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Reputation Analysis and Impact of Node Mobility on Manets for Wireless Networks

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ABSTRACT

A wireless network is formed without any pre existing infrastructure , in which every layer act as a router is called a mobile ad hoc network (MANET). Ad hoc networks is one of the subset of wireless network that dynamically forming a temporary network without using any existing network infrastructure or centralized administration. Mobility is the main problem in Manets. The movement of the mobile node is one of the important characteristics because it can effects the performance of the ad hoc network protocol. Node movement increases the chance for potential contactors to gather more trust information and evidence.

Checking mobility is the main aspect in every Manet, Micro Mobility and macro mobility are two movements we have to consider for this mobility checking. Mobility is one of the important characteristic of Manet, to efficiently reduce uncertainty and to speed up trust convergence.

In this paper we analyze the impact of mobility on Manets. we consider mobility to support our reputation to analyze the performance of Manets and two types of mobility's are consider based on distance.

Keywords **- mobile ad hoc network (MANET), mobility.**

I. INTRODUCTION

Mobile ad hoc networks (MANETs) are self-organizing networks that do not require a fixed infrastructure. Two nodes communicate directly if they are in the transmission range of each other. Otherwise, they reach via a multi-hop route. Each MANET node must therefore be able to function as a router to forward data packets on behalf of other nodes . Because of their unique benefits and versatilities, MANETs have a wide range of applications such as collaborative, distributed mobile computing (e.g., sensors, conferences), disaster relief (e.g., flood, earthquake), war front activities and communication between automobiles on highways.

Most of these applications demand multicast or group communication.In manets mobility is the main considerable character, In Manets node to node connectivity is checked. If mobiles are moving then handover increases based on distance. MOBILE ad hoc networks (MANETs) aim to provide wireless network services without relying on any infrastructure. The main challenge in MANETs comes from their self-organized and distributed nature. There is an inherent reliance on collaboration between the participants of a MANET in order to achieve the aimed functionalities. Collaboration is productive only if all participants operate in an honest manner. Therefore, establishing and quantifying trust, which is the driving force for collaboration, is important for securing MANETs. Trust can be defined as the firm belief in the competence of an entity to act dependably, securely, and reliably within specified context. It represents a MANET participant's anticipation of other nodes' behavior when assessing the risk involved in future interactions. Here, the participant is usually called the trustor, and other nodes are called the trustee. The trust relationship usually builds on the basis of the trustor's past direct interaction experiences and others' recommendations related to the trustee. The abstracted value from past experiences and recommendations is defined as the trustee's reputation. Many reputation systems have been proposed in literature. Most of them sharply divide the recorded behavioral information into right or wrong. For example, in the EigenTrust model [1], behavioral information is obtained by counting the number of "satisfactory" and "unsatisfactory" \interactions, and the difference between these two values is stored as reputation. Besides lacking a precise semantic, this information has abstracted away any notion of time. In EigenTrust, value 0 may represent both "no past interaction" and "many unsatisfactory past interactions." Consequently, one cannot verify exact properties of past behavior based on this information alone.

Two types of mobility schemes are to be considered. One is micro mobility which stands for minimum distance. Another stands for macro mobility which is long distance.

II. MOTIVATION

A MANET has got some of the important properties like self organized and rapid deployable capability; which makes it widely used in various applications like emergency operations, battlefield communications, relief scenarios, law enforcement, public meeting, virtual class rooms and other security-sensitive computing environments.

MANETs have a wide range of applications, Each of these applications can potentially involve in different scenarios with different mobility patterns, traffic rates dependent on the environment and the nature of the interactions among the participants. In order to thoroughly study the protocols for these applications, it is imperative to use the mobility models that accurately represent the mobile nodes which utilize the protocols. So This paper gives analysis of mobility in Manets to increase the performance in different applications.

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III. PREVIOUS WORK

In existing System ,one-dimensional representation of belief, disbelief, and uncertainty is extended from the subjective logic [2]. Each node keeps a belief and disbelief value toward other nodes as a prediction of their future behavior. As these two values are only predictions, uncertainty always exists. We use a triplet to represent a node's opinion (b,d,u) b,d,u are designate belief, disbelief, and uncertainty, respectively.

IV. OUR APPROACH

When the requirement is a short convergence time to quickly start a trust-based application, or a controllable cost, the above two mobility models will offer extreme options. However, these two methods are not flexible enough and we lack a way to find a trade-off between convergence time and cost to satisfy different application objectives. Here, we present a two-level controlled mobility model, which is called hierarchical scheme. In hierarchical scheme, we divide the whole network into several regions, allowing each region to contain a specified number of grids, and choose mobility models for inter- and intraregion movement. Hierarchical scheme combines the advantages of the above two models and offers more options for MANET implementation. Various kinds of clustering mechanisms have been proposed in the MANETs [8], [9]. After using one of the existing clustering mechanisms, this hierarchical scheme can be applied on top of the clusters.

Algorithm 1

VoteForMove
1: while t<Tlimit
2: if m<mthreshold
3: get opinion(node)
4:else if m>=mthreshold
5:Get opnion(node,Supervisor)
4: end while
5: Compute(b; d; u) for each node;
6: if the largest b in all the opinions satisfy b >= Bmin then
7: Vote the node with the largest b;
8: Wait (elected moving node)
9: else
10: Continue();
11: end if;

In this algorithm, movement is calculated based on distance. If m is within threshold then it is called micro mobility. Micro mobility doesn't require confirmation from supervisor. Because movement is within distance. But Macro mobility requires confirmation from nearest supervisor. This supervisor acts as Foreign agent from one place to another place. All nodes will store mobile behavior but supervisor will store particular opinion only.

Algorithm 2

Vote Gathering
1: Counter++;
2: if counter>=threshold then
Start move ();
Broadcast ();
4: end if;

This algorithm shows counter increment. If counter meets threshold then node broadcasts information to all nodes including supervisor. And it starts moving.The moving nodes repeat the local contact process after they arrive in the capital. The pause time period in the capital allows them to build trust between each other and the local nodes of the capital. One node, which is commonly trusted by all moving nodes, will be elected to be the keeper of that region through a process similar to Algorithms 1 and 2. The keeper selects several nodes it trusts as supervisors, which will travel between regions to collect information and feed it back to the keeper.

V. CONCLUSION

In this paper, we analyzed the impact of mobility pattern on performance of mobile ad hoc networks. Here our approach gets a good performance in all types of mobility schemes like micro and macro mobility. We find out that Certainty-oriented reputation systems can achieve good detection rates while keeping the false positive rate at a low level. All the schemes illustrate the uncertainty reduction effect with the assistance of mobility. We observed that different mobility schemes provide different tradeoffs in delay, cost and uncertainty and controlled mobility-based schemes have a better performance in terms of uncertainty reduction.

This work can be further explored to study the impact of mobility on the performance in Manets. Several other parameters such as traffic patterns, node density and initial placement pattern of nodes may affect the performance and hence this work can be extended to investigate them further.

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