International Journal of Emerging Engineering Research and Technology
Volume 2, Issue 4, July 2014, PP 448-454
ISSN 2349-4395 (Print) & ISSN 2349-4409 (Online)

Analysis of the Local Topology Accuracy Using Mobility Prediction and on Demand Learning in Mantes

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Abstract: *Geographic Routing operates without any routing table, and when once the position of the destination is known then the communication is strictly local. Due to the scalability feature of geographic routing it has become one of the most suitable routing strategies in the wireless mobile ad hoc networks. The two reasons why geographic routing scale better for ad hoc networks are that it is not necessary to keep the routing tables up-to date and there is no need to have a network topology and its changes. Establishment and route maintenance is not necessary because no routing table is there. Greedy forwarding, which is the principle approach in geographic routing, fails if a void node is encountered by the packet, i.e., if there is no one hop neighbour that is closer to the destination than the forwarding node itself. To overcome these problem recovery strategies was introduced. Greedy- Forwarding , Recovery-Forwardings in this paper We contend and demonstrate that periodic beaconing regardless of the node mobility and traffic patterns in the network is not attractive from both update cost and routing performance points of view propose the APU strategy means Adaptive Position Update 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. Adaptive Position Update is based on two simple principles:*

i) nodes whose movements are harder to predict update their positions more frequently and vice versa, and (ii) nodes closer to forwarding paths update their positions more frequently (and vice versa). Greedy Perimeter Stateless Routing Protocol (GPSR). APU can significantly reduce the update cost and improve the routing performance in terms of packet delivery ratio and average end-to-end delay. The benefits of APU are further confirmed by undertaking evaluations in realistic network scenarios, which account for localization error, realistic radio propagation, and sparse network. Also for security purpose we are also encrypting the data packets during transmission. So that the intermediate nodes are not able to view the data during transmission.

1. INTRODUCTION

1.1. GPSR

We present Greedy Perimeter Stateless Routing (GPSR), a new routing protocol for wireless datagram networks that uses the *positions* of routers and a packet's destination to make packet-forwarding decisions. GPSR makes *greedy*- forwarding decisions using only information about a router's immediate neighbors in the network topology.

The two dominant factors in the scaling of a routing algorithm are:

1. The rate of topology change.
2. The number of routers in the routing domain.

Both factors affect the message complexity of DV & LS routing algorithms: intuitively, pushing current state globally costs packets proportional to the product of the rate of state change and number of destinations for the updated state. *Hierarchy* is the most widely deployed approach to scale routing as the number of network destinations increases. Without hierarchy, Internet routing could not scale to support today's number of Internet leaf networks. An Autonomous System runs an intra-domain routing protocol inside its borders, and appears as a single entity in the backbone inter-domain routing protocol, BGP. This hierarchy is based on well-defined and rarely changing administrative and topological boundaries. It is therefore not easily applicable to freely moving ad-hoc wireless networks, where topology has no well-defined AS boundaries, and routers may have no common administrative authority. *Caching* has come to prominence as a strategy for scaling ad-hoc routing protocols. When their cached topological information becomes out-of date, these routers must obtain more current topological information to continue routing successfully. Caching reduces the routing protocols' message load in two ways: it avoids pushing topological information where the forwarding load does not require it (*e.g.,* at idle routers), and it often reduces the number of hops between the router that has the needed topological information and the router that requires it (*i.e.,* a node closer than a changed link may already have cached the new status of that link).

