SENDER AND RECEIVER BASED EFFICIENT BROADCASTING ALGORITHM IN MOBILE AD HOC NETWORK (MANET)

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ABSTRACT:

In mobile ad hoc networks (MANETs), all the nodes in the network overhear every data transmission occurring in its vicinity and thus, consumes energy unnecessarily. This paper proposed a ***Novel Broadcast Algorithms*** *for mobile ad hoc networks to improve the effectiveness and afford guarantee for complete delivery of broadcasting. An important objective is to decrease relay redundancy and to evade the broadcast storm difficulty. It proposes two broadcasting algorithms they are, Sender based algorithm and Receiver based algorithm. In this paper we proposed a new Sender based algorithm selects subset of forwarding nodes using 1-hop neighbor information. The proposed algorithms improve the efficiency and also guarantee full delivery.*

Keywords: *MANETs, Novel Broadcast Algorithm, Efficient Broadcasting Algorithm in MANETs.*

1. INTRODUCTION:

A wireless sensor network (WSN) comprises of sensor nodes (SNs) with wireless communication capabilities for specific sensing tasks. Due to the partial existing resources, capable design of localization in multi-hop routing protocols becomes a critical subject within the WSNs.

The familiar greedy forwarding (GF) algorithm is considered a superior scheme with its low routing overheads. Still, the negated problem, which make the GF technique unable to find its next closer hop to the destination, will origin the GF algorithm fading to guarantee the delivery of data packets. The network flooding mechanism is within the GRA and PSR schemes while the negated problem occurs. There also subsist routing protocols that accept the backtracking method at the occurrence of the network holes.

2. METHODOLOGY:

2.1 PROPOSED SYSTEM

Energy saving mechanism is important for the efficient operation of the battery powered networks. Every neighboring node overhear when a node is transmitting a packet. Hence it is necessary to limit the number of overhearing nodes based on probability. The proposed algorithm customizes the number of overhearing nodes. It saves energy consumption without affecting quality of route information. When a node is ready to transmit a frame, check it's overhear the level (OL) for broadcast and unicast transmission. Three possibilities such as prospect overhearing, no overhearing, and unconditional overhearing are measured while discovering the routes. Probability overhearing is defined as that few nodes that satisfies a probability based condition can overhear. There is no overhearing in which only a very minimum number of nodes (sender, receiver and intermediate nodes) can overhear and the others would go to low-power sleep state.

Unconditional overhearing is one in which nearly every one hop nearest nodes in a network can overhear. Sender is able to specify the level of overhearing. Sender may choose either no or unconditional or probability overhearing which is specified in ATIM frame control.

The overhearing or probability overhearing is based on the types of messages that are exchanged. RERR (Route Error) messages are unconditional overhearing. The reason is that the link failure should be informed to all the nodes in the network, so that the nodes in the network will not use it for the next time until the path gets ready. RREQ (Route REQuest) is a broadcast message and based the probability (Po) values, probability overhearing is set.

Step 1 : Check if Destination Address = Broadcast / Unicast

Step 2 : If it is Broadcast, check for whether it is the destination. If so, then it receive the packets.

Step 3 : If it is Unicast, then it checks for the subtype values and decide the level of overhearing will occur.

Step 4: If the sub-type is for restricted overhearing then evaluate the probability values with the threshold and decide the level of the overhearing.

Step 5: In Re-broadcasting the probability and overhearing probability can be identified.

Step 6: Repeat the process 2 to 5.

The Probability based on the overhearing method controls the level of overhearing and forwarding of

Rebroadcast messages. Node is awakening if unrestricted overhearing or probability overhearing is set or if it is a destination node.

$$P_o = 1/n$$

$$P_r = cn/N^2$$

Where, c is a constant, n- No. of neighbors and N- Average no.of. neighbors.

If a node subtype is 1105, it generates a arbitrary number between 0 and 1 and compares it with Po. If it is greater than Po, node decides to overhear. If it is greater than Pr then, the node decides to rebroadcast. Po and Pr are decided based on no.of neighbors. If the number of neighbors is more, then the redundancy is more.

