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A Technique to Enhance Quality of Service using weighted Path Mechanism

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ABSTRACT

Mobile Ad hoc Network (MANET) is a self-arranging, dynamic, multi-jump and infrastructure less remote system. Every hub (node) in MANET is allowed to move self-assertively toward any path. Subsequently, the way will change arbitrarily. A hub can move haphazardly and may join or leave in arrange at whenever. Every hub goes about as host and middle hubs go about as switches by utilizing multi-jump plans. The Mobile Ad hoc arrange is an accumulation of remote hosts shaping an impermanent system without the guide of any settled framework or incorporated organization. A self-sufficient arrangement of versatile switches (and related hosts) is associated by remote connections and the union of which frames a discretionary chart. In this manner, the system's remote topology may change quickly and eccentrically. Such a system may work in an independent form, or might be associated with the bigger Internet. The benefit of MANET is minimal effort, simple to utilize, and no centralization approach. Be that as it may, it has a few restrictions to give QoS to the client. This paper deals with Quality of Service in Wireless Sensor Network that are used to build a Internet of things Applications. The recently accessed path information are stored and converted as weight of the path with their success rate. The paths are identified with maximum weights available in the link, to improve the Quality of Service.

Keywords: MANET, QoS, Routing, WSN, AODV, DSR.

I. INTRODUCTION

A Mobile Ad Hoc Network (MANET) is a decentralized type of network. It is a wireless network without having any infrastructure. There is no fixed route for each node to act both as a router and a host. Node mobility is the major problem in MANET [1]. Most existing ad hoc routing protocols are easily affected by node mobility especially for large scale networks. A mobile ad hoc network is a collection of wireless mobile nodes forming a temporary network without use of any infrastructure or centralized administration. One of the features of MANET is that each node must be able to act as a router to find out the optimal path to forward a packet as shown in figure 1. As nodes may be mobile, entering and leaving the network, the topology of the network will change continuously [2].

Topology based Routing Protocols fall into two categories such as,

i. Table Driven (Proactive) Routing Protocols [3]
ii. On-demand (Reactive) Routing Protocols [4].

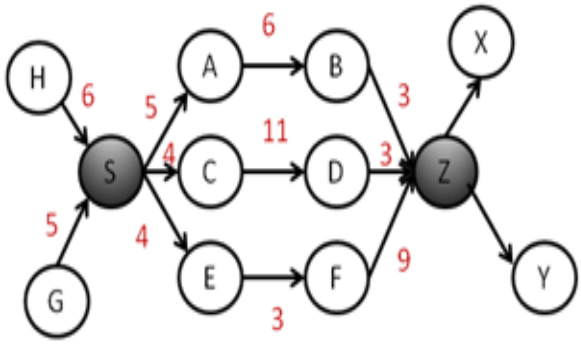

Figure 1: MANET Scenario

Proactive routing protocols maintain one or more routing tables in every node. Each and every routing table has the information about the other node. Thus, they need to propagate a periodic route update message

throughout the network. It provides the actual information about the availability of the network. Reactive routing protocols discover a route by broadcasting the global message and when route is discovered, then with the existing bandwidth, data transmission is done. The main advantage is that they need less number of routing information. Reactive routing protocols are Dynamic Source Routing (DSR) and Ad-hoc On Demand Routing (AODV) [5].

Geographic Routing (GR) is a routing that depends on information about geographic position. It is mainly used for wireless networks. In GR source node sends a message to the geographic location of the destination instead of using the network address node. Its location information broadcast to other nodes periodically. The next relay node is selected only based on the location information of the source node. The geographic routing is scalable and suitable for large networks [6].

II. METHODS AND MATERIAL

A. Related Works

S.M.Nandhagopal et al., [7] discussed that Position based Opportunistic Routing (POR) is based on geographic routing and opportunistic forwarding. The location and position of the neighboring node is found by one hop beacon or piggyback. The neighboring nodes are prioritized for forwarding the packets. The highest priority node is selected for packet transmission. The node has the lowest distance from the source node that has the highest priority. Simulation confirms that Position Based Opportunistic Routing has a high packet delivery ratio with low delay and duplication.

