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Geographic Routing of packet using void handling techniques in MANET's

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ABSTRACT

MANET consist of nodes that are often vulnerable to failure of delivering packets due to wireless network. All the existing Ad-hoc routing protocol are node moveable for geographic network specified. As multiple node are disjoint path from source to destination node. Due to this we have proposed an efficient mechanism which is position based opportunistic routing (POR) protocol when take advantage of the stateless property of geographic routing and broadcast in nature of wireless network. In this survey we have classified the void handling techniques which is used for the virtual destination based void handling method that helps us in providing multi hop packet delivery in robust manner is used together with position based opportunistic routing protocol(POR). This POR is stateless geographic routing and broadcast in effective way. Thus we utilize free air backup method of communications along with multi hop facility without interruption in POR. During this opportunistic of forwarding in void handling process virtual destination is obtained in the manet. This method is local route recovery method which overcomes the problem of duplication caused due to rerouting of packet when delivery of the packet fails. This might reduce rerouting of packet where not necessary thus reduce the cost. Then it necessary places a call to node which is mainly reliable node with a reliable path in multiple segment the Mobile ad hoc (manet) environments. In opportunistic routing neighbourhood location information can be exchange using one hop or multi hop where network varies.

Introduction

In MOBILE ad hoc networks (MANETs) have spread in the world due to significant advantages brought by multi-hop, infrastructure-less transmission. MOBILE ad hoc networks (MANETs) have gained a great deal of attention because of its significant advantages brought about by multi hop, infrastructure-less transmission. However, due to the error present in wireless network and the dynamic network topology which provides reliable data delivery i.e. MANETs is constructed especially in challenged environments without high mobility.

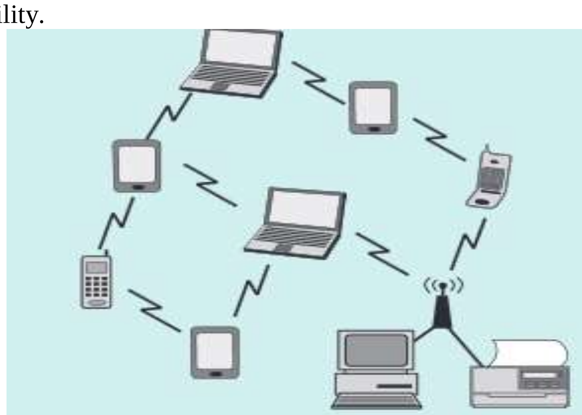

Figure 1. Mobile ad hoc network

Previously in the topology-based MANET routing protocols (e.g., DSDV, AODV, DSR)are quite problem prone to node mobility in wireless network. One of the main reasons is due to the predetermination of an end-to-end route of data transfer before data transmission. Owing to the constantly and even fast changing network topology the requirement, it is very difficult to maintain the deterministic route. The discovery and recovery of the packets in the network are also time and energy consuming. Once the path breaks, data packets will get lost in the network which is never recovered as lack of backup. Thus results in delayed for a long time until the reconstruction of the route, causing retransmission and interruption.

In mobile ad hoc network the infrastructure of wireless networks, where each the user directly communicates with an access point or base station, a mobile ad hoc network, or *MANET*, does not rely on a fixed infrastructure for its operation (Figure 1).The network is an autonomous transitory association of mobile nodes that communicate with each other over wireless links. Nodes that lie within each other's send range can communicate directly and are responsible for dynamically discovering each other. In order to enable communication between nodes that are not directly within each other's send range, intermediate nodes act as routers that relay .However, due to the vulnerability wireless channel and the dynamic network topology, reliable data delivery in MANETs, especially in challenged environments with high mobility remains an issue in the network. Traditional topology-based MANET routing protocols (e.g., DSDV, AODV, DSR [1]) are quite susceptible due to node mobility. One of the main reasons is due to the predetermination of an end-to-end route before data transmission. This is constantly and even fast changing network topology, it is very difficult to maintain a deterministic route in such condition where the network changes constantly . The discovery and recovery procedures are both time and energy consuming. Once the path breaks, data packets will get lost or be delayed for a long time until the reconstruction of the route, causing transmission interruption. Mobile ad hoc networks find application in many fields such as military deployments, disaster rescue missions, and electronic classrooms. In this paper, we