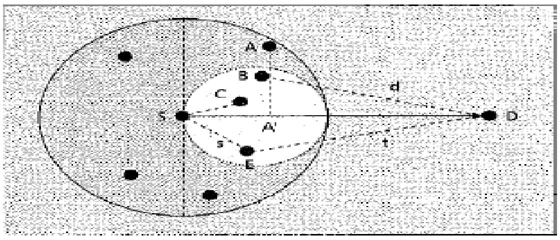


Fig. 1. *Greedy Routing Strategy based on progress, distance and direction*

1.2. BLR

Routing of packets in mobile ad-hoc networks with a large number of nodes or with high mobility is a very difficult task and current routing protocols do not really scale well with these scenarios. The Beacon-Less Routing Algorithm (BLR) presented in this paper is a routing protocol that makes use of location information to reduce routing Overhead. However, unlike other position-based routing protocols, BLR does not require nodes to periodically broadcast Hello-messages this can called beaconing, and thus avoids drawbacks such as extensive use of scarce battery-power, interferences with regular data transmission, and performance degradation. BLR selects a forwarding node in a distributed manner among all its neighboring nodes with having information neither about their positions nor even about their existence. Data packets are broadcasted and the protocol takes care that just one of the receiving nodes forwards the packet. Optimized forwarding is achieved by applying a concept of Dynamic Forwarding Delay (DFD).Consequently; the node which computes the shortest forwarding delay relays the packet first. This forwarding is detected by the other nodes and suppresses them to relay the same packet any further. Analytical results and simulation experiments indicate that BLR provides efficient and robust routing in highly dynamic mobile ad-hoc networks.

A wireless mobile ad-hoc network operates without any centralized administration and does not rely on any fixed infrastructure. Instead the network is completely self-organizing and the communication is maintained on a peer-to- peer basis between the mobile hosts. If two hosts that wish to communicate are not within range, other intermediate nodes act as relay stations.

Due to the mobility of the nodes, changes to the network topology may be frequent and unpredictable.

Furthermore, nodes may suddenly be switched on/o_, causing new links to appear and established links to vanish. Routing in such a dynamic environment is a difficult task and has been subject of extensive research over the past years. Several routing protocols have been denied within MANET working group of IETF such as AODV, DSR, DSDV, TORA, TBRPF, ZRP, OLSR, FSR, and LANDMAR. These protocols either use a kind of flooding to detect routes on demand or proactively maintain routing information at each node. Generally, they are considered not to scale in networks with more than several hundred nodes. Unlike these topology-based routing protocols which do not make use of location information, position-based (also called geometric or directional routing) protocols try to optimize routing by making use of geographical information available at each node [GFG, GPSR, TRR, LAR, AFR, DREAM, EASE].

Every node is aware of its own position and is notified of its neighbors' positions through the exchange of beacons [small packets broadcasted by the neighbors to announce their position]. Additionally, a node is able to determine the location of the destination through a location management scheme.

This additional position-information allows improving routing significantly and, thus, increases the network scalability in terms of network size, mobility, and traffic. Position-based routing is likely one of the enablers for large scale mobile ad-hoc networks, where the number of nodes can potentially reach several thousand as considered in the Terminodes project. {Even though, it was shown in that the per node capacity tends to zero as the number of nodes goes to infinity for certain network and traffic models.}

The Beacon-Less Routing algorithm [BLR] described in this paper performs routing in a distributed manner without information about neighboring nodes. If a node has a packet to send, it broadcasts the packet and every neighboring node receives it. The protocol takes care that just one of these nodes relays the packet. This is accomplished by computing a Dynamic Forwarding Delay [DFD] at each node depending on its position relative to the previous and the destination node. The node located at the "optimal" position introduces the shortest delay and thus transmits the packet first. Other nodes recognize the occurrence of the relaying and cancel their scheduled transmission of the same packet. Avoiding periodical transmission of beacons provides many advantages, such as conserving scarce battery power and avoiding interferences with regular data transmission. To ensure that all nodes detect the forwarding, only nodes within a certain area apply DFD and take part in the contention to forward the packet.

1.3. Performance Comparison

In recent years, many location based routing protocols have been developed for ad hoc networks. This paper presents the results of a detailed performance evaluation on two of these protocols: Location-Aided Routing [LAR] and Distance Routing Effect Algorithm for Mobility [DREAM]. We compare the performance of these two protocols with the Dynamic Source Routing [DSR] protocol and a minimum standard (a protocol that floods all data packets). We used NS-2 to simulate 50 nodes moving according to the random waypoint model. Our main goal for the performance investigation was to stress the protocols evaluated with high data load during both low and high speeds. Our performance investigation produced the following conclusions. First, the added protocol complexity of DREAM does not appear to provide benefits over a flooding protocol. Second, promiscuous mode operation improves the performance of DSR significantly. Third, adding location information to DSR (i.e., similar to LAR) increases both the network load and the data packet delivery ratio; our results conclude that the increase in performance is worth the Increase in cost. Lastly, our implementation of DREAM provides a simple location service that could be used with other ad hoc network routing protocols.

