewall which does not work as a malicious node so these systems provide the secure routing.

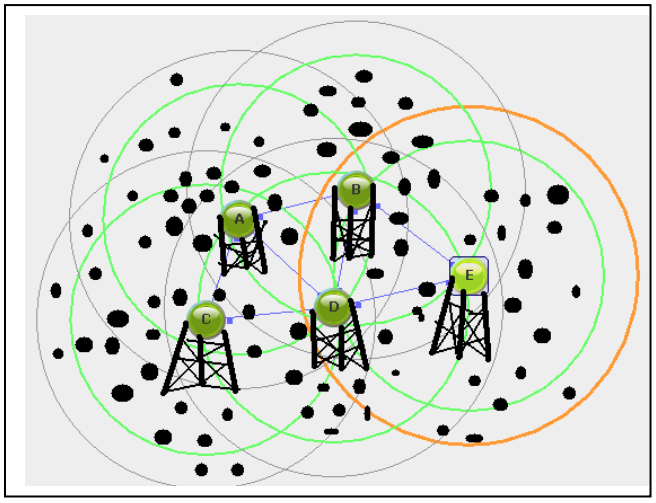
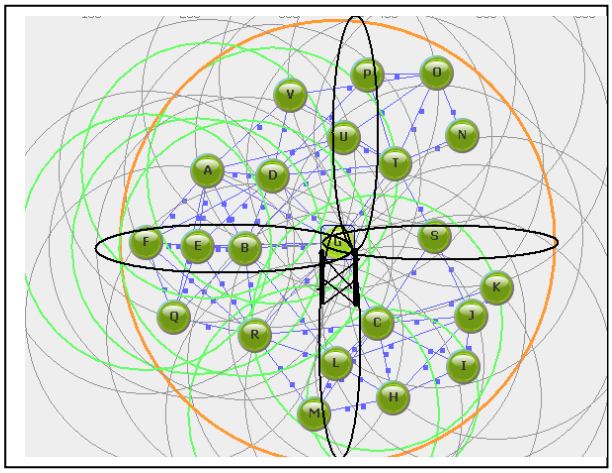


Fig 3 Fixed point Infrastructure

2.1 Fixed Node System Module III.



This is the future work of this System, in this Figure 4 node G is fixed node which is replaced by directional antennas. Using smart antennas we can achieve better performance of MANET. And provide high reliability, this directional antennas' save battery consumption with high speed computation.

4. DISCUSSION

Figure 2, shows the new approach for wireless Ad-hoc network, and suggested that used some fixed point node which will be providing services to that node who haven't found a path for data transmissions. Here tried to provide 100 percent route availability which will be provide guaranteed data transmission.

5. CONCLUSION AND FUTURE WORK

In this proposed work tried to provide a backup path while providing some fixed node system. This system provides maximum possibility of guaranteed data transmissions .In future this fixed node point replaced by using Smart antennas System. And providing solutions on backup path and made the network more reliable and secure.

6. ACKNOWLEDGMENT

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