J.Johnsi et al., [8] developed the Position Based Opportunistic Petal routing mechanism which can be exchanged using one–hop beacon or piggyback in the data packet's header for neighborhood location information. The Petal routing minimizes the number of transmission while maximizing reliability. In this routing technique, there is no need to maintain routing table or information of neighbor. If there is a node with failure in a network, the number of transmissions is reduced due to failed nodes. But, the delay is high. The Petal Routing approach is more reliable in a network with patterned failures or jammers. Davin et al., [9] focused on Wireless Routing Protocol (WRP). Each and every mobile informs the link changes through the use of updated message. An updated message is sent only between the neighboring nodes and it contains a list of information about the neighboring nodes. Loss of links and new possible paths information are updated.
MTOOR- the Moving Target Algorithm is used to deliver message from information source to a moving target node. It is dependent on the ability of the message to carry itself opportunistically and transmit across moving nodes. The main thought of this algorithm is maximum delivery with success at a minimum time to obtain success. The transmission procedure of Moving Target oriented Opportunistic Routing [10] (MTOOR) is implemented completely through the message carrying and forwarding across nodes, without any help of infrastructures. There is no universal route from source to destination that must be created and maintained. The forwarding decision is made on a per-hop system. Even the path of the message is not determined before the forwarding starts. The evaluation results show that, when compared to the existing algorithms, they have a good performance in various node densities in terms of success ratio, average hops, overhead, and time for success. Even when the node density is high, it had an excellent speed and accuracy in the delivery of Data in WSN.

Jubin Sebastian E et al., [11] focused on Location Based Opportunistic Routing Protocol that is based on geographic routing and opportunistic forwarding. The node assumes its own location and position of their neighbor. The location of neighbor is exchanged by one hop beacon or piggyback. If the source node wants to transmit a packet, it gets the location of the destination and attaches the destination address to the packet header. By performing greedy forwarding based on location information, the effect of path divergence can be alleviated very much. The source id and sequence number are given to the packets for identification [12]. The simulator compares AOMVV and GPSR with parameters such as propagation model, transmission range, mobility model, traffic type, packet size, number of nodes and simulation time. The simulation result says packet delivery ratio and throughput are high and duplication is reduced.

Sale Sandeep et al., [13] explained that POR (Position Based Opportunistic)-Packets are sent to the network. If any node fails to check the neighboring node, the data cannot be delivered quickly to the destination.

VDVH [14] (Virtual Destination Based void Handling) improves the efficiency of POR protocol even if the nodes are not distributed in a similar way. In the area of distribution, if there is no node (i.e. empty) a virtual destination is proposed which is based on void handling mechanism. The constantly changing network topology makes conventional ad hoc routing protocol incapable of providing satisfactory performance.

A.Umamaheswaran et al., [15] explored that position-based opportunistic routing mechanism which can be deployed without complex modification to MAC protocol and achieve multiple reception without losing the benefit of collision avoidance provided by 802.11. In the case of communication hole, there is a Virtual Destination-based Void Handling [16] (VDVH) scheme in which the advantages of greedy forwarding (e.g., large progress per hop) and opportunistic routing can still be achieved while handling communication voids that addressed the problem of selective jamming attacks in wireless networks.

S.Sharon Ranjini et al., [17] developed Position Based Opportunistic Routing Protocol for highly dynamic mobile nodes. If communication hole is there it is avoided by Virtual- Destination based void-handling. Here the VDVH Scheme is not needed since there is no void (communication hole) between the nodes that are created. The QOS Parameters such as Throughput, Packet Drop and packet Delivery Ratio are achieved.

RamKumar V.D [18] has implemented an algorithm for selecting the forwarding candidates in the network. The node's distance to the next hop is half of the transmission range. The source node has a list of neighboring nodes which are initialized. The distance between the current node and the destination nodes is calculated. The forwarding table is maintained and this makes the reliable data transmission in dynamic network.

CH.V.S.Lavanya et al., [19] developed a technique for reliable data delivery in dynamically changing network. Due to frequent break link in the network, it causes loss of data and communication error. By implementing network topology, sending acknowledgement, creating list of neighbors and void handling the packet delivery ratio increases without delay and duplication.

B. Proposed System

This work proposes reduce the link failure request by using apriori method. This proposed technique calculates the reboot cost delay in designing measure network. It finds the low level shortest path from source to destination. When sending some data from source to destination, sometimes data will be loss. If the data will be loss the communication process will start again from the first node so the process takes long processing time. The existing work shows high some high error signal during the communication of source to destination. So, this work mainly aimed to reduce the processing time with reduced data loss.

In the network scenario Figure 2, S is the source node and D is the destination node. The source node need to communicate to destination node so it constructs RREQ, instead of sending to all its node, it send only to node which are outer most in the transmission range. In this scenario the source node has 8 nodes in this transmission range as neighbours, instead of sending to all its neighbours it broadcast only selected. The steps proposed work architecture is as follows.

Step 1: Identify the network topology
Step 2: Position and weights of the nodes are calculated by the apriori method
Step 3: Sender find the next nearest node based on weights of path.
Step 4: Steps 2 and 3 are continued till the destination node reached.
Steps 5: the destination system constructs RREQ and unit-cast to the source system without data loss.

