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RESEARCH ARTICLE

A Novel scheme for avoidance of packet flooding in MANET

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Abstract— ***In mobile Adhoc network flooding is basic operation for supporting various operations and protocols. Many routing protocols rely on flooding for disseminating route detection, route maintenance, topology update packets etc. conventional flooding scheme generates unnecessary redundant packet retransmission however cause unnecessary conflict. Some flooding schemes introduced to avoid this problem but these schemes either require information of its entire neighbour more then 1-hope. Or continuing retransmitting redundant data. In this paper we introduce an efficient flooding algorithm which is based on finding distance of each node to its nearest neighbour. This approach is receiver based. Receiver will decide whether packet should forward or not for uniquely identifying the receiver we have assigned prime no. to each node. In our analysis we have seen that this approach is able to reduce the flooding attacks in network.***

Keywords— MANET; flooding; route discovery; receiver based; prime number

I . INTRODUCTION

Mobile Adhoc network means temporarily created network does not need fixed infrastructure, in MANET nodes are dynamic and they are free to move. In general, mobile ad hoc networks are formed dynamically by an autonomous system of mobile nodes that are connected via wireless links without using the existing network infrastructure or centralized administration. route dissemination is One of the most important technique used in MANET and there are many routing protocols for route discovery Like AODV[7],DSR[8].DSDV[9]etc. The simplest scheme of flooding is called pure flooding or blind flooding. In this scheme, every node in the network retransmits the flooding message when it receives a message for the first time. This method is not an efficient method for flooding[3]. Due to the broadcast nature of radio transmissions, when all nodes flood the message in the network, there is a very high probability of signal collisions, which can create some nodes be unsuccessful to receive the flooding message. This is the ostensible broadcast storm problem. In 2006, Hai Liu, Pengjun Wan, Xiaohua Jia, Xinxin Liu and Frances Yao proposed ―Efficient Flooding Scheme Based on 1-hop Information in Mobile Ad Hoc Networks. Flooding is one of the most fundamental operations in mobile ad hoc networks. Conventional implementation of flooding suffers from the problems of excessive redundancy of messages, resource contention, and signal collision. It causes high protocol overhead and obstruction to the existing traffic in the networks.

Further, it slows down the flooding and may interrupt to the ongoing traffic in the network. Various recent studies of flooding protocols have discovered that it is possible to diminish the number of retransmissions. This also reduces contention, the probability of collisions, saves energy in the mobile nodes and increases the flooding .Such optimized flooding protocols can make use of location information, neighbour information or only observations of continuing flooding.

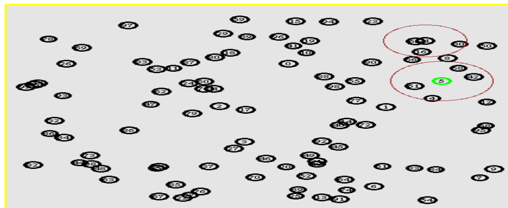

Fig1. Simple Flooding in MANET

The simplest way is to rely on one-hop hello messages. Each node is then aware of all its neighbours. We can also use two-hop hello messages, where each node includes its neighbour list in the hello messages. By doing so, each node in the network will know who its neighbours are and who their neighbours are It is of course possible to gather three-hop and n-hop neighbour information in the same way. However, this increases the overhead as the hello messages will be larger and does not necessarily improve the performance of the flooding.

To recover this problem, several efficient flooding schemes have been proposed for mobile wireless ad hoc networks (MANETs).One trend in flooding scheme designs is to apply a connected dominating set (CDS) to flood the control messages. CDS based flooding requires each node to collect 2-hop neighbours 'information; maintaining information about more than one hope neighbour is unreliable due to node mobility, however, and this technique results in additional overhead. In Edge Forwarding [11], each node acquires the geographic location information of 1-hop neighbours to decide whether it should relay the flooding message. Another noteworthy flooding scheme that uses only 1-hop neighbour information is described. According to this scheme, at each hop, only a subset of neighbour nodes is selected to rebroadcast the flooding message.

