Volume 4, Issue 1, January 2014 ISSN: 2277 128X

International Journal of Advanced Research in Computer Science and Software Engineering

Research Paper

Available online at: www.ijarcsse.com

Geographical location Service lane leaving Connected MANETs

A. Vijay Vasanth[1]
[1]*Senior Assistant Professor,*
Department of Computer Science and Engineering,
Christ College of Engineering & Technology,
Pondicherry University, Pondicherry, India.

R. Premnivas[2], **S. Rajalakshmi**[3]
[2, 3]*M.Tech final year Students,*
Department of Computer Science and Engineering,
Christ College of Engineering & Technology,
Pondicherry University, Pondicherry, India.

Abstract—Mobile platforms can be combined such as manned or unmanned vehicles and peer-assisted wireless communication is an enabler for a vast number of applications. A key enabler for the applications is the routing protocol that directs the packets in the network. Routing packets in fully connected mobile ad hoc networks (MANETs) have been studied to a great extent, but the assumption on full connectivity is generally not valid in a real system. This case means that a practical routing protocol must handle intermittently (irregular) connectivity and the absence of end-to-end connections. In this project, we propose a geographical routing algorithm which is shown to suit dense and sparse areas of intermittently connected MANET (IC-MANET). This geographical routing algorithm is shown to have good delivery ratio and low overhead compared with other leading delay tolerant routing algorithms. To achieve low overhead the proposed algorithm uses a beaconless strategy combined with a position-based resolution of bids when forwarding packets. This geographical routing algorithm maintains a local database of node locations, which is updated using broadcast gossip combined with routing overhearing.

Keywords— MANET, IC-MANET, node, routing, packet, wireless.

I. INTRODUCTION

A MANET is a self configuring infrastructure less network of mobile devices connected by wireless links that communicates through radio waves. In intermittently (irregularly) connected MANET there is no complete connection from source to destination. The data transfer between the nodes is done in a decentralized manner. The Ad-hoc networks form a temporary network to transfer data between the various nodes. The Node which has the mobility that is called mobile node, mobility means roaming around the world. 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. When a node S wishes to communicate to a node D, the former notifies the base station, which eventually establishes a communication with the destination node. Under a reasonable selection of node density and communication range the nodes moving under our mobility model will form an intermittently connected network. The challenge is then to route messages in a reliable manner while observing system resource limits, such as storage, power and wireless bandwidth, in the realistic mobility scenarios envisioned.

Since UAVs is location-aware due to navigational requirements the positional knowledge can be used to perform geographic routing. For geographic routing to work two elements are required, a routing protocol that routes a packet to the destination's position, and a location service that keeps track of where the destination is. For the routing protocol we will explore the viability of beacon-less geographic routing. Beacons regularly transmit special messages that are used by many routing algorithms to determine a node's neighbors. The reason to evaluate beacon-less routing is that beacons, as commonly used by routing protocols, have the following problems such as consuming lots of bandwidth and energy. So Location Based Routing introduces a completely new flavor of network formation. The routers and hosts are free to move randomly and organize themselves in an arbitrary fashion, thus the network topology changes rapidly and unpredictably.

II. RELATED WORK

Routing is about deciding which path a data packet shall use in a network in order to transport it from source to destination. Two location services with very different proactive elements are the DREAM Location Service (DLS)[1][2] and the Simple Location Service (SLS)[2]. In a fully connected MANET this means that the routing protocol shall select a set of nodes that can relay a packet from source to destination. Routing in IC-MANETs [3] with opportunistic contacts is challenging since contact times and durations don't know in advance. The challenge for the routing protocol is to determine if a packet shall be handed over to a peer or not when they meet. The simplest delay-tolerant routing protocol is Direct Transmission [4]. In this routing protocol the source keeps the packet until it encounters the destination. The direct opposite, but still very basic, is Epidemic Routing (ER) [5]. In ER all packets are distributed to all nodes in the network (or at least to a large subset of the nodes) giving a high cost in both transfer and storage overhead. When two nodes meet they exchange information on the messages stored in the nodes. To better handle transmission in an overload situation has proposed prioritized epidemic routing (PREP) [6]. To improve Spray

and Wait [7] [8] have suggested to only spray to nodes that are most likely to encounter the destination. One of the most basic of these protocols is the motion vector (MoVe) [9]. The path predicted by the navigation aids, and the knowledge of the road network, can be leveraged by the routing protocols use this type of information are GeOpps[10], Predictive Graph Relay (PGR)[11] and GeoSpray[12]. Neighbor information is generally gathered by the use of beacons, messages broadcast regularly that will be heard by all nodes within communication range[13].