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primarily look at reliability in terms of providing a protection to node failures in ad hoc networks. Node failures may be for short periods or for long periods of time, and due to various reasons. First, since these networks are likely to be deployed in wireless environments. The communications between the ad hoc nodes will have to be send via the channel. Thus, in the communications between nodes would typically endure periods of failure and as a result, packet gets lost. It is possible that certain nodes might completely lose connectivity for temporary periods due to the fading conditions. One way of this overcoming this would be to use sophisticated antenna systems or modulation methods. However, many of the ad hoc nodes, if not all of them, would be constrained by size. processing and power limitations and so may not possess such capabilities. Second, many of the ad hoc nodes are power constrained. Due to battery drain, it is possible that some of these nodes might not be able to function problem. Such a condition may result in a long term failure if a node's battery is completely drained or if it is possible to re-charge the node's battery, the node might not function for after a short periods of time. Third, nodes in an ad hoc network are error pore due to compromise. Compromises are especially likely for unattended sensor nodes . A simple form of denial of service is to simply cause of node failure. Geographic routing (GR) [2] uses location information to forward data packets, in a hop-by-hop routing condition. Greedy forwarding is used to select next hop forwarder in large geographic condition with the largest positive progress toward the destination node while void handling mechanism is triggered to route around communication voids [3]. No end-to-end routes need to be maintained, leading to GR's high efficiency and scalability. Therefore GR is very responsive to the incorrectness of geographical location information [4]. In the operation of greedy forwarding, the neighbour which is relatively distant from the sender is chosen as the next hop. If the node moves out of the sender's coverage area. Then transmission will fail. Thus GPSR [5] (a very famous geographic routing protocol), the MAC-layer failure feedback is used to offer the packet that gives another chance to reroute the node. Though its unable to keeping up with the performance when node mobility increases. In reality, due to the broadcast nature of the wireless medium a single packet transmission will produce multiple reception. If such transmission is used as backup. Then robustness of the routing protocol can be significantly improved the performance. The concept of such multicast-like routing strategy has already been demonstrated in opportunistic routing ([6], [7], [8]). Though, most of them use link-state style topology database to select and prioritize the forwarding candidates nodes. In order to acquire the inter-node loss rates, periodic network-wide measurement is required, which is impractical for mobile environment. As mentioned in [9], the batching used in these protocols also tends to delay packets and is not preferred for many delay sensitive applications. Now, location-aided opportunistic routing has been proposed [10] which directly uses location information to guide packet forwarding node. Though just like the other opportunistic routing protocols. It is still intended for static mesh networks and focuses on network throughput while the robustness brought upon by opportunistic forwarding has not been well described. Different from topology-based routing and geographic routing exploits the geographic information rather than topological connectivity information to move data packets to gradually approach and eventually reach the intended destination node. Only one-hop geographic information of neighbouring nodes is exploited in most geographic routing protocols. Hence, geographic routing does not require the establishment or maintenance of complete routes from sources to receiving nodes. So, nodes do not have to store routing tables. There is no need to transmit routing messages to update route states either [6]. The localized operation and the stateless feature of geographic routing make it simple and scalable. Geographic routing also enables a geo-casting service, which supports the delivery of packets to all nodes in a specified geographic region [7]. n recent years the widespread availability of wireless communication and handheld devices has stimulated research on self-organizing networks according to their network that do not require a pre-established infrastructure. These *ad hoc networks*, as they are commonly called, consist of autonomous nodes that collaborate in order to transport information among the network.