The main part of this work is to limit the number of overhearing nodes based on probability. It reduces the energy consumption lacking in affecting the quality of route information.

This modified algorithm is also integrated into a routing protocol called AODV to find the routes from given source node to the destination node based on available bandwidth. When a link failure occurs, then the node upstream of the link will detects the failure, invalidates the routing table entry for the destination node and unicast an RERR message towards the source node. Once the source node it receives the RERR, and then it switches the primary path to the next best alternate link-disjoint path. It is designed mainly for the high dynamic ad hoc networks when route breaks and link failures occur frequently. By implementing this method it reduces the routing overhead and improves the performance of the network.

We extend the Random Cast algorithm in following way .At each node the Sender id energy is in the node. Route is selected in which there is a maximum of minimum remaining energy and this field is added to the RREQ as well as in the RREP New field is added to the RREQ message it carries the composed remaining energy of nodes participating between source and the destination. In this, Destination node does not give an immediate reply to the request but waits for the mean time. Algorithm which selects the nodes on the basis of the energy status in each node, will helps in discovering alternate paths and to solve the problem of asymmetric links. In this, neighboring nodes establish source and destination node. Battery status can be divided into three categories:

i) If the Battery Status < 20% then, It is called Danger state.

ii) If it is 20% > Battery Status and < 50% then, it is Critical State.

iii) If the Battery Status > 50% then, It is Active mode.

3. IMPLEMENTATION:

A. Forwarding Node Selection

In the proposed sender-based algorithm each sender selects a subset of nodes to forward the message. The subset of neighbor is called B-Coverage set. A node can have several B-Coverage set. A forwarding node selection algorithm is called slice based algorithm. Slice-based selection algorithm is the one that selects all of the neighbors as the B-coverage set. Sender-based algorithm can get packed delivery if it uses one slice-based algorithm to select the forwarding nodes.

B. Reducing forwarding nodes

Every broadcasting node attaches a list of its selected forwarding nodes to the message before broadcasting it to the destination node. This will increases the bandwidth and also the power required to broadcast the messages in the nodes. The proposed slice-based selection algorithm is implemented to reduce the number of selection forwarding nodes in the worst case. Then slice-based algorithm selects a subset of neighbors such that there is at least one selected node in any nonempty bulged slice around A.

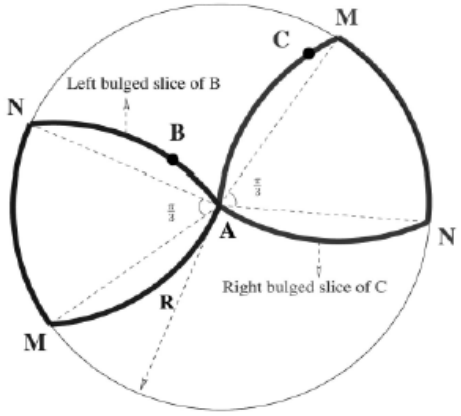

Fig.1 Nearest neighbor's connection

4. CONCLUSION:

An effort has been made to combine the advantages of 802.11 PSM with multichip routing protocols such DSR. The approach called random cast is followed to obtain randomized overhearing .The proposed mechanism follows and additional energy saving mechanism by setting a threshold value at each node. The nodes whose energy is greater than the threshold value can participate in routing. The proposed mechanism is implemented by considering the parameter as number of neighbors' and remaining battery energy. This work can be extended by considering other factors such as, sender ID, and node Mobility.

Mobility, constrained bandwidth, and limited power cause frequent topology changes. Broadcasting plays a vital role in mobile ad hoc networks. The proposed selection algorithm is the outcome in the fewer broadcasts in the network. The proposed receiver based algorithm significantly reduces the number of forwarding nodes in the network. So this algorithm is efficient, has minimum number of retransmission and is collision free.

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