III. EXISTING SYSTEM

In Infrastructure wireless networks, the mobile node can move while communicating, the base stations are fixed and as the node goes out of the range of a base station, it gets into the range of another base station. At this point, the communicating nodes do not need to know of a route for one to each other. All that matters is that both nodes source and destination are within the transmission range of the base station. If one of them fails to fulfil this condition, the communication will abort.

The two nodes S and D which want to communicate are in the range of the base station. S send the message to the base station which in turn forwards it to destination node D. Thus communication is carried out with help of a base station. All messages have to pass through the base station. Node E is out of the range of the base station this prevents it from communicating to other nodes in the network. When node E wants to communicate to any node in the network it has to contact the base station. Since it is out of range communication is not possible. Some limitation of the existing system involves

- Maintenance of information is done manually
- Data collection is not uniform and is stored in different forms
- Locating the appropriate server and client profile and updating it whenever
- Required becomes cumbersome.
- Enforcement of data integrity not possible.
- Unavailable of prominent security measures for data collection.

IV. PROPOSED WORK

The concept behind this infra-structure less networks is the collaboration between its participating members, i.e., instead of making data transit through a fixed base station, nodes consequentially forward data packets from one to another until a destination node is finally reached. Typically, a packet may travel through a number of network points before arriving at its destination.

Location Based Routing introduces a completely new flavour of network formation. The routers and hosts are free to move randomly and organize themselves in an arbitrary fashion, thus the network topology changes rapidly and unpredictably. Absence of a supporting structure in mobile ad-hoc networks, to a certain extent, invalidates almost all of the existing techniques developed for routine network controls in the existing wireless networks.

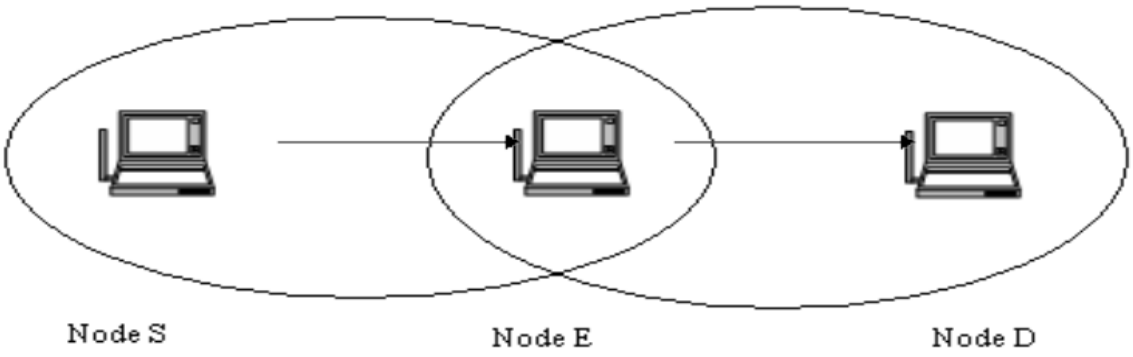


Fig. 1 Infra-structure less Network

Here the node S wants to communicate to node D. The oval indicates the communication range of the node. The communication range of S does not exceed to include D. In this case routing is necessary, node E is in the range of S which has D in its range. So S in order to communicate to D first sends the message to E which in turn forwards it to D. Thus the node E acts as a router and a node.

V. ALGORITHM

A. LAROD - LoDiS Algorithm

Location Aware Routing for Delay-Tolerant Networks (LAROD) is a geographical routing protocol for IC-MANETs that combine geographical routing with the store–carry–forward principle. It is a beaconless protocol and uses greedy packet forwarding when possible. When greedy forwarding is not possible, the node that holds the packet (the custodian) waits until node mobility makes it possible to resume greedy forwarding.

In Location Dissemination Service (LoDiS), every node is a location server, and location data are updated by data exchanges as nodes encounter each other. The reason that all nodes are location servers is to avoid delaying the packet at the source node.