Purpose:

It addresses the problem of delivering data packets for highly dynamic mobile ad hoc networks in a reliable and timely manner in the given network. Most existing ad hoc routing protocols are susceptible to node mobility as they are wireless, especially for large-scale networks. Driven by this issue, we propose an efficient Position-based Opportunistic Routing (POR) protocol which takes advantage of the stateless property of geographic routing and the broadcast nature of wireless mobile ad hoc network medium. In the case of communication gap or hole, a Virtual Destination-based Void Handling (VDVH) scheme is further proposed to work together with POR to provide more reliability. The analysis of the results show that POR achieves excellent performance even under high node mobility with acceptable overhead and the new void handling scheme also works well.

Existing System:

Geographic routing (GR) uses location information to forward data packets, in a hop-by-hop routing fashion. Greedy forwarding is used to select next hop forwarder with the largest positive progress towards the destination while void handling mechanism is triggered to route around communication voids. No end-to end routes need to be maintained, leading to GR's high efficiency and scalability. In the operation of greedy forwarding, the neighbor which is relatively far away from the sender is chosen as the next hop. If the node moves out of the sender's coverage area, the transmission will fail.

Disadvantages of existing system:

1.GR is very sensitive to the inaccuracy of location information.
2.If the node moves out of the sender's coverage area, the transmission will fail.
3.Due to the error prone wireless channel and the dynamic network topology, reliable data delivery in MANETs, especially in challenged environments with high mobility remains an issue.
4.Owing to the constantly and even fast changing network topology, it is very difficult to maintain a deterministic route. The discovery and recovery procedures are also time and energy consuming. Once the path breaks, data packets will get lost or be delayed for a long time until the reconstruction of the route, causing transmission interruption.Typically ,these nodes act as final systems and routers at the same time. Ad hoc networks can be classify into two classes: *static* and *mobile*.

