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Effective Utilization of Hello Packets for Reduce Network Partitioning and Node Mobility in MANET

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ABSTRACT: Mobile ad hoc networks is a self-organizing wireless networks for mobile devices. It does not require any fixed infrastructure due to no wired backbone. It is suitable to use in environment that have a need of on the fly set-up. Every host is a router and packet forwarder. Each node may be mobile, and topology changes frequently and unpredictably due to the arbitrary mobility of mobile nodes. This aspect leads to frequent path failure and route rebuilding. One of the most common problems of MANETs is network partitioning. In this situation, the network splits up into several isolated fragments incapable of communicating with each other. Network partitioning can lead to dramatic consequences especially in disaster scenarios. In this proposal, Using hello packets each and every nodes periodically can update their presence in the networks. While updating, the update packets may also have information about power level, location of the nodes. If the nodes detects that neighbor nodes is keep going away from nodes. It will send Recover Packets (RCP) to the neighbor nodes which is partitioning from networks, later the relieving nodes will come towards in opposite direction. This leads to do effective path finding, control the node mobility and reduce network partitioning.

KEYWORDS: Network Partitioning; MANET; hello packets; mobility; network lifetime

I. INTRODUCTION

Mobile ad hoc networks is a self-organizing wireless networks for mobile device which is composed by a group of mobile terminals with wireless transceiver when the communication facility damaged between the mutual connections of sub elements[1]. Conflict in the accident of natural disaster such as non center distributed controlled network may provide the temporary communication support compared with other communications networks, ad hoc networks has the following characteristics. Network is a self-regulating topology which is dynamic, bandwidth is restricted, and the capacity of network is changeable. MANET is mobility where all the nodes are allowed to move in different dimensions which results in dynamic topology, since nodes are moving so they can go out of range network or come in range of network at any time, any node which part of network (n1) time (tj) can be part of an other network (n2) at time (tj) MANET are also used for meetings or other conventions in which people can quickly share information and data acquisition operations in hospitable terrain. The terminal energy is limited and the networks are controlled through distributing it and so on. The routing protocol in ad hoc network is critical in achieving good performance of networks. The challenge of designing network protocols for MANET comes from link until they break which caused network performance degradation .The route reconstruction of link takes major challenge of routing protocols task doing rebuilding packets can be lost making QoS of connections depending on the state of networks

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II. RELATED WORK

It is vitally important for a node in a MANET to discover live neighbour nodes through Hello messaging or a link layer feedback mechanism. For neighbor discovery, periodically exchanging Hello messages is preferred over link layer feedback because the former does not restrict usage and implementation to a specific link layer technology such as ACK packets [9]. Many Hello messaging schemes focus on figuring out dynamic network topology [10] or discovering live neighbours with an energy saving scheme [5], which requires all network nodes to continuously exchange Hello messages or beacons while they are awake. In such traditional Hello messaging schemes no start/end condition is described [11]. This can cause unnecessary bandwidth usage and hidden energy consumption if an on-demand MANET routing protocol (e.g., Ad hoc On-Demand Distance Vector (AODV) [12], or Dynamic MANET On-demand (DYMO) [13]) is used, where a new path is discovered through Route Request (RREQ) and Route Response (RREP) packet exchanges.

If a constant Hello interval is used, the risk of attempting to transmit a packet through a broken link decreases as the event interval increases. Instead of using a constant Hello interval, our proposed scheme uses a constant risk level. As the event interval increases, the Hello interval can also increase without increasing risk. If the event interval is extremely large, the Hello messaging interval is also correspondingly large; that is Hello messaging is practically suppressed. When a node receives or sends a packet, the Hello messaging interval is reset to a default value so that up-to-date information is kept in a neighbor table for active communication [15].

