An Approach for Geographical Routing in MANET

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ABSTRACT

Geographic routing is a* routing *principle that relies on geographic position information. It is mainly proposed for* wireless networks *and based on the idea that the source sends a message to the geographic location of the destination instead of using the network address. In geographic routing, nodes need to maintain up-to-date positions of their immediate neighbors for making effective forwarding decisions. Periodic broadcasting of beacon packets that contain the geographic location coordinates of the nodes is a popular method used by most geographic routing protocols to maintain neighbor positions. Adaptive Position Update (APU) strategy for geographic routing, which dynamically adjusts the frequency of position updates based on the mobility dynamics of the nodes and the forwarding patterns in the network. In this paper we mainly proposed for* wireless networks *and based on the idea that the source sends a message to the geographic location of the destination instead of using the network address. The benefits of APU are confirmed by undertaking evaluations in realistic network scenarios, which account for localization error, realistic radio propagation, and sparse network. . In this paper we systematize the knowledge about the geographical routing and explain about how various parameters are executes using various techniques.

Keywords:- adaptive position update, MANET

1. INTRODUCTION

A Mobile Ad hoc Network (MANET) is a self organized infrastructure less network. Routing is an important issue in a MANET because of the dynamic nature of the network. A node acts both as host and a router. There are three types of routing mechanisms in MANETs. They are the proactive, reactive and hybrid. A proactive routing algorithm finds the route based on the information of routing table at each node. A reactive routing algorithm finds the routes by initiating the route discovery at the source and maintaining the discovered routes for further discovery of route process in the cache. A hybrid algorithm is a combination of both the proactive+ and reactive algorithm. Based on the structure MANETs are classified as flat structured and clustered networks. In flat structured network communication is unicast . In clustered networks the communication is multicast. Some of the types of clustered networks are tree structured, others are mesh structured. Geographic routing is a routing principle that relies on geographic position information. It is mainly proposed for wireless networks and based on the idea that the source sends a message to the geographic location of the destination instead of using the network address. The physical positions of each node, geographic routing algorithms have also been applied to networks in which each node is associated with a point in a virtual space, unrelated to its physical position. Mobile Ad Hoc Network are formed by autonomous system of mobile hosts connected by wireless links with no supporting fixed infrastructure and no administrator. Communication is directly between nodes or through intermediate nodes acting as routers. The advantage of such network are rapid deployment , robustness, flexibility, inherent support for mobility. The vision of Ad Hoc network is wireless internet, where all users can move anywhere anytime and still connecting with rest of the world.[8] A mobile ad hoc network (MANET) is a self-organizing and self configuring multi hop wireless network, where the network structure changes dynamically due to member mobility. Ad hoc wireless network are self creating and self organizing and self administrating. The nodes are free to move randomly and organize themselves arbitrarily; thus, the network's wireless topology may change rapidly and unpredictably. Such a network may operate in a standalone fashion, or may be connected to the larger Internet . Mobile nodes that are within each other's radio range communicate directly via wireless links, while those far apart rely on other nodes to relay messages as routers. In ad hoc network each node acts both as a host and a router which forwards the data intended for some other node. An ad hoc network might consist of several home-computing devices, including laptops, cellular phones, and so on. Each node will be able to communicate directly with any other node that resides within its transmission range. For communicating with nodes that reside beyond this range, the node needs to use intermediate nodes to relay the messages hop by hop. Geographic routing is a routing principle that relies on geographic position information. It is mainly proposed for wireless networks and based on the idea that the source sends a message to the geographic location of the destination instead of using the network address. The physical positions of each node, geographic routing algorithms have also been applied to networks in which each node is associated with a point in a virtual space, unrelated to its physical position. In geographic routing, the forwarding decision at each node is based on the locations of the node's one-hop neighbors and location of the packet destination as well. Geographic routing is a routing principle that relies on geographic position information. It is mainly proposed for wireless networks and based on the idea that the source sends a message to the geographic location of the destination instead of using the network address . Geographic routing is a routing principle