In static ad hoc networks the position of a node may fixed. It has become part of the network. Typical examples are rooftop networks [1]. Thus, for future work we solely focus on mobile ad hoc networks. In mobile ad hoc networks the systems may move randomly. Examples mobile ad hoc networks may be the establishment of connectivity among handheld devices or between vehicles. As mobile ad hoc networks can change their topology frequently and without prior notice and routing in such networks is a demanding task. We distinguish two different approaches: *topology-based* and *position-based* routing. Topology-based routing protocols use the information about the links that exist in the network to perform packet forwarding. They can be further divided into *proactive*, *reactive*, and *hybrid* network approaches. Proactive algorithms employ classical routing strategies such as distance-vector routing (e.g., DSDV [2]) or link-state routing (e.g., OLSR [3] and TBRPF [4]). They maintain routing information about the available paths in the network even if these paths are not currently used. The main drawback of these approaches is that the maintenance of unused paths may occupy a significant part of the available bandwidth in the condition where topology of the network changes frequently [5]. In response to this observation, reactive routing protocols were developed (e.g., DSR [6], TORA [7], and AODV [8]). Reactive routing protocols preserve only the routes that are currently in use and thereby reducing the load on the network when only a small subsection of all available routes is in use at any time. However, they still have some inherent limitations in the network. First, since routes are only maintained while in use, it is typically required to perform a route discovery before packets can be exchanged between communication peers. This leads to a delay for the first packet to be transmitted in. Second, even though route maintenance for reactive algorithms is restricted to the routes currently in use, it may still generate a significant amount of network traffic when the topology of the network changes frequently. At last packets are routed to the destination are likely to be lost if the route to the destination changes. Multipath routing is one way of improving the reliability of the transmitted information in packet. While multipath routing may be used for various other reasons such as load-balancing, congestion avoidance, lower frequency of route inquiries and to achieve a lower overall routing overhead. Our objective is to primarily design a multipath routing framework for providing enhanced protection form to node failures. If one could provide multiple paths from a source to a destination node. One could lighten the transmission of redundant information on the various paths (by the use of known techniques such as vast encoding [6]) that would help the receiver in reconstructing the transmitted information even if a few of the network paths gets failed. By multiple paths, we imply multiple node disjoint routes from a source node to a destination node. Our first goal towards this is to design a routing protocol that would allow us to find multiple node-disjoint paths from a given source to a destination nodes. Towards this, we make modifications to the Ad Hoc Distance Vector Routing Protocol (AODV) [7] which is one of the most popular ad hoc routing protocols to facilitate the discovery, and consequently the use of multiple node-disjoint paths. Hybrid ad hoc routing protocols such as ZRP [9] hybrids local proactive routing and global reactive routing in order to achieve a higher level of efficiency and scalability. However, even a combination of both strategies still needs to maintain least those network paths that are currently in use, limiting the amount of topological changes that can be tolerated within a given amount of time. A survey and evaluation of topology is based upon approaches that can be found in [10]. In the following we will focus totally on position-based routing. Position-based routing algorithms eliminate some of the limitations of topology-based routing by using additional information. They are that information about the physical position of the participating nodes be available. Commonly, each node determines its own position through the use of GPS or some other type of positioning service. In the *location service* is used by the sender of a packet to determine the position of the destination and to include it in the packet's destination address. The routing decision at each node is then based on the destination's position contained in the packet and the position of the forwarding node's neighbours. Position-based routing thus does not require any information managing of routes. The nodes have not store routing tables or to transmit messages to keep routing tables up to date about the information. As a further advantage, position-based routing supports the delivery of packets to all nodes in a given geographic region in a natural way. This type of service is called *geo-casting.* We found that the number of node-disjoint paths from a source to a destination is dependent on the node location in the ad hoc network (as might be expected). Furthermore, we found that as the distance between a source and its destination is increased, one could find no more than a very limited number of paths between them, even at moderate node densities. This above observation lead us to believe that, one would require at least a few of the ad hoc nodes to be more *reliable*. One could focus that these nodes would be placed in moving vehicles and could be less constrained in terms of size, processing and power. They would be physically more secure and robust to compromises. These nodes are fewer and could then, be allowed to participate in routing along multiple routes between the same source-destination pair. For the ease of notation let us call these nodes *R-nodes*. The revised objective is then to construct a sequence of *reliable segments* between the source and the destination . Nodes that join two segments have to be R-nodes. P segment is said to be reliable if it consists of either a fix number of paths between the two R-nodes that it connects or if it is made up of R-nodes entirely. P concatenation of reliable segments is called a *reliable path*. In this survey the state of the void handling techniques for geographic routing in wireless networks.

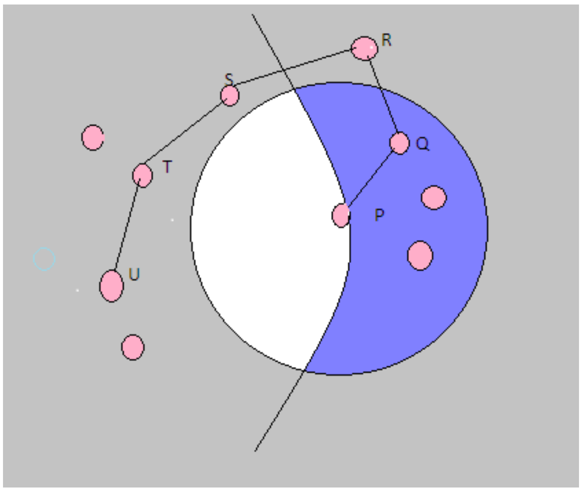

Fig 1. P void, with respect to destination U, occurs at node R where greedy forwarding fails.

In void-handling techniques currently available in the literature. For an in depth understanding of these techniques, we separate these techniques from their relevant geographic routing protocols. That is, we present basic principles and inherent characteristics of these techniques, independent of other components of geographic routing as well as of any wireless network environment with specific network characteristics given in above figure no1.Note that a void handling technique is invoked only when a data packet encounters a void and greedy forwarding fails at the void node. Once the stuck data packet overcomes the void or reaches a node that is closer to the destination than the void node, greedy forwarding is then reactivated for the packet. Even though a dense deployment of connectionless nodes can reduce the likelihood of the occurrence of a void in the network. It is still possible for some packets to encounter voids that are induced by some problem like the unreliable nodes. The margins of a connectionless network. These packets have to be discarded when only a single greedy-forwarding strategy is used even if a topologically valid path to the destination node may still present. therefore, it is necessary to design a void-handling technique for geographic routing in an effective and efficient manner. The suitable path to the destination node may still exist.