Giruka and Singhal proposed two approaches for suppressing Hello messages when they are not required [14]: an on-demand mechanism (reactive Hello protocol), and a monitoring activity mechanism (event-based Hello protocol). The reactive Hello protocol enables Hello messaging only when it is demanded using a Hello request-reply mechanism, but increases delay due to additional packet exchange before communication. The event-based Hello protocol enables only active nodes (i.e., those either sending or receiving data packets) to broadcast Hello packets based on a threshold called an activity timer. However, a threshold that is set too high rarely reduces the Hello messaging overhead, whereas a low threshold results in local connectivity information loss. Thus, there is an outstanding need to effectively suppress unnecessary Hello messaging while minimizing the risk of losing local connectivity information.

III. PROPOSED ALGORITHM

A. *Description of the Proposed Algorithm:*

As far as Adhoc networks concerned network partitioning and link breaks in path play as major issue. In this proposal the mobility of user can control by the power level and location of the mobile user. The location of the mobile user is represented by X axis and Y axis. If the axis value is increased when the nodes are in mobility, it seems that the neighbour nodes are moves away from the network.

The proposed algorithm as follows is going to implement to control of path breaks.

Step1: Nodes are periodically updated with neighbor nodes by sending hello packets.
Hello packets (power level, location)

Step2: Calculate which nodes have power level and distance axis reduced.

Step3: If the neighbor nodes reached threshold level.

Step4: Nodes will broadcast Recover packets to neighbor nodes.

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Step5: Neighbor nodes make changes in topologies by receiving Recover packets. That is mobile user will keep moves in reverse direction

