Maximum Speed Data Transfer using SOGR EM Algorithm for Mobile Ad Hoc Network

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Abstract: ***Mobile ad hoc network has been a huge challenge to develop a routing protocol that can meet different application requirements and optimize the routing path according to the change of topology. Geographic routing protocol mainly used to provide application needs but it will provide inaccurate local topology and destination position information introduces high overhead when there is no traffic. After using two self adaptive on demand geographic routing protocol to build efficient route path based on user needs. The in accurate local topology knowledge is removed by using SOGR protocol. Topology information updated with respect to time at every node. On demand routing mechanism to reduce the control overhead and adaptive parameter setting and route optimization scheme are used this protocol to provide efficient route path. But this protocol used to provide 98 percent delivery ratios and very low forwarding overhead but using the proposed SOGR EM [Expectization Maximization] algorithm provide the maximum delivery ratios, and also reduce the control overhead and reduce the number of packet forwarding, reduce the average end to end delay and minimize the overhead with respect to node densities, maximum speed.***

Keywords: Mobile ad hoc network, proactive mechanism, SOGR EM, efficient route path, maximum likelihood.

1. Introduction

Mobile ad hoc network (MANET) is a infrastructure less network. The topology changes very dynamically [1]. The design of routing protocol for quickly changing the topology is very much challenging the mobile ad hoc network. The routing protocols can be classified as proactive, reactive, and hybrid. The proactive protocols maintain routing information; the reactive only create and maintain route based on demand or requirement. Hybrid protocols combine the reactive and proactive protocols. the proactive protocols having the control overhead, there is no traffic. Reactive protocols having the large transmission delay, geographic routing protocols recently main used because of the packet are forwarding using the intermediate node with the help of neighbor's position, and destination's position attached to the packet header by the source. Geographic routing have disadvantage of inaccurate local geographic topology and destination position can lead to routing failure and more collisions. To obtain a accurate topology to determine the beaconing cycle and another one method to increase the beaconing frequency, both option not consider the another traffic conditions and routing requirements, increasing beaconing frequency may be generated unnecessary overhead, so beaconless scheme have been proposed to avoid the overhead of sending periodic beacons when no traffic are there. The aim of work to develop holistic geographic routing schemes adapting various methods to provide efficient and robust routing paths, specially we propose two self adaptive on demand geographic routing protocols that provide transmission paths based on the need of applications [1]. The two protocols having the advantage of reduce the control overhead, efficient routing is achieved, optimization schemes are designed to make route path, these protocol give the maximum end to end delay from source to destination while packet are transfer and also control overhead high [1]. In our proposed protocol SOGR EM algorithm are mainly designed to reduce the delay and control overhead and considering respect to the two factors maximum speed and node density.

2. Related Work

The novel efficient geographic multicast protocol (EGMP) has high packet delivery ratio and low control overhead based route. Face routing approach that routes the message in the faces of the network, the faces are recognizable and constructible and capture geometric features [2], this routing reduce the overhead [3].Various route discovery and maintenance purpose using hello messages that rely on recently proposed protocol [4].

3. Method

a) AODV: (Ad hoc on demand distance vector routing) It is a basic protocol, this protocol is used to establish a route path but this protocol provide a in accurate local topology information so lead to routing failure.
b) GPSR: (Greedy perimeter stateless routing) this protocol are used to reduce the control overhead.
c) SOGR HR: (Hybrid reactive mechanism) this scheme used to find out the next hop of a forwarding node [1]. The path find out from the forwarding node to destination, the next hop determined by using this scheme.
d) SOGR GR: (Geographic based reactive mechanism) this protocol is avoid the collision, it mainly depend on only one hop neighbor's positions. The SOGR GR and HR the two protocols are mainly have the important parameter. Set there parameter get optimal performance. The above two protocols are used to forward the packet from source to destination with out collision but it will provide maximum end ton end delay, and also overhead, so we are using the proposed protocol SOGR EM

(Expectization Maximization) algorithm to reduce the delay and control overhead.

e) SOGR EM: (Expectization Maximization), The Expectization maximization algorithm combined with the SOGR to get a better performance of reduces the delay and control overhead.

3.1 SOGR EM algorithm steps

1) In between source and destination having the number of stages, it consists of number of nodes.
2) All the nodes find the maximum likelihood value of every stage.
3) Which node having the maximum value of every stage, that node selected and forward the packet from source to destination.
4) Finally data reach the destination.