Literature Survey

Multipat-routing protocols for reliable data transmission

Multipath direction-finding can be use support to reliable message over untrustworthy low-power connectionless links through introducing data redundancy during the data transmission process.

In multipath direction-finding protocols ,it has designed to provide reliable data transmission.

Reliable Information Forwarding using multiple paths (ReInForM):

We describe the multi-path forwarding algorithm, ReInForM for as long as desired dependability in data delivery. The main idea is to provide reliability in data delivery by introducing redundancy in the form of multiple copies of each packet delivered through multiple paths from source to sink. We describe the network model that we assume for the underlying sensor network. The network graph G= (V, E) has |V|=n vertices and |E|=m edges. The vertices stand for the sensor nodes which have uniform random distribution. The edges stand for the wireless communication links between nodes. The links are assumed to be symmetric (the graph is undirected) and all nodes have equal communication radius R. Thus, G is a *unit disk graph* in which an edge Based on the local knowledge of some network conditions (control error, hop to sink, out-degree etc.), the source decide to send various copies of packets through multiple paths. Each packet header contain information about network conditions from the previous step, which is used for forwarding decisions. As a packet travels in the direction of the sink, these fields are efficient at each node to account for local deviation in network conditions. The method is similar to *Dynamic Packet State* (DPS) fashion used for data networks . The idea behind DPS is to carry some state information in the packet header enabling the network to serve the packet in hop-by-hop manner. This fields are used to the data packets and sends multiple copies of the generated data packets over several paths. The transmission node identify the essential number of paths to full fill the reliability demands of the collected information along with the DPS fields of the data packets. During data transmission all the mediator nodes use the provided information by the DPS fields in the received data packets to identify the number of copies that should be transmitted to their next-hop of neighbouring nodes. As soon as possible this process continues until all the transmitted data packets reach to the sink node. ReInForM tries to improve data transmission consistency through utilizing the packet duplication technique at all the involved sensor nodes in the data transmission process.

Drawbacks:

The high reliability of this protocol is achieved at the high cost of energy consumption and bandwidth utilization. It's in contrast with the primary demands of resource constrained sensor nodes.

Multipath Routing

Multipath routing, which is typically proposed to increase the reliability of data transmission in wireless ad hoc networks. It allows the establishment of multiple paths between the transmitter and the receiver.

Existing multipath routing protocols are broadly classified into the following three types:

1) Using alternate paths as backup
2) Packet replication along multiple paths.
3) Split, multipath delivery, reconstruction using some coding techniques.

It may be difficult to find suitable number of independent paths. More importantly, in the face of high node mobility, all paths may be broken with considerably high probability due to constantly changing topology, especially when the end-to-end path length is long, making multipath routing still incapable of providing satisfactory performance.

PRO (Position-based Opportunistic Routing)

An opportunistic retransmission protocol PRO is proposed to cope with the unreliable wireless channel. Implemented at the link layer, PRO leverages on the path failure information Receiver Signal Strength Indicator (RSSI) to select and prioritize relay nodes. By assigning the higher priority relay a smaller contention window size, the node that has higher packet delivery ratio to the destination will be preferred in relaying.

GR(Geographic routing)

In a hop-by-hop routing fashion, Geographic routing (GR) uses location information to forward data packets. In a hop-by-hop routing fashion. Greedy forwarding is used to choose next hop forwarder with the largest positive progress towards the destination while void handling mechanism is triggered to route around communication voids. No end-to end routes need to be maintained and leading to GR's high efficiency sand scalability.

Drawback

GR is very sensitive to the inaccuracy of location detail information.