An ad hoc network is a set of wireless mobile nodes (MNs) that cooperatively form a network without specific user administration or configuration. Each node in an ad hoc network is in charge of routing information between its neighbors, thus contributing to and maintaining connectivity of the network. Since ad hoc networks have proven benefits, they are the subject of much current research. Many unicast routing protocols have been proposed for ad hoc networks, a performance comparison for a few of the protocols are in. Some of the unicast routing protocols for an ad-hoc network use location information in the routing protocol in an effort to improve the performance of unicast communication. A few of the proposed algorithms include the Location-Aided Routing [LAR] algorithm, the Distance Routing Effect Algorithm for Mobility [DREAM], the Greedy Perimeter Stateless Routing [GPSR] algorithm, and the Geographical Routing Algorithm [GRA].

This paper is the first to provide a detailed, quantitative evaluation comparing the performance of two locations based ad hoc network routing protocols: LAR and DREAM. Simulation results on LAR, DREAM, and other location based protocols exist on the individual protocols; however, since these simulation results are based on different simulation environments, different simulation parameters and even different network simulators, the performances are not comparable. We compare the simulation results for LAR and DREAM with the Dynamic Source Routing [DSR] protocol, a unicast routing protocol that does not use location information. We chose DSR since it performs well in many of the performance evaluations of unicast routing protocols).

2. LITERATURE SURVEY

2.1. Dynamic Source Routing [DSR]

DSR is a source routing protocol which determines routes on demand. In a source routing protocol, each packet carries the full route (a sequenced list of nodes) that the packet should be able to traverse in its header. In an on demand routing protocol (or reactive protocol), a route to a destination is requested only when there is data to send to that destination and a route to that destination is unknown or expired. In the evaluation of DSR, both and only locate routes that consist of bi-directional links. {Although DSR does not require bi-directional links in the protocol, IEEE 802.11 requires bi-directional links in the delivery of all non broadcast packets.} The version of DSR in our study also only locates bi-directional links. In other words, a route reply packet containing the complete route from S to D is sent along the reverse route to S. MNs using DSR may operate in promiscuous mode. In promiscuous mode, an MN can learn potentially useful routes by listening to packets not addressed to it. Simulation results on DSR presented in use promiscuous mode operation, while simulation results on DSR presented in do not use promiscuous mode operation. Contrary to comments in, we discovered that including promiscuous mode operation in DSR significantly reduced control overhead and significantly increased delivery ratio at higher speeds. However, as noted in, promiscuous mode operation is power consuming. Thus, we chose to present both promiscuous mode operation and non-promiscuous mode operation in our simulation results for DSR.

2.2. Location Aided Routing [LAR]

Like DSR, LAR is an on-demand source routing protocol. The main difference between LAR and DSR is that LAR sends location information in all packets to (hopefully) decrease the overhead of a future route discovery. In DSR, if the neighbors of S do not have a route to D, S floods the entire ad hoc network with a route request packet for D. LAR uses location information for MNs to flood a route request packet for D in a forwarding zone instead of in the entire ad hoc network. The term forwarding zone in this paper is defined the same as We propose a novel beaconing strategy for geographic routing protocols called Adaptive Position Updates strategy [APU]. Our scheme eliminates the drawbacks of periodic beaconing by adapting to the system variations. APU incorporates two rules for triggering the beacon update process. The first rule, referred as Mobility Prediction [MP], uses a simple mobility prediction scheme to estimate when the location information broadcast in the previous beacon becomes inaccurate. The next beacon is broadcast only if the predicted error in the location estimate is greater than a certain threshold, thus tuning the update frequency to the dynamism inherent in the node’s motion. We model APU to quantify the beacon overhead and the local topology accuracy. The local topology accuracy is measured by two metrics, unknown neighbor ratio and false neighbor ratio. The former measures the percentage of new neighbors a forwarding node is unaware of but that are actually within the radio range of the forwarding node. On the contrary, the latter represents the percentage of obsolete neighbors that are in the neighbor list of a node, but have already moved out of the node’s radio range. Our analytical results are validated by extensive simulations. Also for security purpose we are also encrypting the data packets during transmission. So that the intermediate nodes are not able to view the data during transmission. For Encryption process, we are using RC4 Algorithm. We model APU to quantify the beacon overhead and the local topology accuracy. The local topology accuracy is measured by two metrics, unknown neighbor ratio and false neighbor ratio. The former measures the percentage of new neighbors a forwarding node is unaware of but that are actually within the radio range of the forwarding node. On the contrary, the latter represents the percentage of obsolete neighbors that are in the neighbor list of a node, but have already moved out of the node’s radio range. Our analytical results are validated by extensive simulations.

