A Survey - Reliable Data Delivery for Highly Dynamic Mobile Adhoc Network

Dr. Calduwel Newton P ,
Department of Computer Science,
Bishop Heber College (Autonomous),
Trichirappalli, India.
calduwel@yahoo.com

Arul Ramya P,
Department of Computer Science,
Bishop Heber College (Autonomous),
Trichirappalli, India.
arulramya08@gmail.com

Abstract— **A Mobile Ad Hoc Network (MANET) is a decentralized type of network. It is a wireless network without having any infrastructure. There are no fixed route each node act as both a router and a host. Node mobility is the major problem in MANET. Most existing ad hoc routing protocols are easily affected to node mobility especially for large scale networks. This paper aims to survey various mechanism used for reliable data delivery in MANET.**

Keywords— *MANET, POR, Geographic Routing, Void handling, Reliable data delivery*

I.   INTRODUCTION

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, each node must be able to act as a router to find out the optimal path to forward a packet. As nodes may be mobile, entering and leaving the network, the topology of the network will change continuously.

Geographic Routing (GR) is a routing that depends on geographic position information. 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 broadcasted to other nodes periodically. The next rely node is selected only based on the location information of the source node. The geographic routing is scalable and suitable for large networks.

A.   Position Based Opportunistic Routing Protocol

It is based on geographic routing and opportunistic forwarding. The topology is set by sending hello packets to the neighboring nodes. The topology must be set first before implementing geographic routing and opportunistic forwarding. The location and position of the neighbor nodes can be identified by one-hop beacon or piggyback in data packet header.

Source node initiates the packet to transmit, it gets the destination location attached with the packet header. In Multihop the path may diverge from its final location. Suppose if the node fails to transmit the packet, the forwarding nodes checks the neighbor list at every hop to see whether the destination is within the range.

B.   Virtual Destination Based Void Handling

In the network is not uniformly distributed which causes lack of communication between the nodes to improve Location based opportunistic Routing (LOR). Void handling mechanism based on virtual destination is proposed when a communication hole occurs virtual destination is introduced temporarly to forward the packets.

The control messages are introduced in virtual destination based void handling namely path acknowledgment and reverse suppression. Path acknowledgment is given for the destination where the packet has been delivered and also to the source where the packet has been forwarded.

Some definitions,

- *Packet Delivery Ratio*

The number of data packets received at the destination(s) to the number of data packets sent by source(s).

- *End-to-end delay*

The average and medium end-to-end delay are evaluated, along with cumulative delay distribution function.

- *Throughput*

The average successful message delivered over a communication channel.

II.   RELATED WORKS

S.M.Nandhagopal et al., [4] discussed that Position based Opportunistic Routing is based on geographic routing and opportunistic forwarding. The location and position of the neighbor node is found by one hop beacon or piggyback. The neighbor 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 has the highest priority. Simulation confirms that Position Based Opportunistic Routing has high packet delivery ratio with low delay and duplication.

J.Johnsi et al., [3] 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, no need to maintain routing table or neighbor information. If there is a

failure node 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.

S.M.Nandhagopal et al., [2] focused on Wireless Routing Protocol(WRP). Each and every mobile inform the link changes through the use of updated message. An updated message is sent only between the neighboring nodes and it contains 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 be opportunistically carry and transmit across moving nodes. The main thought of this algorithm is maximum success delivery with minimum success time.

The transmission procedure of Moving Target oriented Opportunistic Routing 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, has a good performance in various node densities in terms of success ratio, average hops, overhead, and success time. Even when the node density is high, had an excellent speed and accuracy in delivery of Data in WSN.

Sale Sandeep et al., [5] explained POR (Position Based Opportunistic)-Packets are sent to the network. If any node fails to check the neighboring node in which the data can be delivered quickly to the destination. VDVH (Virtual Destination Based void Handling) improves the efficiency of POR protocol even if the nodes are not distributed in 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.

Jubin Sebastian E et al., [1] focused on Location Based Opportunistic Routing Protocol is based on geographic routing and opportunistic forwarding. The node assumes its own location and position of their neighbor. The neighbor location 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 attach the destination address to the packet header. By performing greedy forwarding based on location information the effect of path divergence can be very much alleviated. The source id and sequence number is given to the packets for identification. 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 is high and duplication is reduced.

A.Umamaheswaran et al., [6] 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, A Virtual Destination-based Void Handling (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.

Addressed the problem of selective jamming attacks in wireless networks. Consider an internal adversary model in which the jammer is part of the network under attack, thus being aware of the protocol specifications and shared network secrets. The jammer can classify transmitted packets in real time by decoding the first few symbols of an ongoing transmission. Evaluate the impact of selective jamming attacks on network protocols such as TCP and routing. The selective jammer can significantly impact performance with very low effort. The three schemes can be developed that transform a selective jammer to a random one by preventing real-time packet classification. Those schemes combine cryptographic primitives such as commitment schemes, cryptographic puzzles, and all-or-nothing transformations with physical-layer characteristics. Analyze the security of our schemes and quantified their computational and communication overhead.

S.Sharon Ranjini et al., [7] 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 is created. The QOS Parameters such as Throughput, Packet Drop, Packet Delivery Ratio are achieved.

RamKumar V.D [8] 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 the list of neighbor nodes and is initialized. The distance between the current node and the destination nodes are calculated. The forwarding table is maintained and this makes the reliable data transmission in dynamic network.

CH.V.S.Lavanya et al., [9] 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.

III. SUMMARY

By using Position based opportunistic routing protocol and topology based routing protocol reliable data delivery is achieved. Since mobile adhoc network has highly dynamic nodes the packet delivery remains challenging.

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