If the node moves out of the sender's coverage area then transmission will fail.

Abbreviations	Full Forms
MANET	Mobile ad hoc network
POR	Position-based Opportunistic Routing
VDH	Virtual Destination-based Void Handling
GR	Geographic routing
DPS	Dynamic Packet State

Proposed System

We propose a novel Position based Opportunistic Routing protocol (POR) is proposed, in which several forwarding candidates cache the packet that has been received using MAC interception. If the best forwarder does not forward the packet in certain time slots, suboptimal candidates will take turn to forward the packet according to a locally formed order. In this way, as long as one of the candidates succeeds in receiving and forwarding the packet, the data transmission will not be interrupted. Potential multi-paths are exploited on the- fly on a per-packet basis, leading to POR's excellent robustness.

Advantages of proposed system:

- Position based opportunistic routing mechanism which can be deployed without complex modification to MAC protocol and achieve multiple receptions without losing the benefit of collision avoidance.

- Opportunistic routing can still be achieved while handling communication voids.

Scope:

It is mainly used for a position-based opportunistic method of routing mechanism which can be deployed without complex modification to MAC protocol and achieve multiple receiver without losing the benefit of avoiding collision. The new concept of in-the-air backup significantly decreases the reasons of error of the routing protocol which reduces the latency and duplication of forwarding caused by local route repair. In the case of communication hole, we propose a Virtual Destination-based Void Handling (VDVH)scheme in which the advantages of greedy forwarding and opportunistic routing can still be achieved while handling communication voids. We analyze the effect of node mobility in the network on packet delivery and explain the improvement brought about by the particular node who is the forwarding candidates. The overhead caused by the POR with focus on buffer usage and bandwidth of the node consumption due to forwarding candidates node duplicate relaying may also be caused. Through it analysis, this has conclude that due to the selection of forwarding area and the properly overcome a and designs the duplication limitation. The POR’s performance gain can be achieved at little overhead cost of the network. Thus finally, it evaluates the performance of POR through extensive MANET network and verifies that POR achieves excellent performance in the face of high node mobility while the overhead is acceptable. We addressed a position-based opportunistic routing (POR) mechanism which can be deployed without complex modification to MAC protocol and achieve multiple receptions without losing the benefit of collision avoidance. In the case of communication hole, we propose 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.

We evaluate the effect of node mobility on packet delivery and explain the improvement brought about by the participation of forwarding candidates.

Overall Design:

In the below fig a MANET is created which contains of multiply nodes among which reliable data is to be send form source to destination. In the network any node cane be source and any other node can be destination. In below fig node A is source node and sink node is B. The method used is POR and VDVH for sending reliable packets form source to destination.

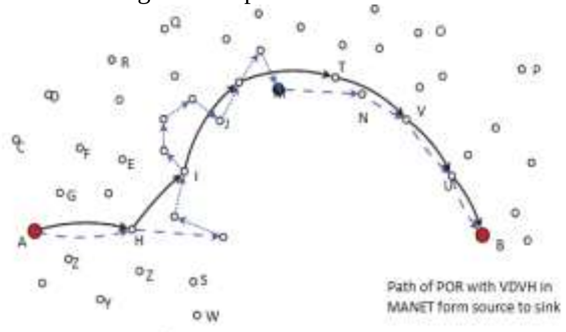

Fig 1. Overall design of the reliable MANET

Modules

1. Network formation
2. Packet Transmission
3. Acknowledgement Module
4. Relay Module
5. Update Module

Module Description

Network Formation

In this module we can construct a topology to provide communication paths for wireless Ad-hoc network. he node will provide the own details such as Node ID through which the transmission is done and similarly give the neighbor nodes details.

Packet Transmission

In this module the node has transmit the packet from source to destination. Transmission stage occurs at time in which node transmits if it has a packet.

