

A Novel Paradigm: Friendship Etiquette In MANET

Nivedita Shirke
Research Scholar, Sri Satya Sai
Institute of Science & Technology,
Sehore

Gajendra Singh Chandel
Faculty, Sri Satya Sai Institute of
Science & Technology, Sehore

Shubham Joshi
Faculty, Sri Aurobindo Institute of
Technology, Indore

Abstract: The nature of wireless mobile ad hoc network is purely volatile when location of mobile terminals is unpredictable. The next generation of wireless network can be determined by the existing flaws in the networking resources and their applied policies. Although, these determinations can be done on comparative study of various aspects of wired network viz. network infrastructure, resource sharing, power or energy efficiency, ease to handle, routing protocols, routing configuration etc with respect to unpredictable strategies of wireless networks. The dynamic topology of MANETs allows nodes to join together and leave the network at any instance of time. Hence node cooperation is the essential key term for mobile terminals. Once the mobile terminals meet cooperation the reliability factor increased and thus the trust developed among nodes this can result friendship in participating nodes. This paper presents a review of friendship mechanism desired in the MANET scenario for betterment of routing security.

Keywords: reliability index, node cooperation, friendship, mobile.

I. Introduction:

The mobile ad hoc networks have received tremendous attention because of their self configuration and self maintenance capabilities. Although security has long been an active research platform in wireless networks, the unique characteristics of MANETs present a new set of nontrivial challenges to security design. These challenges include open network architecture, shared wireless medium, stringent resource constraints, and highly dynamic network topology. Consequently, the existing security solutions for wired networks do not directly apply to the MANET domain.

Unlike a fixed wireless network, wireless ad hoc networks or on the fly networks are characterized by the lack of infrastructure. Nodes in the mobile ad hoc networks are free to move and organize themselves in an arbitrary fashion. Each user is free to roam about while communicating with others. The path between each pair of the users may have the multiple links, and the radio between them can be heterogeneous. This allows an association of various links to be a part of the same network. Mobile ad hoc networks can operate in a standalone fashion or cloud possibly be connected to a larger network such as the Internet. The rapid advancement in the hierarchy of internet, the routing strategies must be designed so smartly such that the participating node can be frequently switched here and there without any disturbance to the sunning scenario. As the packet travels inside MANET with or without routing strategy which needs to maintain the traveling path, to ensure end to end delivery across nodes. This results in increasing cooperation and distribution of packet load of each node. Thus cooperation Index can be achieved. This may help to procure the overall distinct factor required to be maintained in the

network. Further, this factor may help to deduce the reliability index inside MANET. The reliability can be achieved only when the number of cooperative nodes become in large number. Although the reliability is the measure of successful packet transmission, but along with node cooperation the reliability become fruitful.

The reliability index can be further useful to mitigate node isolation and selfish index. Hence the conjunction of Node Cooperation along with Reliability Index and disjunction of node isolation and selfish index can form friendship etiquette inside MANET. These two factors (node isolation and selfish index) play a terrific role to measure friendship. Until and unless we traverse the nodes we cannot assure the availability of friend nodes. So, selfish nodes and non forwarding nodes need to be avoided.

II. Literature Survey:

The research community implicated many outstanding milestones in the era of friendship mechanism inside MANET. The following citation represents a novel study of friendship etiquette generation of mobile nodes.

CONFIDANT was proposed by S. Buchegger et al. [1]. Here evidence from direct experiences and recommendations is collected. Trust relationships are established between nodes based on collected evidence and trust decisions are made based on these relationships. There are four interdependent modules; (a) monitor, (b) reputation system, (c) path manager and (d) trust manager. Monitor collects evidence by monitoring the transmission of a neighbor after forwarding a packet to the neighbor.

It then reports to the reputation system only if the collected evidence represents a malicious behavior. Reputation system changes the rating for a node if the evidence collected for malicious behavior exceeds the predefined threshold value. Then, path manager makes a decision to delete the malicious node from the path. Trust manager is responsible for forwarding and receiving recommendations to and from trustworthy nodes. But this approach does not talk much about isolating the misbehaving nodes from the network.

Cooperative On-demand Secure Route (COSR) described by F. Wang et al. [2], is a novel secure source route protocol which takes action against malicious and selfish behaviors. COSR measures node reputation (NR) and route reputation (RR) by contribution, Capability of Forwarding (CoF) and RR is used to balance load and to avoid hot point. In the COSR, nodes' reputation depends on the information from Physical layer, Media Access Control (MAC) layer, and Network layer, and it can be computed by nodes' CoF, history action, and recommendation. CoF denotes the capability of forwarding packets of a certain node. As the information of CoF is provided by its owner, malicious node might cheat others by false data. To avoid the emergence of such malicious behavior, COSR takes strategies like:

- a. Discounting where COSR uses nodes' reputation to discount those providing CoF data.
- b. Punishment. Where once COSR finds that any node provided a false CoF, it will punish such node through reducing its reputation level.

M. T. Refaei et al. [3] proposed a Collaborative Reputation (CORE) mechanism that also has a watchdog component for monitoring network components. Here the reputation value is used to make decisions about cooperation or gradual isolation of a node. Reputation gives values are obtained by regarding nodes as requesters and providers, and comparing the expected result to the actually obtained result of a request.