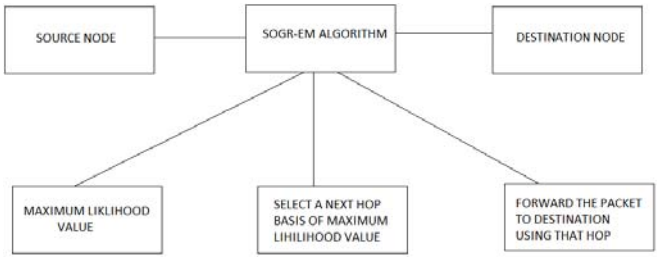

Figure 1: Block diagram of SOGR EM algorithm

Figure 1 shows the following working steps;

1. Source node and destination node in between using SOGR EM algorithm.
2. Find the maximum likelihood value of all intermediate nodes.
3. Select the maximum likelihood value node and forward the packet from source to destination.

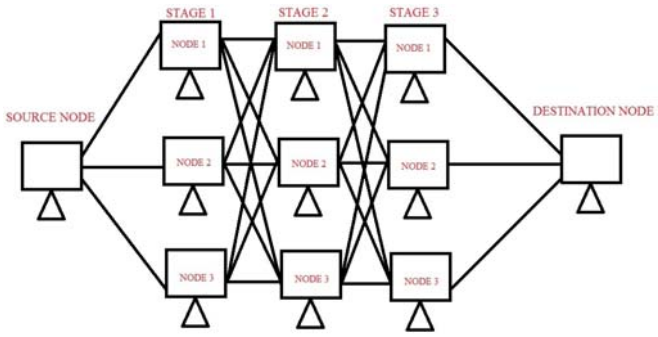

Figure 2: Multistage representation of SOGR EM algorithm

a) Consider the above figure 2, in between source node and destination node having the three stages, each stage containing three nodes.
b) In every stage represented by stage1, stage2, stage 3, with respect to source one hop neighbor, two hop neighbor and three hop neighbor.
c) In first stage (one hop neighbor) find the maximum likelihood value of every node and which node having the maximum value that node will be selected and forward the packet from source to corresponding one hop neighbor node.
d) Find the two hop neighbor, maximum likelihood value of all nodes, and which node having the maximum value that node will be selected and forward the packet from one hop neighbor to two hop neighbor node.
e) The third hop neighbor find the maximum likelihood value of all node and which node having the maximum value that node will be selected and forward the packet from two hop neighbor three hop neighbor.
f) Finally the packet forward from three hop neighbor to destination.

4. Performance Evaluation

In this section, we evaluate the performance of SOGR HR, SOGR GR and SOGR EM with respect to moving speed, node densities.

4.1 Simulation Results

The simulation result mainly determines by consider the existing system simulation result of SOGR, it will be find out by [1]. Consider the above simulation result and it consist of the parameter of average end to end delay, control overhead, and average number of packet forwarding, overhead with respect to maximum speed, and node densities.

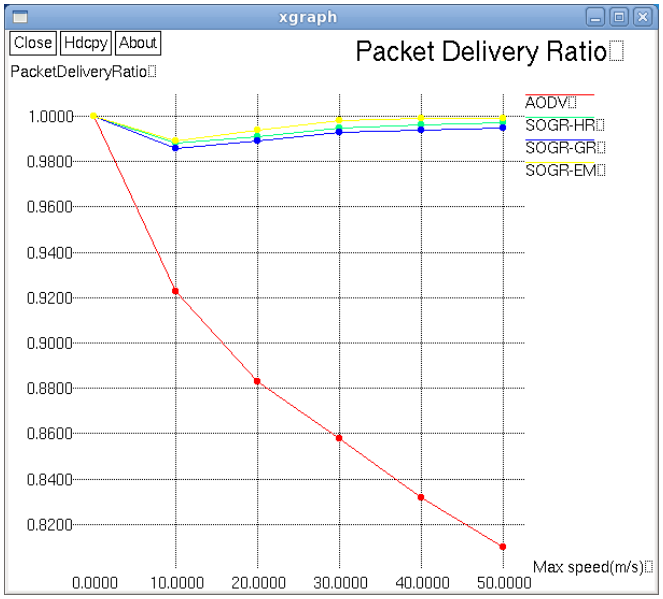

Figure 3: Packet delivery ratio

In figure 3 packet delivery ratio with respect to maximum speed, the packet delivery ratio is very small of using SOGR EM algorithm compared to the existing AODV, SOGR HR and SOGR GR protocol.