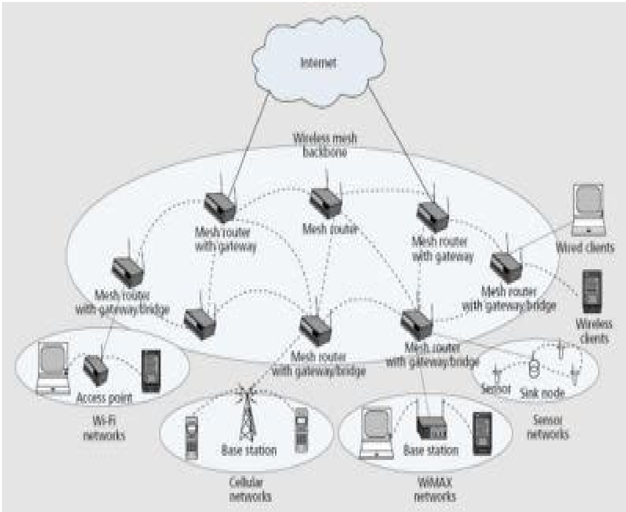

Fig : Geographical routing in MANET

Geographic routing is a routing principle that relies on geographic position information. It is mainly proposed for wireless networks and based on the idea that the source sends a message to the geographic location of the destination instead of using the network address. The physical positions of each node, geographic routing algorithms have also been applied to networks in which each node is associated with a point in a virtual space, unrelated to its physical position. In geographic routing, the forwarding decision at each node is based on the locations of the node's one-hop neighbors and location of the packet destination as well. Some geographic routing schemes, simply assume that a forwarding node knows the location of its neighbors. While others use periodical beacon broadcasting to exchange neighbors' locations. In the periodic beaconing scheme, each node broadcasts a beacon with a fixed beacon interval. If a node does not hear any beacon from a neighbor for a certain time interval, called neighbor time-out interval, the node considers this neighbor has moved out of the radio range and removes the outdated neighbor from its neighbor list. The neighbor time-out interval often is multiple times of the beacon interval. The periodic beaconing can cause the inaccurate local topologies in highly mobile ad-hoc networks, which leads to performances degradation, e.g., frequent packet loss and longer delay. So the outdated entries in the neighbor list is the major source that decreases the performance. We proposed several simple optimizations that adapt beacon interval to node mobility or traffic load, including distance-based beaconing (DB), speed-based beaconing and reactive beaconing. We provide various parameters for producing results so its leads to the accuracy in the MANET. The various algorithms are used in it and various autonomous systems are also there to produce different results. The GPSR performance and behavior simulated in this project. As geographical routing is used as the mobile ad-hoc network by using network simulator we can check various parameters. The strategy for geographic routing in mobile ad-hoc network is implemented in this. Many system has worked on this but the data efficiency and reliability is main. So by using shortest path, using ant technology in artificial intelligence, the performance degradation is calculated. The GPSR performance is aim for scalability under increasing numbers of nodes in the network, and increasing mobility rate. Using GPSR the various networks are used so that the data sufficiency is measured. The beacon is used in mobile communication for the various data transfers. The various strategies are used in this because of the geographical routing so the data transmission is produced in it. The data is adopted from the various hubs so to perform actions on it. In this the geographical routing is the main part of the theory.[2]