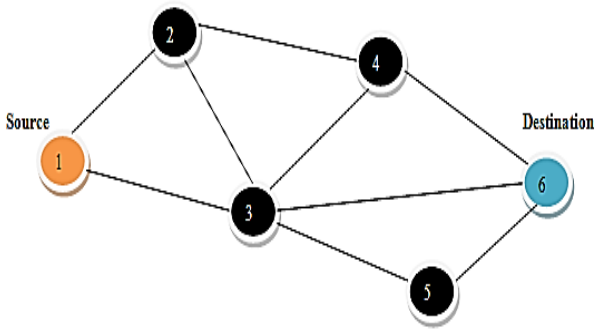

Figure 2: Network Scenario

The RREQ packet is sent to all the nodes present in the shaded region. In this proposed technique, the source node sends the RREQ only to selected nodes as shown in table 1 that indicates the node which receive RREQ.

III. RESULTS AND DISCUSSION

Consider the network topology with 6 nodes where 0 as source node and 6 as destination node. The remaining are intermediate node respectively. The source node constructs the path between. 1 and 6 with 3 and 4 are intermediate node. At certain time the link fails due the mobility. The proposed work maintains a table using apriori algorithm the sort most frequent path. When there is a link failure, the resent path chosen and data transferred.

Table 1: Available Paths

S.NO	PATH
1	1-2-4-6
2	1-3-4-6
3	1-3-6
4	1-3-5-6
5	1-2-3-6
6	1-2-3-4-6
7	1-3-2-4-6
8	1-2-3-5-6

In network scenario the link between 3 and 4 fails. Then the node searches a frequent in its table the avail paths are tabulated in the table-2.

Table 2 : Available Paths

S.NO	PATH
1	3-4-6
2	3-6
3	3-5-6
4	3-2-4-6

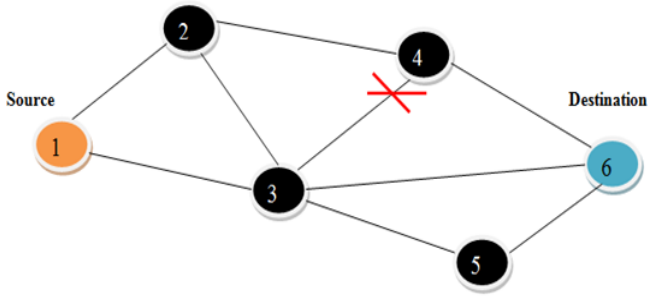

Figure 3: Link Failure

In Figure 3 the there is a link failure between node 3 and node 4, in proposed work every node maintains a table as shown in table 2. The table contains the frequent used and available paths. The node 3 instead of calculating new it will choose the frequent path.

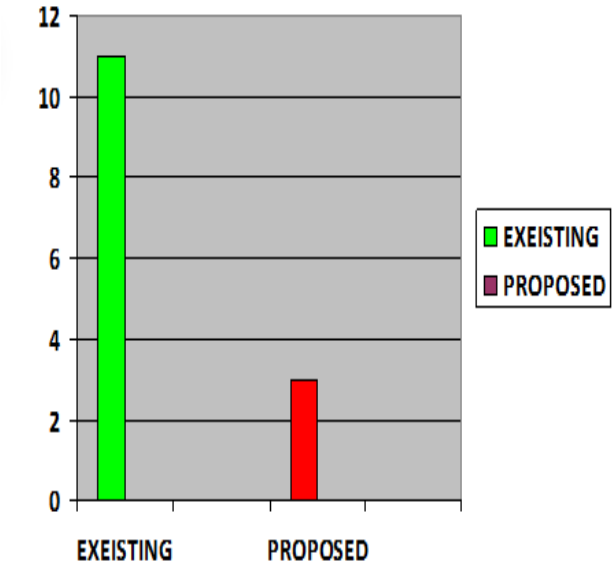

Figure 4: Control packets

The figure 3 shows the comparison existing and proposed work. The proposed work the number of control packets reduced by this the network overhead and used energy is reducing.

IV.CONCLUSION

This paper presents how to optimize the routing protocol in order to reduce the delay in MANET. This technique gives the priority to all the paths between the source node and destination node based on the path's speed. High speed path gets high priority. The best and quality path is chosen through this technique. . After completing the transmission, calculate the speed of the path and maintain it in the node's table. Therefore this optimizing technique reduces delay in time, packet loss and control routing overhead effectively. QoS contains numerous parameters. Accordingly, QoS may shift starting with one application then onto the next application. Applications like document exchange and validation administrations require high dependability. A few applications like sound and video will require low unwavering quality and fast.

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