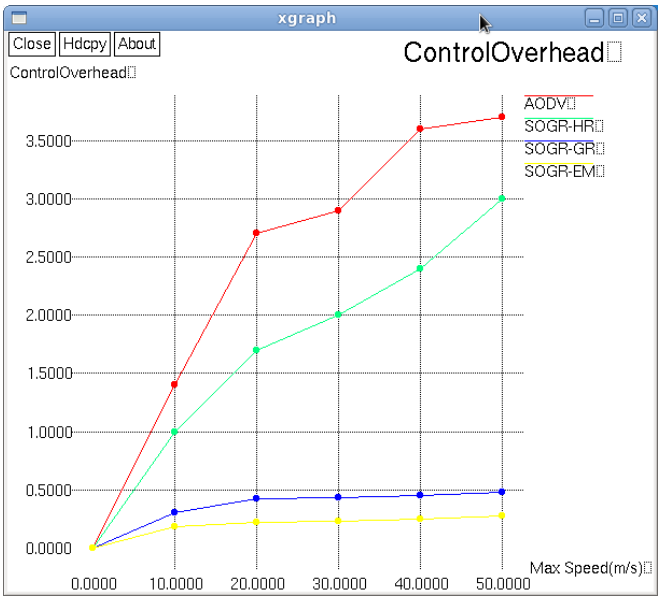

Figure 4: Control overhead

In figure 4 control overhead compare to all existing protocol, the SOGR EM provides very low control overhead.

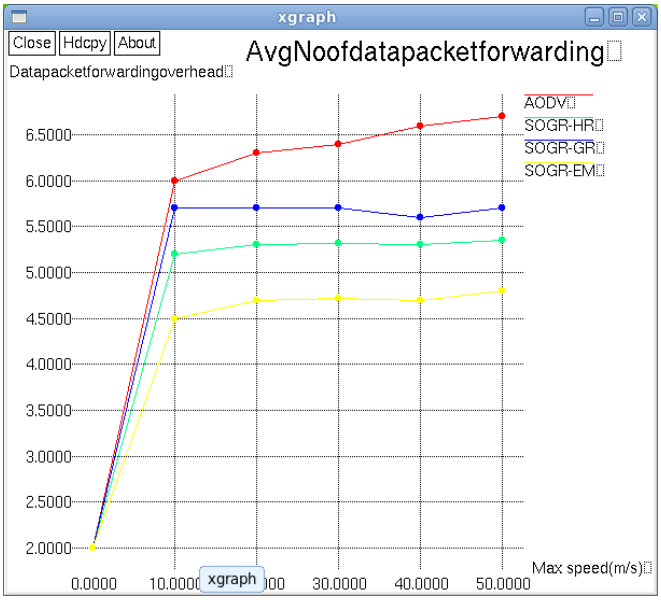

Figure 5: Data Packet Forwarding

In figure 5 the average number of packet forwarding is very low by using SOGR EM algorithm compare to all other protocol such as AODV, SOGR HR, SOGR GR.

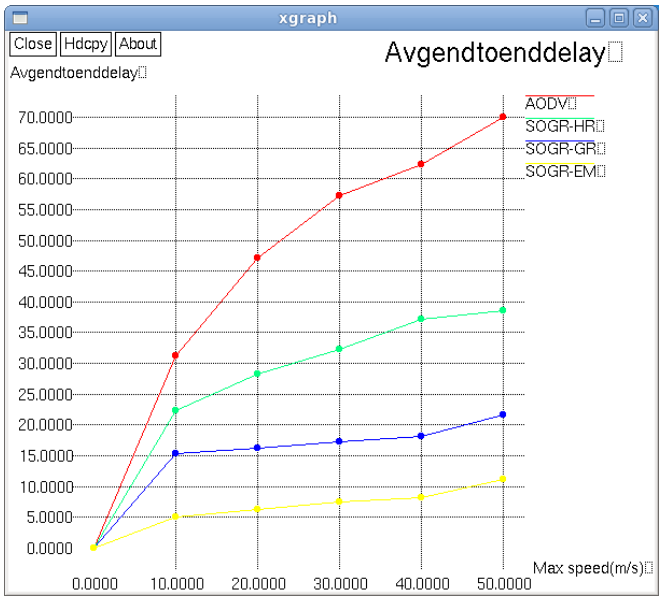

Figure 6: Average End To End Delay

In figure 6 the average end to end delay very low by using SOGR EM algorithm compare to all other protocol such as AODV, SOGR HR, and SOGR GR.

