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Novel Method to Discover Neighboring Node

KEYWORDS: Ad hoc Networks, Consistency, Connectivity, Link availability, Buffer Zone, MANETs, Broadcasting

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ABSTRACT *A mobile ad hoc network (MANET) is a wireless network that uses multi-hop peer-to-peer routing instead of static network infrastructure to provide network connectivity. MANETs have applications in rapidly deployed and dynamic military and civilian systems. The network topology in a MANET usually changes with time. Therefore, there are new challenges for routing protocols in MANETs since traditional routing protocols may not be suitable for MANETs. A formal framework is used to model inaccurate local views in MANETs, where full coverage is guaranteed if three sufficient conditions, connectivity, link availability, and consistency, are met. Three solutions are proposed to satisfy those conditions. First, we give a minimal transmission range that maintains the connectivity of the virtual network constructed from local views. Then, we use two transmission ranges, one for neighborhood information collection and the other for actual data transmission, to form a buffer zone that guarantees the availability of logical links in the physical network. Finally, we propose a mechanism called aggregated local view to ensure consistent local views. By these, we extend Wu and Dai's coverage condition for broadcasting in a network with mobile nodes.*

1. INTRODUCTION

BROADCASTING a packet to the entire network is a basic operation and has extensive applications in mobile ad hoc networks (MANETs). For example, broadcasting is used in the route discovery process in several routing protocols, when advising an error message to erase invalid routes from the routing table, or as an efficient mechanism for reliable multicast in a fast-moving MANET. In MANETs with the promiscuous receiving mode, the traditional blind flooding incurs significant redundancy, collision, and contention, which is known as the broadcast storm problem. Efficient broadcasting in a MANET focuses on selecting a small forward node set while ensuring broadcast coverage. Broadcast protocols can be classified into deterministic and probabilistic approaches. The probabilistic approach usually offers a simple solution in which each node, upon receiving a broadcast packet, forwards the broadcast message with probability p. This can be further classified based on the type of neighborhood information used:

- ✓ Location-information-based
- ✓ Neighborset- based

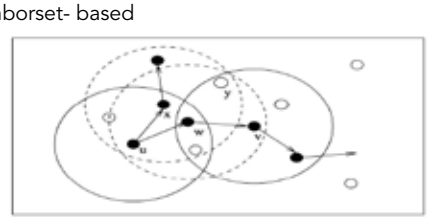

Fig. 1. Forward node set in a MANET.

There are two sources that cause the failure of message delivery Collision. The message intended for a destination collides with another message. In Fig. 1, if messages from nodes w and x collide at node y, node y does not receive any message. Mobile nodes. A former neighbor moves out of the transmission range of the current node (i.e., it is no longer a neighbor). In Fig. 1, when node w moves out of the transmission range of u, the nodes along the branch rooted at w of the broadcast tree will miss the message.1 Results in show that the effect of collision can be relieved by a very short (1ms) forward jitter delay, where a very high (99 percent) delivery ratio is achieved in static networks. The majority of delivery failures are caused by mobile nodes. Therefore, in this paper, we focus on delivery failures caused by mobility only. The major challenges in designing a localized broadcast protocol while ensuring broadcast coverage are as follows:

- ✓ The network topology changes over time, even during the broadcast process.
- ✓ The local (1-hop) information is constructed based on "Hello" intervals. To avoid serious collision among "Hello" messages, nodes start their intervals asynchronously, making it difficult to ensure consistent local/global views among nodes.
- ✓ The collection process for k-hop information incurs delay which may not reflect the current network topology when there are mobile nodes, even for a small k in localized solutions.

1.1 Overview of the Proposed Framework

This paper concentrates on the deterministic approach. This guarantees the full coverage in mobile adhoc network. This uses deterministic broadcast protocols that use neighbor set information only, which is more efficient method.

The main contributions of this paper are as follows:

- ✓ Propose the first localized broadcast protocol that can handle node mobility while ensuring broadcast coverage.
- ✓ Systematically address the issue of inconsistent local view caused by neighborhood information delay, asynchronous "Hello" intervals, and node mobility.
- ✓ Introduce a new controllable parameter to balance broadcast efficiency and broadcast delivery ratio.
- ✓ Conduct a simulation study to verify the effectiveness of the new approach.

1.2 Description of Problem

Broad casting a packet to the entire network is a basic operation and has extensive applications in mobile ad hoc networks (MANETs). For example, broadcasting is used in the route discovery process in several routing protocols. The Broad casting protocols may be probabilistic which is prone to be not accurate. These protocols which may use the node information may be of neighbored node, location or directions all are not accurate. They are not properly updated in static networks.

1.3 Existing System

The existing methods in Broad casting follow the protocols which suffer from the following drawbacks:

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- ✓ Probabilistic approach cannot guarantee full coverage
- ✓ Neighbor set information not accurate
- ✓ Static network broadcast schemes perform poorly in terms of delivery ratio when nodes are mobile.
- ✓ There are two sources that cause the failure of message delivery Collision.
- ✓ The messages from nodes w and x collide at node y; node y does not receive any message.
- ✓ Mobile nodes, a former neighbor moves out of the transmission range of the current node

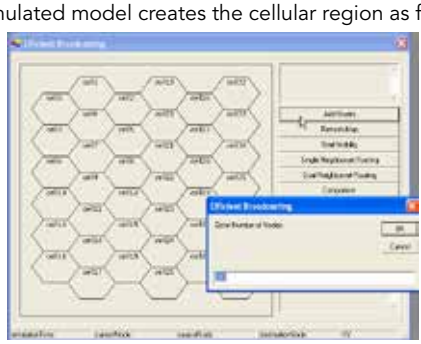
Due to these reasons the broad casting protocol in mobile network may not result in accurate result. The proposed protocol explained as follows in next section.