Pseudo code

Source node at data packet generation
    Get destination location from location service
    Broadcast data packet
    Set up timer for broadcasting packet to t
Destination node at data packet reception
    If the packet is received for the, first time
    Deliver data packet to application
    //Inform of delivery to destination
    Broadcast ack packet
All intermediate (non-destination) nodes at data packet reception
    Update location service, with data packet location information
    //Packet has been delivered to the destination
    If an ack has been received for the packet
    //Inform of delivery to destination
    Broadcast ack packet
    //The node is a tentative custodian
Else if the node is in the forwarding area
    If the node does not have a copy of the packet
    Set up timer for Broadcast to t_r
    //If the custodian is ahead of the node
Else if custodian is in node forwarding area
Remove packet in node if it has one
At ack packet reception
    Update location service with ack packet location information
    If the node has a copy of the packet
    Remove packet
when a data packet rebroadcasting timer expires
    If the packets TTL has expired (t_m)
    Remove packet
Else
    Update location information in packet with location server data
    Broadcast data packet
    Set up timer for rebroadcasting the packet t_r.

B. Expand Ring Search Algorithm

Initiate the Route Discovery; node transmits a "Route Request" as a single local broadcast packet, which is received by (approximately) all nodes currently on the transmission range of, including node. Each Route Request identifies the initiator and target of the Route.The source node searches successively larger areas until the destination node is found. This is done by, for every RREQ retransmission until a route is found, incrementing the time to live (TTL) value carried in every RREQ packet, thus expanding the ``search ring" in which the source is cantered.

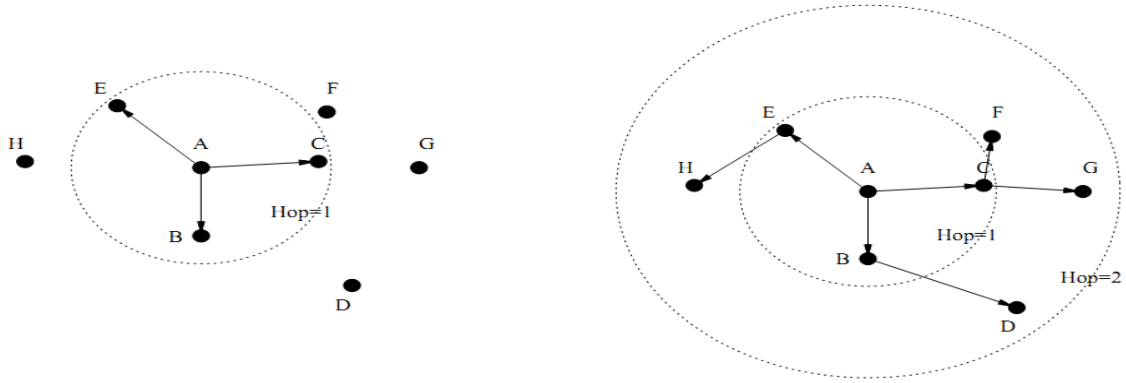


Fig. 2 Expand Ring Sea

VI. RESULTS AND DISCUSSION

Ns (from network simulator) is a name for series of discrete event network simulators, specifically ns-1, ns-2 and ns-3. These simulators are used in the simulation of routing protocols, among others, and are heavily used in ad-hoc networking research, and support popular network protocols, offering simulation results for wired and wireless networks alike.