IV. FLOWCHART

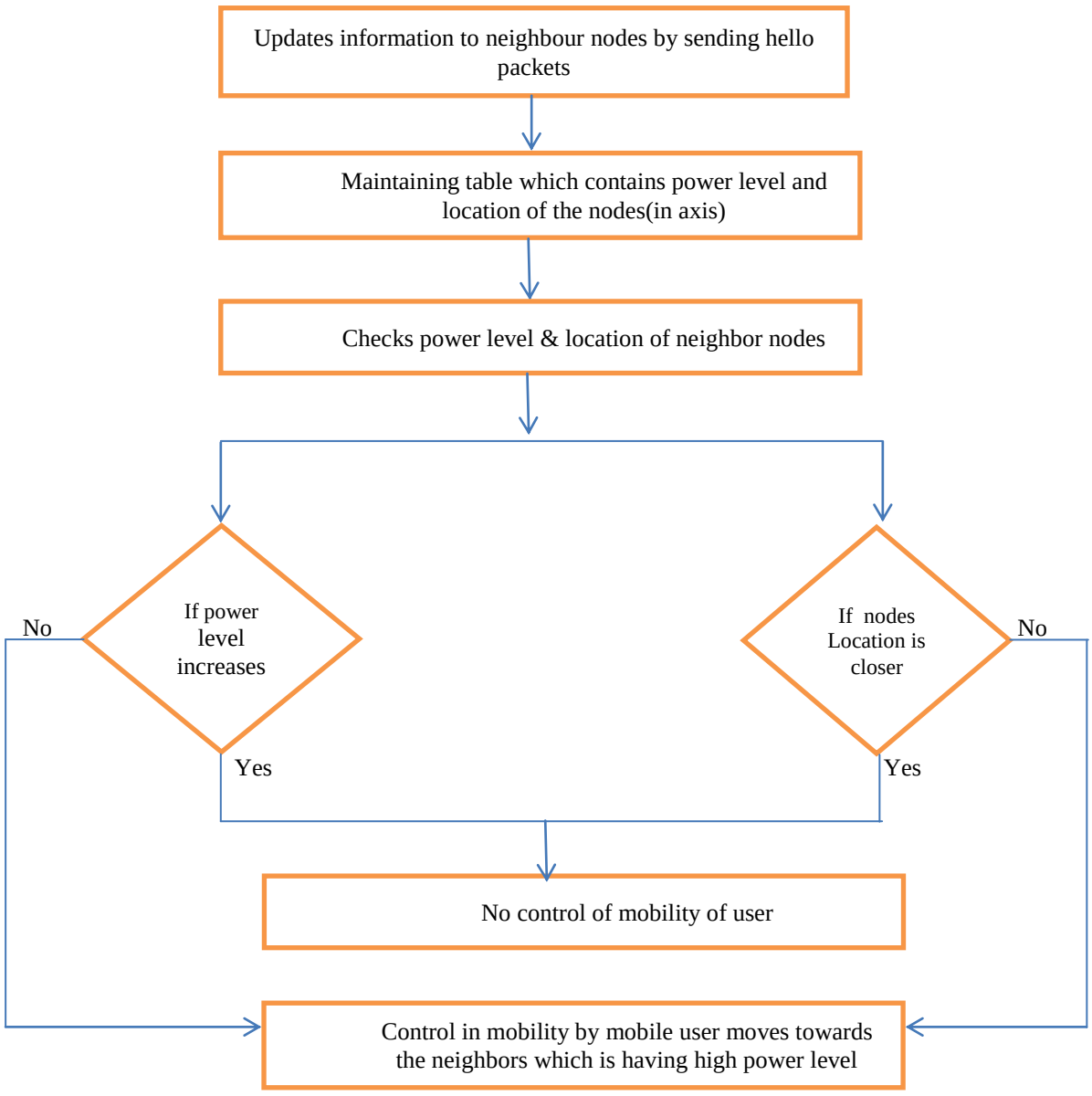

Fig No.1 : Flow chart in process of proposed method

A. *Location or Distance Calculation*

Here is how to calculate the distance between two nodes when you know their coordinates. Let us call the two nodes A and B. the node B is send the update packets to neighbor node A. It calculates the mobility behavior of the

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neighbor node B. By receiving power level and location of the neighbor nodes , node a calculates by below algorithm. We can run lines down from A, and along from B, to make a Right Angled Triangle. And with a little help from Pythagoras we know that: $a^2 + b^2 = c^2$
Now label the coordinates of points A and B
x_A means the x-coordinate of point A
y_A means the y-coordinate of point A
The horizontal distance "a" is $(x_A - x_B)$
The vertical distance "b" is $(y_A - y_B)$

Fig No 2 : Distance Calculation

Likewise each and every neighbor's calculates the distance or location of the corresponding neighbor nodes. In the above, its considered only two nodes for the easy understanding. Periodically the node calculates the distance among the group of nodes. If the distance reduces from the previous cases of calculation, the node will do unicasting by sending recover packets to change the reverse direction of mobility.

The performance analysis and simulation are carried out to evaluate network performance using network simulator NS-2 [2] based on the quantitative basic parameters like throughput, delay and Packet Delivery Ratio (PDR) in term of number of nodes and various mobility rates.

V. SIMULATION RESULTS

A. *Design Considerations:*

SIMULATION PARAMETERS

Parameter	**Value**
Target area	220 x 220 m^2
Number of nodes	10
Initial energy of nodes	2J
Communication range of each SN	20–40 m
Speed of mobile sink	2 m/s

The simulation is done with 10 nodes a small topology as shown in Fig.3. The proposed approach is implemented with Ns2. The network showed in Fig. 1 is able to reduce the energy consumption by the nodes, around 60-80 nodes is produced optimal consumption of nodes. Energy usage by the nodes is decreases when large number of nodes accommodated in the network as shown in figure 4. Throughput also gets decreases when large number of nodes increases as shown in figure 5 and figure 6. As far as this proposed method concern, mobility is controlled through the recovery control message then the network partitioning is overcome as well. Our results shows that the metric total

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transmission energy performs better than the maximum number of hops in terms of network lifetime, energy consumption and total number of packets transmitted through the network.