Acknowledgement Module

In this module the nodes send acknowledgement details. Set of nodes that have received the packet transmitted by node. In this module nodes send acknowledgement packet who received the packet from the source. In the reception and acknowledgment stage, successful reception of the packet transmitted by node is acknowledged to it by all the nodes. We assume that the delay for the acknowledgment stage is small enough (not more than the duration of the time slot) such that node infers by time. The acknowledgment packet of node includes a control message known as estimated best score (EBS).

Relay Module

In this module the node select the routing action according to the randomized rule. Node transmits FO (forwarding), a control packet that contains information about routing decision at some time strictly between times. If termination action is chosen then all nodes in wipe out the packet. Upon selection of routing action, the counting variable is updated.

Update Module

In this module the node update the following details. After concluding the transmission and relay the node will update the score Vector. The node updates EBS and Message for future acknowledgements.

Overview of our Approach

The proposed scheme avoids these problems by adopting the additional static local storage instead of sliding window playback buffering. For this efficiently support users’ interactive operations and decrease complexity. The advantage of using this additional storage is that any user interactivity on the part of the peer does not affect its children from continuing to receive its stored media data. Moreover, observations from a large number of user requesting logs indicate that random seeking is frequently performed by most users. This is reasonable, as users usually jump directly to the scene of interest and skip boring segments. Therefore, it would be favorable if the system could guarantee peers the ability to jump to any play point in the requested video without searching for new parent peers that possess specific segments. In this survey, a novel Position-based Opportunistic Routing (POR) protocol is proposed. In POR (Position-based Opportunistic Routing), several forwarding candidates cache the packet that has been received using MAC interception. If the packet does not forward by best forwarder in certain time slots. Then, suboptimal candidates will take turn to forward the packet according to a produced formed order. In this way, as long as one of the candidates succeeds in receiving and forwarding the packet. The data transmission will not be broken up. All possible multi paths are broken on the fly on a per packet basis. POR’s excellent error free.

Algorithms

A] Forwarder List:

Algorithm 1 shows the procedure to select and prioritize the forwarder list. In packet header attached the candidate list to it and modernized hop by hop. Only the nodes specified in the candidate list will act as forwarding candidates. In candidates list, the lower the index of the node ,it has the higher priority .

Algorithm 1:Candidate Selection

ListN : Neighbor List
ListC : Candidate List, initialized as an empty list
ND : Destination Node
base : Distance between current node and ND
if find(ListN;ND) then
next hop $\leftarrow$ND
return
end if
for i $\leftarrow$0 to length(ListN) do
ListN[i].dist$\leftarrow$dist(ListN[i];N_D
end for
ListN:sort()
next hop$\leftarrow$ListN[0]
for i $\leftarrow$1 to length(ListN) do
if dist(ListN[i],N_D)$\geq$base or length(ListC) = N
then
break
else if dist(listN[i], listN[0]Þ < R/2 then
ListC.add(ListN[i])
end if
end for

Conclusion:

It has addressed the problem of reliable data delivery in highly dynamic mobile ad hoc networks .Constantly changing network topology and ranges of network makes conventional ad hoc routing protocols was incapable of providing satisfactory performance along with problem like continues change in route of packet. Thus frequent link breakage of node due to node mobility, substantial data packets would either get lost, or experience connectivity in the network. In connectionless network, we address POR (Position based Opportunistic Routing). The advantages of POR is broadcast nature and stateless property of geographic routing that takes in MANET. At the time of selecting next node for a large range, the link break is done when some forwarding candidates are openly specific in the network. In the air backup The broken route can be recovered in a timely manner that takes the advantage of POR. The effectiveness of the participation of forwarding candidates nodes next to node mobility, in addition, due to opportunistic forwarding is analyze and best possible result is obtain. When the delay and replication are minimized the high packet delivery proportion is achieved. On the other hand, the difficulty of communication void is obtain in geographic routing. A virtual destination-based void handling method is obtain while working with multicast forwarding fashion. The benefit of greedy forwarding and the error free routing can be achieve when handling using communication voids by provisionally adjust the direction of data flow. Existing void handling scheme perform weakly in mobile environment.

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