II. RELATEDWORK

Flooding is considered as a easy and direct approach to broadcast a message from one node to another node in the network. Recent studies of flooding protocols have revealed that itis possible to reduce the number of retransmissions. This also reduces contention, the chance of collisions, saves energy in the mobile nodes and increases the flooding speed. The easiest way is to rely on one-hop hello messages. Each node is then aware of all its neighbours. Two-hop hello messages may be used, where each node includes its neighbour list in the hello messages. By doing so, each node in the network will know who its neighbours and who their neighbours are.

In previous research PFPS(prioritization flooding with self pruning were introduced. in this combination of CBB[2], and RAD[2] were used. According to this study PFPS needs one hope hello message. Each receiving node can compare its own neighbour list with the one in the flooding & determining whether all its neighbour are already has been covered. if any uncovered neighbours Just like SBA[2] the retransmission will be cancelled if all the neighbours are covered by redundant messages received later.

In “Efficient Location-Aided Flooding Scheme Initiated by Receiver for MANET” we have analysed That in this paper they proposed an efficient flooding Protocol that minimizes flooding traffic by leveraging location information of 1-hop neighbour nodes[1]. This scheme is receiver-based, it means that each receiver of a flooding message determines whether it should forward the message based on the given retransmission rule. Simulation results show that this scheme is very efficient. It is able to diminish the number of forward nodes almost to that of the lower bound but maintains a high delivery ratio. But in this paper transmission range of each node are same and nodes are supposed to be connected.

Another study done by Chaithannia , Ashly Thomas" Different Enhancements for Flooding Scheme in Mobile Adhoc Networks "In that method cache the nodes which are recently involved in data packet forwarding, and use only them to forward route requests. Dropping route request [6] forwarding from the other nodes considerably reduces routing overhead [4]. The method is the combination of blind flooding and node caching. In that cache nodes which are recently involved in data packet forwarding, and use only them to forward route requests. So that blind flooding of the route request in the network can be avoided, this in turn reduces the routing overhead.

IN 2009, Huey-Ing Liu proposed ―A Distributed Intelligent Broadcasting Protocol for Mobile Ad Hoc Networks" In this paper They proposes a distributed intelligent broadcasting protocol (DIBP) that is capable of dynamically determining the broadcasting nodes in a MANET[18], based upon the distribution of network nodes. This approach eliminates the need for active network monitoring and periodical maintenance is not required.

III.PRAPOSED APPROACH

In our approach we are dividing the nodes in to the groups according to their transmission range and we have assigned each node of that range a prime number. Our method is basically a receiver based according to this method once sender sends the data receiver will decide to which node packet should be forwarded by calculating common division factor.

These are the basic steps:

1) Initialize the number of node participated in flooding scheme.

2) This will be done by dividing those in to the group according to calculated distance.

3) Now in the next step assign each node a prime number and sort the nodes according to calculated distance.

4) Find common division factor of each node and proceed further.

A. NFP Algorithm:-

NFP(int num,float maxd, int s, int d, int nod array[20])

1. *Set numnode←num.*
2. *For i←1 to numnode.*
3. *N[i] ←euclidian[i].*
4. *For i←1 to numnode.*
5. *W[i]=weight([i])*
6. *For i←1 to numnode*

   Find onehope(n[i])

7. *Arrange node in ascending order according to weight w[i].*
8. *For i←1 to numnode*

   Assign Primenum(n[i])

9. *while each node recives packet*

Multiply senders each neighbour prime no and send it to the receiver

find common prime number for neighbour (n[i]) and store in routing table.

If common than packet will not be passed

Else

Pass the packet

10.CDFN←find(s,d)

Return(CDFN)

Note: NFP: Novel Flooding Prevention.

CDFN: Common Divisor Factor Number

Maxd:Maximum Distance=250

s←source node

d←destination node

Participates in flooding. In our method we will find the distance of each with respect to all other node that lies on transmission range by Euclidian distance method. After finding the distance sort all the node according to their weight in ascending order. Assign each node a prime no and will maintain a routing table of product value of all prime numbers.identify common divisor factor of receiver and if it will equal to recovers' middle node packet will not be forwarded to that node and backtrack the receiver list.

Following graph represents the relationship among transmission range and ratio of forwarding.