3. IMPLEMENTATION

3.1. Adaptive Position Updates Strategy

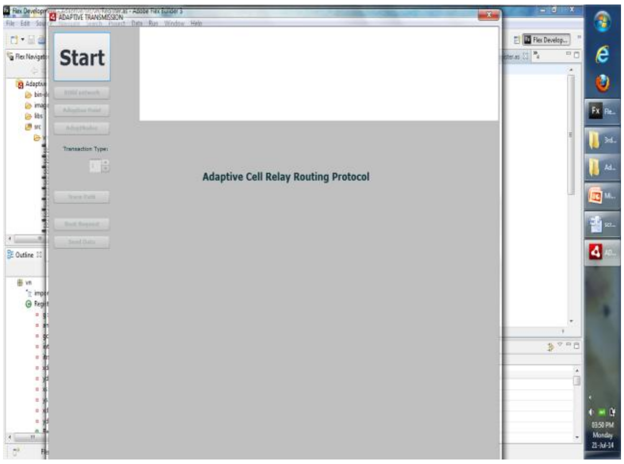
1. All nodes are aware of their own position and velocity,

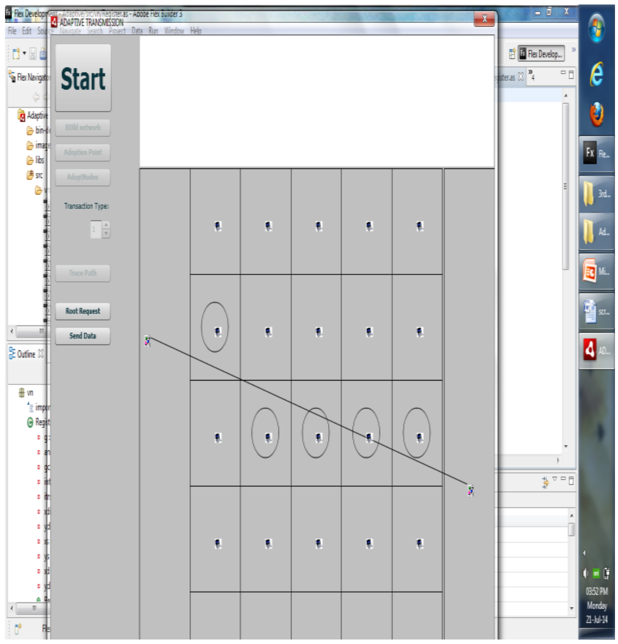
2. All links are bidirectional,

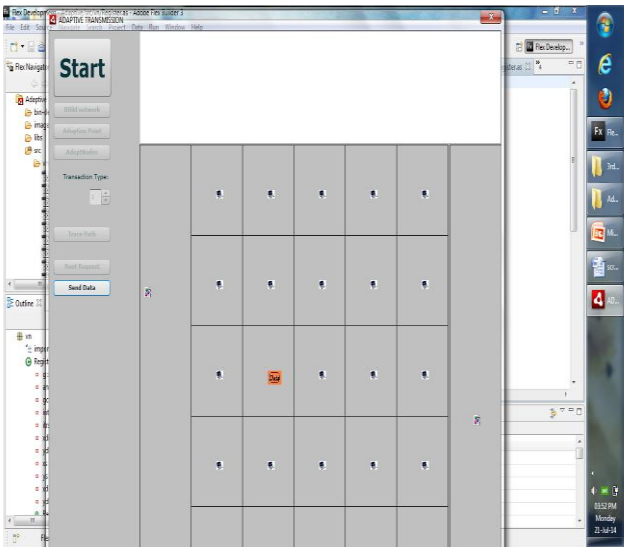
3. The beacon updates include the current location and velocity of the nodes, and

4. Data packets can piggyback position and velocity updates and all one-hop neighbors operate in the promiscuous mode and hence can overhear the data packets.

Upon initialization, each node broadcasts a beacon informing its neighbors about its presence and its current location and velocity. Following this, in most geographic routing protocols such as GPSR, each node periodically broadcasts its current location information. The position information received from neighboring beacons is stored at each node. Based on the position updates received from its neighbors, each node continuously updates its local topology, which is represented as a neighbor list. Only those nodes from the neighbor list are considered as possible candidates for data forwarding. Thus, the beacons play an important part in maintaining an accurate representation of the local topology.