2. BACKGROUND

A mobile ad hoc network (MANET) is a continuously self-configuring, infrastructure-less network of mobile devices connected without wires. Ad hoc is Latin and means "for this purpose". Each device in a MANET is free to move independently in any direction, and will therefore change its links to other devices frequently. Each must forward traffic unrelated to its own use, and therefore be a router. The primary challenge in building a MANET is equipping each device to continuously maintain the information required to properly route traffic. Such networks may operate by themselves or may be connected to the larger Internet. They may contain one or multiple and different transceivers between nodes. This results in a highly dynamic, autonomous topology. MANETs are a kind of Wireless ad hoc network that usually has a routable networking environment on top of a Link Layer ad hoc network. MANETs consist of a peer-to-peer, self-forming, self-healing network in contrast to a mesh network has a central controller (to determine, optimize, and distribute the routing table). MANET stands for Mobile Ad Hoc Network. The Ad Hoc network that is used for mobile communication is called MANET. When the user is mobile, the session may not hold good and the communication may get hand-off. The MANETS come into picture when the user is moving. The MANETS use wireless networks to connect with different networks. Some of the MANETS are connected to LANs and some are connected to the internet based on the application of the network. These networks configure themselves even though they are not connected to any wireless routers. The characteristics of MANET **is** that it is used as **dynamic** topologies. In it the nodes of the network keep on moving with different speeds, which results in the variations in the structure of the network.It is energy-constrained operation so that the devices in the modern electronic world completely rely on batteries. The design of the network is to be optimized to conserve the energy consumed by the mobiles. The bandwidth of the wireless network is very much limited and the networks are to be optimized to perform with the maximum efficiency with in the limited bandwidth. When compared to the wired means of communication, wireless means of communication is more affected for security. The security of the MANET is to be optimized so that the information transferred is secured.

3. RELATED WORK

The Greedy Perimeter Stateless Routing, GPSR, a routing algorithm that uses geography to achieve small per-node routing state, small routing protocol message complexity, and extremely robust packet delivery on densely deployed wireless networks. GPSR generates routing protocol traffic in a quantity independent of the length of the routes through the network, and therefore generates a constant, low volume of routing protocol messages as mobility increases, yet doesn't suffer from decreased robustness in finding routes. DSR must query longer routes as the network diameter increases, and must do so more often as mobility increases, and caching becomes less effective. DSR generates drastically more routing protocol traffic in our 200-node and 112-node simulations than it does in our 50-node ones. GPSR keeps state proportional to the number of its neighbors, while both traffic sources and intermediate DSR routers cache state proportional to the product of the number of routes learned and route length in hops The large range of position error due to mobility may introduce longer transmission delay. The moving speeds less than 10 m/s do not introduce significant impact on the system performance. The simulations have shown that many kinds of system components contribute to the overall performance of a MANET.[3] The exact number may not apply to the real system. For example, the 70 dBm for carrier sense threshold may not necessarily be the same for various environments; the system performance might be significantly affected when the moving speed is larger than 10 m/s, and so on. This enables secure localization with a broad spectrum of localization techniques—ultrasonic or RF—based on the received signal strength or the time of signal flight. It also intend to investigate in more detail the privacy implications of our approach.[5] Mobile ad-hoc networks (MANETS) are expected to play an important role in the deployment of future wireless communication systems. Routing is an essential component of communication protocols in mobile ad hoc networks. The design of the protocols are driven by specific goals and requirements based on respective assumptions about the network properties or application area. Therefore, it is extremely important that these networks should be able to provide efficient quality of service that can meet the vendor requirements. To provide efficient quality of service in mobile ad-hoc networks, there is a solid need to establish new architectures and services for routine network controls. The time delay is the main concern for QoS of routing protocols demanding that real time data be transmitted within a definite time interval. QoS support is essential for supporting time critical traffic sessions. The comparison of proactive and reactive and hybrid routing protocols based on significant QoS parameter like throughput, bandwidth, time complexity, Power requirement, Route acquisition delay, Control overhead, Routing Structure, Communication Overhead, Scalability etc. The review typical routing protocols and reveal the characteristics and trade-offs. The two self-adaptive on-demand geographic routing protocols.[7] The two protocols adopt different schemes to obtain and maintain local topology information on data traffic demand. One protocol purely relies on one hop topology information for forwarding as other geographic routing schemes; the other one combines both geographic and topology-based mechanisms for more efficient path building. With parameter adaptation schemes, each node can determine and adjust the protocol parameter values independently according to different network environments, data traffic conditions and mobile nodes' own requirements. To alleviate the negative effects of outdated local topology information on geographic routing, it need to design more efficient position distribution mechanisms to update the local topology knowledge in time and adaptively based on demand. The simulation results show that this protocols can efficiently adapt to different scenarios and perform better than the existing geographic routing protocols. Nearly four times delay reduction has been observed in high mobility case.[8]