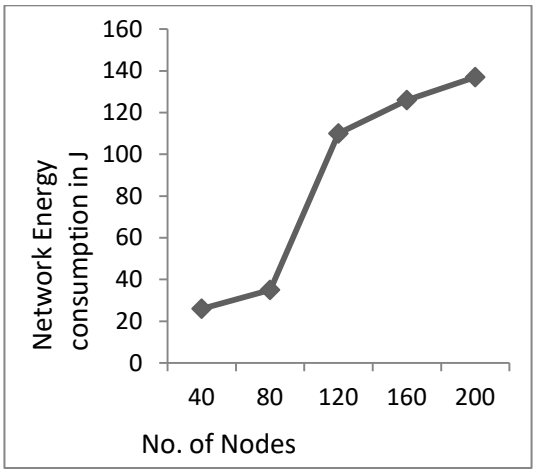

Fig. 3. Energy Consumption by Each Node

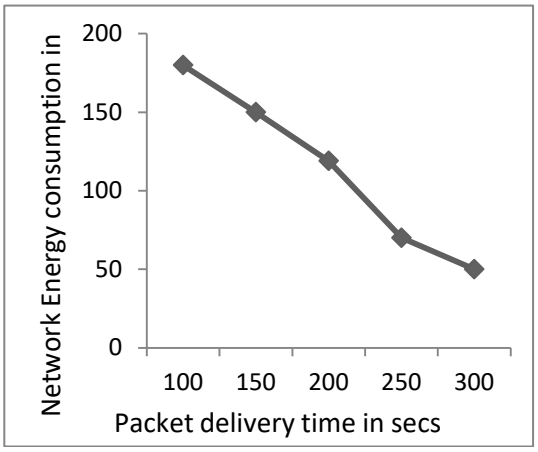

Fig. 4. Energy Consumption Vs packet delivery time

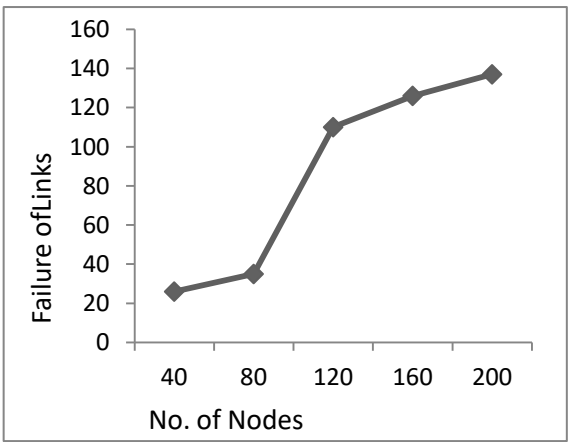

Fig. 5. Link failure Vs No of Nodes

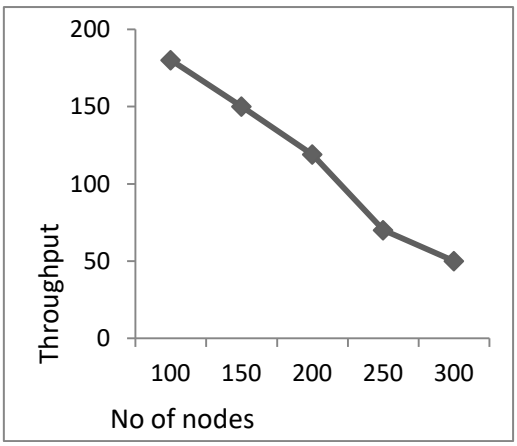

Fig. 6. Throughput Vs No of Nodes

VI. CONCLUSION AND FUTURE WORK

Using hello packets each and every nodes periodically can update their presence in the networks. While updating, the update packets may also have information about power level, location of the nodes. The mobility of the node may vary with the transmission power level of neighbor nodes. This leads to do effective path finding, control the node mobility and reduce network partitioning. The network partitioning and remerging problem can be solved through this method. We have used very small network of 10 nodes, as number of nodes increases the complexity will increase. We can increase the number of nodes and analyze the performance. This paper may be extended for more number of nodes and also speed.

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