1.4 Proposed System

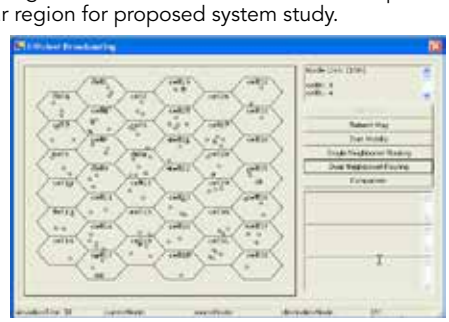
The proposed system based on mobility management and, in particular, neighbor set management in a mobile environment. The broadcast protocols in MANETs based on self-pruning. The major task is of Mobility Management where, the capacity of MANETs is constrained by the mutual interference of concurrent transmissions between nodes. This is modeled as an undirected graph G = (V, E) where V is a set of mobile nodes and E is a setof wireless links. A link exists between two nodes u and v if and only if their physical distance is less than a transmission range r. The proposed efficient broadcast protocol based on self-pruning. In a self-pruning protocol, each node determines its forwarding status based on its local k-hop information, where k = 2 or 3.

2. SIMULATION OUTPUT

The simulated model creates the cellular region as follows

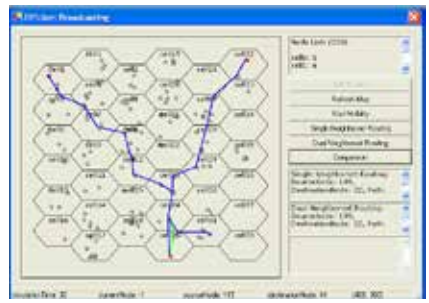


According to the Node count the nodes are placed in the cellular region for proposed system study.



The static neighbor set algorithm is invoked by selecting the source and destination. This draws the routing as follows in green line

Next the dual neighbor set is invoked for the same that draws the routing in blue line as follows



3. CODE DESIGN

This paper is modularized into four as follows

· **Simulation Environment**

To implement and test the algorithm simulated model is designed for mobile adhoc Network. Here the Java class is written to simulate the cellur network. The cellur region is created with java code and the nodes are placed in various places. This is done by calling a method to place node. Number of nodes in the network is based on user input. The user interface form gets the input from the user regarding Number nodes. According to input the method creates small circle which denotes the node and it is placed on the cellular region randomly by generating random number and this multiplied by the user screen x and y position. This concept gives the uniqueness of the node.

· **Implementation**

The mobility management and, in particular, neighbor set management in a mobile environment in this project is based Connectivity, link and availability. The broadcast protocols in MANETs based on self-pruning. The major task is of Mobility Management where, the capacity of MANETs is constrained by the mutual interference of concurrent transmissions between nodes. The mobility of nodes adds another dimension of complexity in the mutual interference. Broadcast Protocols Based on Self-Pruning, which helps in a MANETS. This is modeled as an undirected graph G = (V, E) where V is a set of mobile nodes and E is a set of wireless links. A link exists between two nodes u and v if and only if their physical distance is less than a transmission range r.

This proposed method maintains a mobility control method that addresses connectivity, link availability, and consistency issues.

Three sufficient conditions are given:

- ✓ the first one on the connectivity of the physical network to ensure connectivity of the virtual network,
- ✓ the second one on the bound of the range difference to ensure link availability,
- ✓ and the third one on the consistent local views to ensure correct decision made at each node

The algorithm here is implemented in the two different forms as follows

· **Single Neighbor-set Routing**

Here java class is written to implement the above mentioned sufficient condition based on each node determines its forwarding status based on its local single neighbor set information. Based on next single neighbor set information is forwarded to link the virtual network based on link availability. The directed graph is designed to model this network and nodes in the directed graph represents mobile node and vertex of graph represents the connectivity established between nodes. So to implement the algorithm in program point of view Directed graph concept is used. With this code is written and if user can able to select the source and destination

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node at run time by clicking the mouse on the node. Due to mouse down event is handed to capture the source and destination node.

- **Dual Neighbor-set Routing**

Here java class is written to implement the above mentioned sufficient condition based on each node determines its forwarding status based on its local Dual neighbor set information. Based on next two different neighbor set information is forwarded to link the virtual network based on link availability. The same concept above mentioned is called with this input. Result is displayed in the adjacent frame.

The result of experiment is compared and the efficiency is displayed.

- **Comparison**

The result of the above mentioned algorithm is compared in the following three properties

- ✓ Link
- ✓ Connectivity
- ✓ And Availability

The separate class is written that invokes the two methods and compares the properties. The efficiency ratio is displayed to the user. The efficiency of the delivery is found to be 99% in this simulated mobile adhoc network.

5. CONCLUSION

This paper describes the proposed a mobility management method based on the use of two transmission ranges. Using this mechanism, we have also extended Wu and Dai's coverage condition to a dynamic environment where network topology is allowed to change, even during the broadcast process. In addition, connectivity, link availability, and consistency issues related to neighborhood information of different nodes have also been addressed. The proposed scheme can also be extended to provide mobility management for other activities, such as topology control in MANETs. The constraint used on r2 - r1 in this paper is conservative. Our probabilistic analysis suggests that high delivery ratio can still be achieved with a larger r1. Simulation results show that the proposed method and the dual neighbor set enhancement achieve good balance between delivery ratio and broadcast redundancy by adjusting the value of r1 based on the network mobility level. A future extension would be automatic buffer zone width adjustment that adapts to the neighborhood mobility level.

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