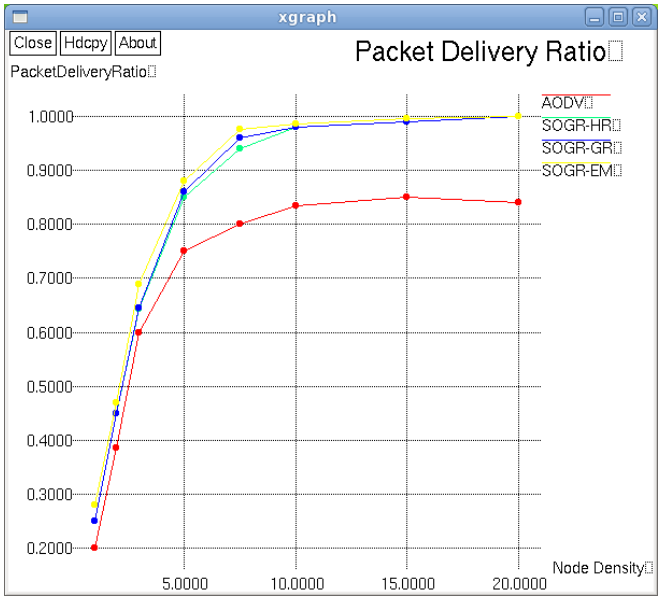

Figure 7: Packet Delivery Ratio

In figure 7 packet delivery ratio with respect to node densities the high packet delivery ratio is get compare to all other existing protocol.

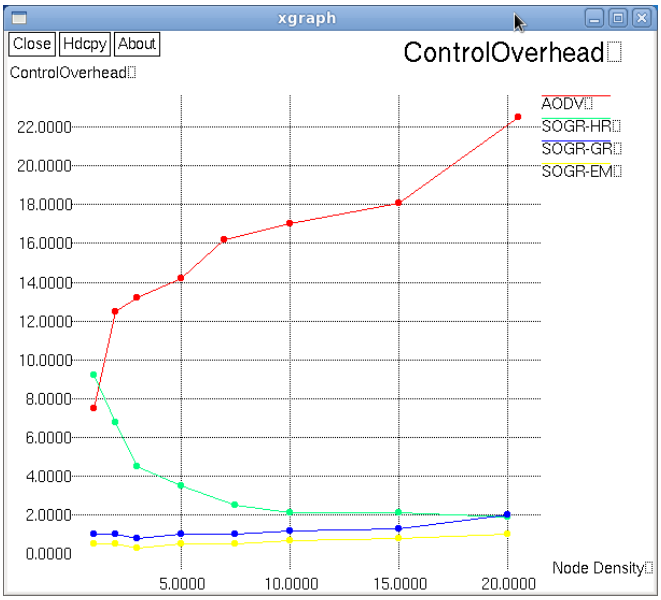

Figure 8: Control overhead

In figure 8 control overhead, the control overhead are reduced compare to existing protocol method such as AODV, SOGR HR, SOGR GR protocol.