4. CONCLUSIONS

Here, we have identified the need to adapt the beacon update policy employed in geographic routing protocols to the node mobility dynamics and the traffic load. We proposed the *(APU) Adaptive Position Update* strategy to address these problems. In this 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. Our results indicate that the APU strategy generates less or similar amount of beacon overhead as other beaconing schemes but achieve better packet delivery ratio, average end-to-end delay and energy consumption. In addition, we have simulated the performance of the proposed scheme under more realistic network scenarios, including the considerations of localization errors and a realistic physical layer radio propagation model. Future work includes utilizing the analytical model to find the optimal protocol parameters suppose let us taken example the optimal radio range, studying how the proposed scheme can be used to achieve load balance and evaluating the performance of the proposed scheme on TCP connections in Mobile Ad-hoc Networks.

REFERENCES

[1] J. Hightower and G. Borriello, "Location Systems for Ubiquitous Computing," Computer, vol. 34, no. 8, pp. 57-66, Aug. 2001.

[2] B. Karp and H.T. Kung, "GPSR: Greedy Perimeter Stateless Routing for Wireless Networks," Proc. ACM MobiCom, pp. 243-254, Aug. 2000.

[3] L. Blazevic, S. Giordano, and J.-Y. LeBoudec, "A Location Based Routing Method for Mobile Ad Hoc Networks," IEEE Trans.Mobile Computing, vol. 4, no. 2, pp. 97-110, Mar. 2005.

[4] Y. Ko and N.H. Vaidya, "Location-Aided Routing (LAR) in Mobile Ad Hoc Networks," ACM/Baltzer Wireless Networks, vol. 6, no. 4,pp. 307-321, Sept. 2002.

[5] T. Camp, J. Boleng, B. Williams, L. Wilcox, and W. Navidi, "Performance Comparison of Two Location Based Routing Protocols for Ad Hoc Networks," Proc. IEEE INFOCOM,pp. 1678-1687, June 2002.

[6] D. Johnson, Y. Hu, and D. Maltz, The Dynamic Source Routing Protocol (DSR) for Mobile Ad Hoc Networks for IPv4, IETF RFC 4728,vol. 15, pp. 153-181, Feb. 2007.

[7] C. Perkins, E. Belding-Royer, and S. Das, Ad Hoc On-Demand Distance Vector (AODV) Routing, IETF RFC 3561, July 2003.

[8] J. Li, J. Jannotti, D.S.J.D. Couto, D.R. Karger, and R. Morris, "A Scalable Location Service for Geographic Ad Hoc Routing," Proc.ACM MobiCom, pp. 120-130, Aug. 2000.

[9] Z.J. Haas and B. Liang, "Ad Hoc Mobility Management with Uniform Quorum Systems," IEEE/ACM Trans. Networking, vol. 7,no. 2, pp. 228-240, Apr. 1999.

[10] A. Rao, S. Ratnasamy, C. Papadimitriou, S. Shenker, and I. Stoica, "Geographic Routing without Location Information," Proc. ACM MobiCom, pp. 96-108, Sept. 2003.

[11] S. Lee, B. Bhattacharjee, and S. Banerjee, "Efficient Geographic Routing in Multihop Wireless Networks," Proc. ACM MobiHoc,pp. 230-241, May 2005.

[12] Q. Chen, S.S. Kanhere, M. Hassan, and K.C. Lan, "Adaptive Position Update in Geographic Routing," Proc. Int'l Conf. Comm.(ICC '06), pp. 4046-4051, June 2006.

[13] M. Heissenbuttel, T. Braun, M. Walchli, and T. Bernoulli, "Evaluating of the Limitations and Alternatives in Beaconing,"Ad Hoc Networks, vol. 5, no. 5, pp. 558-578, 2007.

[14] Y. Kim, R. Govindan, B. Karp, and S. Shenker, "Geographic Routing Made Practical," Proc. Second Conf. Symp. Networked Systems Design and Implementation, pp. 217-230, May 2005.

[15] F. Kuhn, R. Wattenhofer, and A. Zollinger, "Worst-Case Optimal and Average-Case Efficient Geometric Ad-Hoc Routing," Proc. ACM MobiHoc, pp. 267-278, June 2003.

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