In CORE the reputation value ranges from positive (+) through null (0) to negative (-). The advantage of this method is that having a positive to negative range allows good behavior to be rewarded and bad behavior to be punished. This method gives more importance to the past behavior and hence tolerable to sporadically bad behavior, e.g. battery failure. But the assumption that past behavior to be indicative of the future behavior may make the nodes to build up credit and then start behaving selfishly.

Reputation of any mobile node reflects its utility inside the MANET for performing various tasks. The reputation is the term by which we can understand the efficacy of any participating node. It's a very vital in the infrastructure less wireless network that their participating nodes perform whatever must match with their objective and perspective. When one node would like to transfer their data and operands to other nodes with means of acknowledgement based scheme than using nodes' feedback system we can analyze one's reputation index, to find suitable among available nodes for further and hence we can establish trust between nodes or networks. The occurrence of reliability and trust coefficient can be applied in combined approach to accommodate the usefulness of reputation model.

Reputation is one nodes' opinion about another node. This reputation system can be used to make decisions about which nodes to include and which nodes to exclude from the network. R. Sameh et al. [4] in her paper described a reputation model based on Eigen vector based degree centrality. Here each node collects information about its neighbor by direct monitoring as well as from other neighbors. Trust is built based on these centralities. Nodes with higher centrality have higher probability of getting in contact with other nodes. Second hand information is collected only from those neighbors with high centrality not from all the neighbors. They claim that their approach can be used in a highly dynamic environment and in a sparse network also.

Mobile Ad hoc Networks (MANETs) are extensively used in military and civilian applications. Thus the formation of friendship etiquette in the hostile environment is solely required. The technicalities of friend mechanism comprises of participating nodes to follow reliability, cooperation and trust across all administrative and functional domains to achieve state of the art packet delivery services with efficiently application of routing strategies inside MANET.

III. Related Work:

Mobile wireless networks are receiving an increasing interest due to the possibility of ubiquitous communications they offer. In particular, mobile ad hoc networks (MANETs) enable users to maintain connectivity to the fixed network or exchange information when no infrastructure, such as a base station or an access point, is available. As mobility plays a crucial role in a MANET, relative node movements can break links and thus change the topology. The underlying topology

control algorithm and routing protocol will take a while to adapt. During this period, packets can be lost and the survivability of network will degrade.

The obligation of these indexes played a vital role in terms of calculating various factors that can affect overall design of friendship mechanisms in MANET scenario. The root cause of Packet drop, attacks, vulnerability, misbehavior, and misconduct can be measured by applying these indexes. Selfishness Index is the key index to mention all this attackers. Basically attacker gets promotion of their malfunctions and misconducts from these selfish nodes. However the node isolation may also endeavor the further causes of attacks. Due to this the mobile terminal can be tampered with and reliability tends to decrease.

Further, the path stability is an issue which needs to be in considerations. The stable path for traversing nodes and data forwarding is also essential to ensure the travelled route to identify the packet log when required. A stable route in Ad Hoc networks is a route which does not fail for an acceptable period of data transfer. In the same way, intermediate nodes of the route must have acceptable stability. An intermediate node is stable when it does not break the route by its movement.

P. Mitra et al [5] described that, finding of stable routes has always been a challenging issue in wireless mobile networks. Those routes are selected, which have been available for a creation period of time and have Hop Count amount at least. In the other words, it predicts routes sustainability for a certain period and finds the shortest sustainable route. Z. Cheng et al [6] proposed a Reactive routing method which finds routes with longer lifetimes through estimating routes failure period. It used the best of them as substitute route and uses the next route as the main route. For Reliable Source Routing, I. Jawhar et al [7] described, route demand is just sent the nodes that have more reliability than the predefined threshold. V. Rishiwal et al [8] schematized that a route can be chosen which its nodes enjoy from enough energy and sustainability; such selection is based on two Stability and Energy Efficiency Criterion.

IV. Conclusion:

In this paper, we survey on various aspects for being a friendship mechanism in Mobile ad hoc networks. By the through study on this, we analyzed that, formation of a friend mechanism can be done with the help of conjunction of reliability index, node cooperation index, trust factor, reputation index with the disjunction of selfish index and node isolation index. However the more acute result can be obtained by the simulation study of friendship mechanism in all aspects and thus we can propose novel friendship etiquette inside wireless networks to mitigate several key impacts in terms of achieving security with integrity.

V. Discussion:

This work implicates the overall design of friendship mechanism in multiple aspects. First the reliability index, which can be essential for being a friend node. Second the node cooperation index, which must be calculated each and every time prior to communication between nodes. Third the selfish index and node isolation index, which can be the only reason for a node to behave like a un-friend (known attacker). Forth the reputation index which can actuate our

outcome, whether it's correct or not. That means until and unless we ensure the reputation of participating nodes we cannot assure a node can be friend of another node. Hence this collective approach still required to be addressed by research community to overcome this problem to develop and maintain the friendship etiquette inside Mobile Ad Hoc Networks.

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