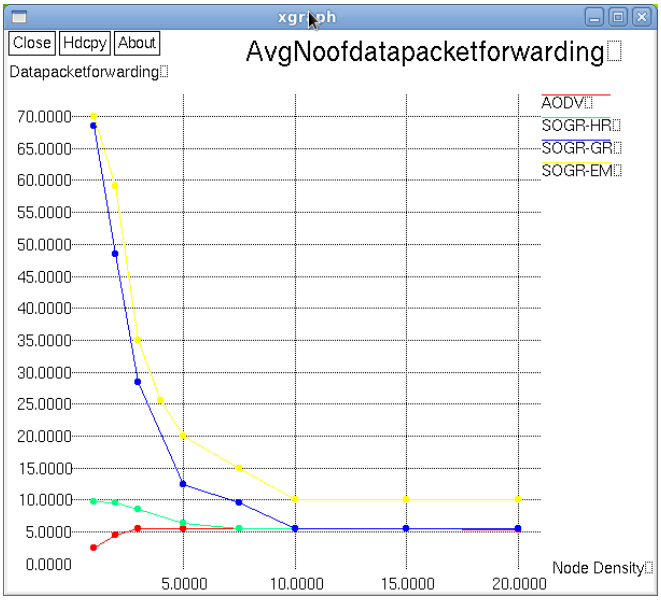

Figure 9: Data packet forwarding

In figure 9 the average number of packet forwarding is high, using SOGR EM then only get the high performance compare to all other protocols.

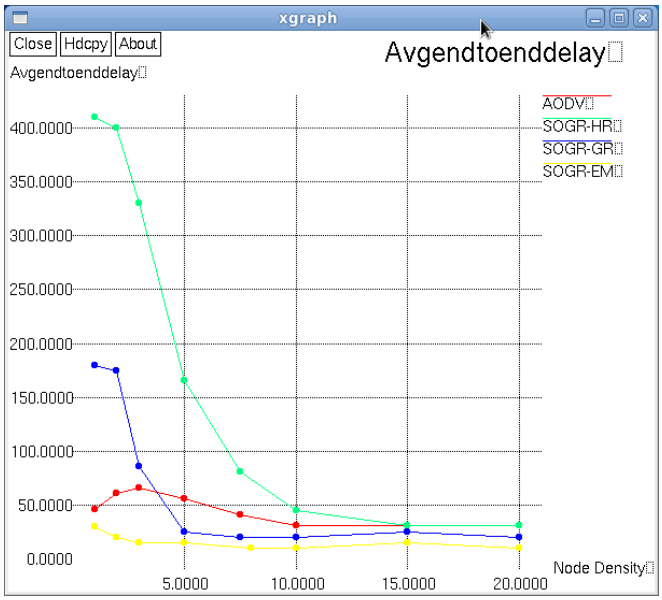

Figure 10: Average End To End Delay

In figure 10 average end to end delay are low by using SOGR EM algorithm compare to all other protocols.

5. Conclusion

In this work, we have developed the protocol, SOGR EM routing protocol that will high performance compare to existing all other protocol such as AODV, SOGR GR, SOGR HR protocols [1]. The propose protocol reduce the average end to end delay, control overhead, average number of packet forwarding, packet delivery ratio with respect to maximum speed and node density. Finally conclude that the overall performance is improved while using SOGR EM algorithm, here we mainly consider the two factor such as average end to end delay and control overhead with respect to maximum speed and node density, clearly shown that the very small end to end delay and control overhead using SOGR EM algorithm when compare to existing protocol SOGR GR and SOGR HR, AODV.

References

[1] X. Xiaojing xiang, Xin wang and Zehua Zhou, "Self Adaptive on demand geographic routing for mobile ad hoc networks" IEEE Trans. Mobile computing, vol.11, no.9, pp. 1572-1586, Sep 2012.

[2] X. Xiaojing xiang, X. Wang And Y.Yang,"Supporting Efficient and Scalable Multicasting over Mobile Ad Hoc Networks," IEEE Trans. Mobile Computing, vol 10, no. 4, pp. 544-559, Apr. 2011.

[3] F. Zhang, H. Li, A. Jiang, J. Chen, and P. Luo, "Face Tracing Based Geographic Routing in Non planar Wireless Networks," Proc. IEEE INFOCOM, pp. 2243-2251, May 2007.

[4] Y.C. Tseng, S.Y. Ni, and E.Y. Shih, "Adaptive Approaches to Relieving Broadcast Storms in A Wireless Multihop Mobile Ad Hoc Network," IEEE Trans. Computers, vol. 52, no.5, pp.545- 557, May 2003.

[5] Abraham, D. Dolev, and D. Malkhi, "LLS: A Locality Aware Location Service for Mobile Ad Hoc Networks," Proc. Workshop Discrete Algorithms and

Methods for MOBILE Computing and Comm.(DialM), 2004.
[6] C. Perkins, E.M. Royer, and S. Das, "Ad Hoc On-Demand Distance Vector (AODV) Routing," IETF RFC 3561, July 2003.

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