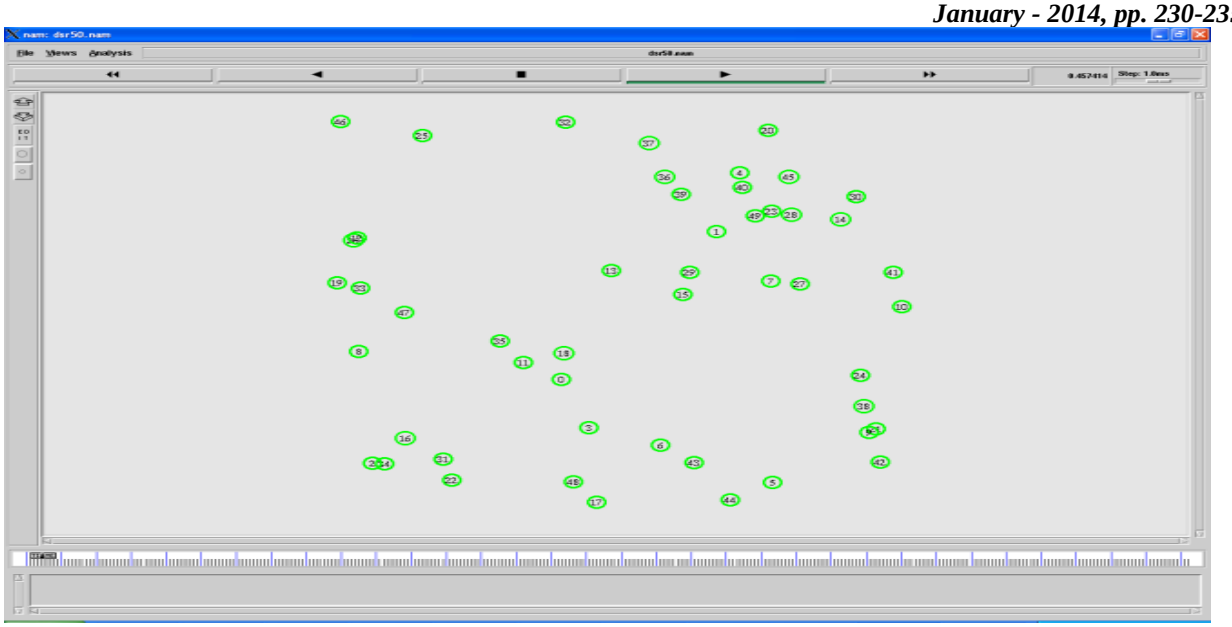
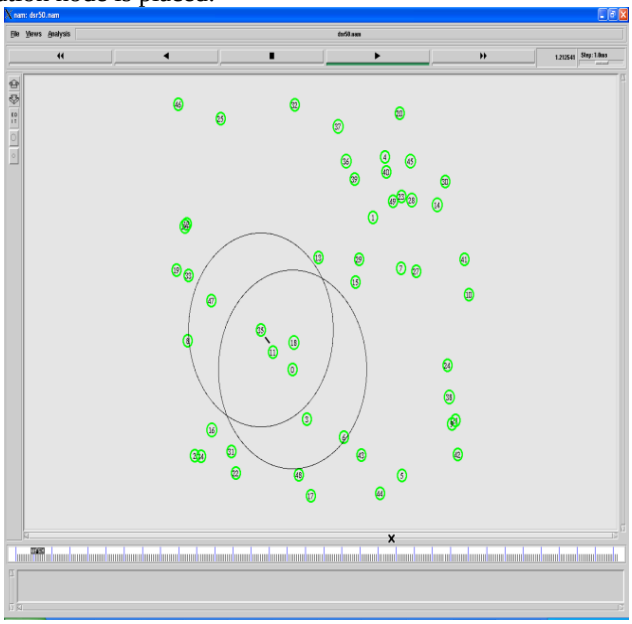
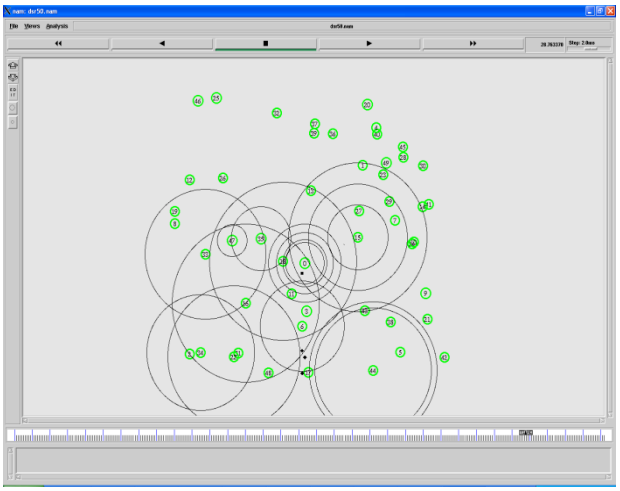


Fig. 3 Nodes at different Locations

Maximum possibility for node to transfer within the ring of source node. It must be in forwarding in correct direction based on the destination node is placed.





a b

Fig. 4 a) Core and b) Re-Core selection

Core Finding

- If the core node and user defined destination node are same then it transmits the file to the corresponding destination node.
- After route discovery, to find the core node of the system then compares core node and user defined node in core class

Re-Core Selection

- To select the re-core node address for finding the destination address.
- Re-Core selection is used when the core process is not able to find the destination address

Fig. 5 Graphical Representation of Delivery ratio for different node densities under Pheromone mobility