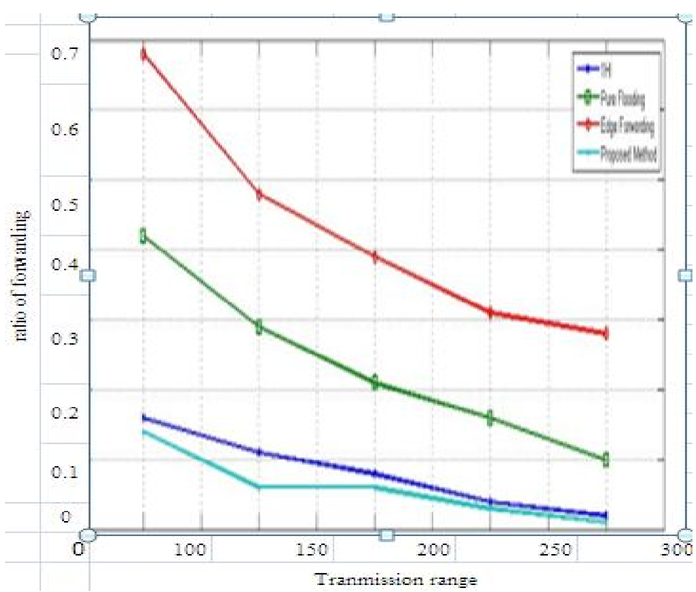

Fig2.graph B/W transmission range and ratio of forwarding.

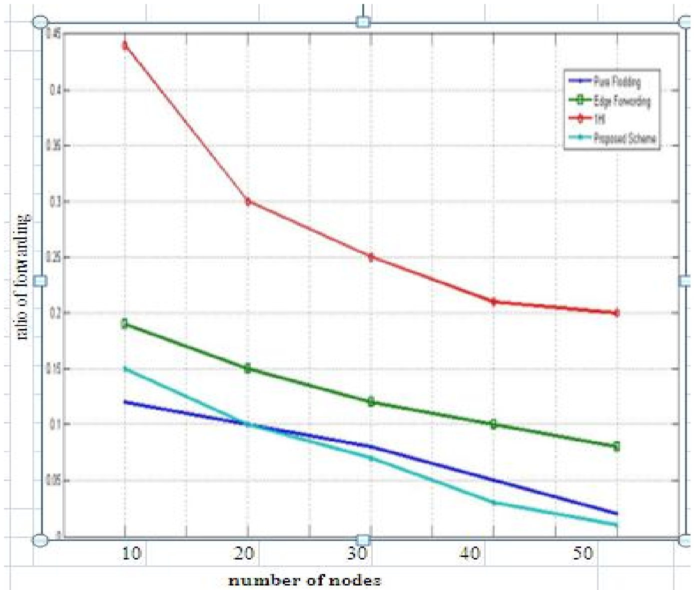

Fig 3.shows graph B/W number of nodes &ratio of forwarding

Notations used in our graph are:-

1H -------
Pure flooding -------
Edge forwardig------
Proposed method-----

IV.PERFORMANCE ANALYSIS

A.Simulation environment

To analyse our result we simulate it. For this we used ns-2.35.in this we evaluate the performance of NFP algorithm and We select the following flooding schemes for comparison with our own: Pure flooding, Edge forwarding and 1hope methode.to analyse this we need sorted neighbour list of all neighbour and information of assigned prime number to each of its neighbour nod. first the transmission range of each node is set to 250meter i.e. only node in this range are used for efficient flooding. Number of nodes are 10,20 ,50respectivly.data packet size is 250byte. The bandwidth of a wireless channel is set to 2Mb/s as the default.We compare here the result of it with CD[3],Edge forwarding method FSP[2]etc.according to our analysis it enhance the flooding, reduce traffic load and also reduce transmission delay, packet overhead etc.

Paramters	Values
Simulator	Ns2.35
OS	Ubuntu12.10
Number of node	20-50
Mac Layer	IEEE802.11
Packet size	250byte
Bandwidth	2Mb/s
Size of Square Area	1000 x 1000m

V.CONCLUSION

In this paper, we proposed a novel solution for the broadcast storm problem in MANETs. Our proposed approach is based on the well known probabilistic scheme. As in our graph we compared it with edge forwarding, pure flooding[17] and 1hopemethod[13].It shows an improved result as compare to other approach and can significantly improve the flooding operation MANETs due to our new efficient and novel mechanism. Moreover, it is also confirmed that our approach Out performs existing protocols by reducing network overhead and packets collision. As a future work, we can deploy our approach in more scenarios and large scale networks.

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