4.ANALYSIS OF GEOGRAPHICAL ROUTING

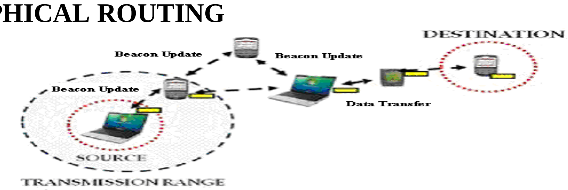

Fig . System Design[1]

So, first we create network module with Source node, intermediate nodes and sink node. In this network environment we are going to perform our technique of Adaptive position update (APU). In the router node, we design as the network nodes perform the operations of Beaconing information, mobility prediction rule and On-demand Learning Rule. The Source node perform the operation of triggering router node by sending the data using Socket technique by giving the ip address from one node to another node. The destination node performs the operation of receiving data and acknowledging the details. after triggering the router node, the node initialization process is carried out. Then, the beacon packets are transmitted to all the nodes in the network. In this module, we check the nodes distance between previous position and current position. The node distance greater than acceptable threshold update their position to its neighbors through beacon packets. The Node Prediction rule is triggered when there is change in the location of the node. The change in the location of the node is cannot be predicated because it moves in the random direction. So the beacon packet is send when the deviation is greater than the threshold condition and it is known as Acceptable Error Range (AER). It act node to send the beacon packets to the neighboring nodes. As the name suggests, a node broadcasts beacons on-demand, i.e., in response to data forwarding activities that occur in the vicinity of that node. According to this rule, whenever a node overhears a data transmission from a new neighbor, it broadcasts a beacon as a response. By a new neighbor, we imply a neighbor who is not contained in the neighbor list of this node. In reality, a node waits for a small random time interval before responding with the beacon to prevent collisions with other beacons. Recall that, we have assumed that the location updates are piggybacked on the data packets and that all nodes operate in the promiscuous mode, which allows them to overhear all data packets transmitted in their vicinity. In addition, since the data packet contains the location of the final destination, any node that overhears a data packet also checks its current location and determines if the destination is within its transmission range. If so, the destination node is added to the list of neighboring nodes, if it is not already present. Note that, this particular check incurs zero cost, i.e., no beacons need to be transmitted. We evaluate the impact of varying the mobility dynamics and traffic load on the performance of APU and also compare it with periodic beaconing and two recently proposed updating schemes: distance-based and speed-based beaconing (SB). The simulation results show that APU can adapt to mobility and traffic load well. For each dynamic case, APU generates less or similar amount of beacon overhead as other beaconing schemes but achieve better performance in terms of packet delivery ratio, average end-to-end delay and energy consumption.

5. CONCLUSION

In this paper, it is identified the need to adapt the beacon update policy employed in geographic routing protocols to the node mobility dynamics and traffic load. In this the Adaptive Position Update strategy to address these problems. The APU scheme employs two mutually exclusive rules. The MP rule uses mobility prediction to estimate the accuracy of the location estimate and adapts the beacon update interval accordingly, instead of using periodic beaconing. The ODL rule allows nodes along the data forwarding path to maintain an accurate view of the local topology by exchanging beacons in response to data packets that are overheard from new neighbors. We mathematically analyzed the beacon overhead and local topology accuracy of APU and validated the analytical model with the simulation results. We have embedded APU within GPSR and have compared it with other related beaconing strategies using extensive NS-2 simulations for varying node speeds and traffic load.

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