VII. CONCLUSION AND FUTURE WORK

We have shown that, by using a MANET broad-cast gossiping technique and continuous medication of packet location information, geographical routing in I C-MANETs is feasible. The proposed location service (LoDiS) has then been integrated with a routing protocol (LAROD) and thoroughly studied in comparison with a high-performance baseline. We have also shown t hat the delivery ratio for LAROD–LoDiS is the same as that obtained using LAROD with an oracle location service. The cost of LoDiS is also relatively small compared with the basic cost of routing using LAROD. Because the cost of LoDiS is constant per node, the more traffic there is in the network, the lower the relative cost will be. We have also shown that LAROD–LoDiS gives a much higher delivery rate at a much lower overhead LoDiS is a very good base to use for further studies of location services in IC-MANETs and DTNs. Depending on what one considers a reasonable scenario for an I C-MANET, further studies and improvements of the LAROD–LoDiS routing algorithm should be done for very sparse systems or a mixed scenario with both dense and sparse areas. In this thesis we have not addressed security issues related to routing. We have assumed that all nodes in the system are benign and cooperative. This is a reasonable assumption in a closed system such as the military and in emergency services. A security mechanism that ensures that the nodes only accept data from trusted parties should be relatively simple to add provided that security credentials can be provided by a trusted element in advance of deployment. If keys can be compromised then we need to add a key revocation mechanism, a challenge in a disconnected system. Additional security challenges can be added depending on the assumptions regarding the system environment.

REFERENCES

[1] S. Basagni, I. Chlamtac, V. R. Syrotiuk, B. *A. Woodward. A distance routing effect algorithm for mobility (DREAM).* Proceedings of the ACM/IEEE International Conference on Mobile Computing and Networking (Mobicom).1998.ACM

[2] T. Camp, J. Boleng, L. Wilcox. *Location Information Services in Mobile Ad Hoc Networks*. Proceedings of IEEE International Conference on Communications (ICC). 2002. IEEE

[3] P.-C. Cheng, K. C. Lee, M. Gela, J. Härri. *GeoDTN+Nav: Geographic DTN Routing with Navigator Prediction for Urban Vehicular Environments.* Mobile Networks and Applications. Volume 15, Number 1, 2010. Springer

[4] T. Spyropoulos, K. Psounis, C.S. Raghavendra. "Efficient Routing in Intermittently Connected Mobile Networks", The Single-Copy Case. *IEEE/ACM Transactions on Networking.* Volume 16, Number 1, 2008. IEEE/ACM

[5] A. Vahdat, D. Becker. "Epidemic Routing for Partially-Connected Ad Hoc Networks". Tech. Rep. CS-2000-06, Duke University. 2000.

[6] R. Ramanathan, R. Hansen, P. Basu, R. Rosales-"Hain, R.Krishnan. Prioritized Epidemic Routing for Opportunistic Networks". Proceedings of the 1st International MobiSys workshop on Mobile opportunistic Networking (MobiOpp). 2007. ACM

[7] T. Spyropoulos, K. Psounis, C.S. *Raghavendra. Spray and wait: an efficient routing scheme for intermittently connected mobile networks*. Proceedings of the 2005 ACM SIGCOMM workshop on Delay-tolerant networking (WDTN). 2005. ACM

[8] T. Spyropoulos, T. Turletti, K. Obraczka. *Utility-based Message Replication for Intermittently Connected Heterogeneous Networks*. Proceedings of IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (WoWMoM). 2007. IEEE

[9] J. LeBrun, C. Chuah, D. Ghosal, M. Zhang. *Knowledge-Based Opportunistic Forwarding in Vehicular Wireless Ad Hoc Networks.* Proceedings of IEEE 61st Vehicular Technology Conference (VTC). 2005. IEEE

[10] I. Leontiadis, C. Mascolo. GeOpps: *Geographical Opportunistic Routing for Vehicular Networks*. Proceedings of IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (WoWMoM). 2007. IEEE

[11] J. Kurhinen, J. Janatuinen. *Delay Tolerant Routing in Sparse Vehicular Ad Hoc Networks*. Acta Electrotechnica et Informatica. Volume 8,Number 3, 2008, Versita

[12] V.N.G.J. Soares, J.J.P.C. Rodriges, F. Farahmand. *GeoSpray: A geographic routing protocol for vehicular delay-tolerant networks*. Information Fusion. Article in press. Elsevier

[13] M. Heissenbüttel, T. Braun, T. Bernoulli, M. Wälchi. *BLR: Beacon-less routing algorithm for mobile ad hoc Networks.* Computer Communications. Volume 27, 11, 2004. Elsevier

