Network and Complex Systems
ISSN 2224-610X (Paper) ISSN 2225-0603 (Online)
Vol.5, No.3, 2015
www.iiste.org

A Novel Approach on Greedy Maximal Scheduling Algorithm on Embedded Networks

Mr.N.Kumaresan
Assistant Professor, Department of Electronics and Communication Engineering,
Anna University of technology, Coimbatore
prakumpriniv@gmail.com

N.Arun Prasath
M.E. (Embedded Systems and Technologies) Student, Department of Electronics and Communication Engineering, Anna University of technology, Coimbatore
arunprasathest@gmail.com

Abstract
There has been a significant amount of work done in developing low-complexity scheduling schemes to achieve high performance in wireless networks. A centralized sub-optimal scheduling policy, called Greedy Maximal Scheduling (GMS) is a good candidate because its empirically observed performance is close to optimal in a variety of network settings. However, its distributed realization requires high complexity, which becomes a major obstacle for practical implementation. In this paper, we develop simple distributed greedy algorithms for scheduling in wireless networks in embedded. we propose greedy algorithms for scheduling, with better performance and lower complexity and reduce delay .We reduce the complexity by relaxing the global ordering requirement of GMS, up to near-zero. Simulation results show that the new algorithms approximate the performance of GMS, and improved method to reduce packet loss and enhance the total output. This algorithm also reduce larger queue length on the wireless networks.
Keywords:linux fedora-8 OS, Network Stimulator,Ns-2.

I INTRODUCTION

There have been significant advances made in our understanding of the wireless scheduling problem. The Scheduling is a process that determines which links transmit, at what times, and at what power levels. Throughput optimal scheduling is in general a nonlinear, non-convex optimization problem mainly due to interference constraints between links, and thus requires high computational complexity. In addition, the nature of multi-hop wireless networks demands a distributed solution based on local information, which often causes additional complexity.

The scheduling problem is especially important because it has been shown that the scheduling component results in the highest complexity among various network functionalities. Although the optimal scheduling solution has been known for a long time, it requires a high order polynomial complexity even under the simplest 1-hop interference model1.Hence,it is difficult to implement the optimal solution. In order to reduce the complexity and at the same time, with the aim of approximating the optimal performance. For that purpose we greedy maximal scheduling algorithm in network transmission.

II OBJECTIVE

The main objective is to implement low complexity scheduling schemes develope to achieve high performance in multi-hop wireless networks. simple distributed greedy algorithms for scheduling in multi-hop wireless networks and reduce the complexity by using GMS, up to near-zero. Improved high performance throughput on variety of network settings and avoid interference on network transmission. The greedy algorithms for scheduling, with better performance and lower complexity and reduce delay. Simulation was done and comparing results on delay, packet lost, output in the graph.

III EXISTING METHOD

To design a scheduling policy, called Local Greedy Scheduling (LGS), which schedules only links with the locally longest queue. Other links that have a smaller queue length than their neighbours are simply not scheduled under LGS. Clearly, this restriction will reduce complexity at the cost of some performance. LGS has a two-tier decision procedure, At each time slot, links with the locally longest queue have the right to transmit. If more than two interfering links have the same largest queue length, they are added to the schedule in an increasing order of index unless they interfere with some links that were added earlier the LGS is suit for only locally longest queue.

The key idea is to schedule links with the locally longest queue and to resolve the contention between them without collision using a predetermined link ordering. Achieving the collision-free resolution is important since it ensures that the resultant schedule is maximal on the set of links with the locally longest queue.

IV PROPOSED METHOD

The most well-known sub-optimal scheduling policy is the Greedy Maximal Scheduling (GMS) policy or Longest Queue First (LQF) policy. *GMS* schedules links in decreasing order of the queue length conforming to interference constraints.

It has been known to achieve an efficiency ratio of under the 1-hop interference model, where the efficiency ratio is defined as the largest fraction of the optimal capacity region that the scheduling policy can support. *GMS* is an important scheduling policy because it has a good provable performance bound superior to many distributed scheduling policies and it empirically achieves the same performance as throughput-optimal scheduling in a variety of network setting. For practical implementation in multi-hop wireless networks, *GMS* has been realized as a distributed algorithm. However, these algorithms are quite simple to ensure the precise queue length ordering of links.

The new greedy algorithms that achieve good throughput performance with lower complexity and delay. GMS is an important scheduling policy because it has a good provable performance bound superior to many distributed scheduling policies.This algorithm also reduce larger queue length on the wireless networks and also enhance the throughput on networks .

To reduce the complexity based on the observation that links with the largest queue length within their interference range are crucial in characterizing the capacity region of GMS.

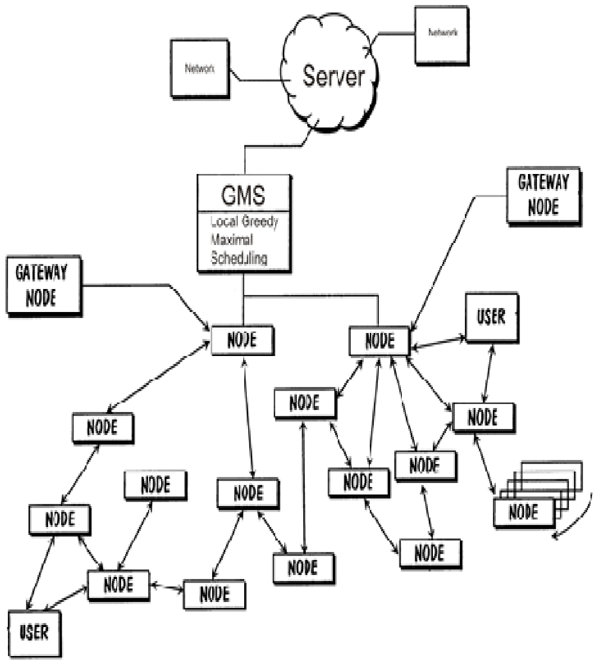

Fig.1. Block diagram of Proposed method. (packets transmission on network by using local greedy maximal scheduling algorithm)

The performance of local greedy approximations remains an open problem. In this paper, we analyze their complexity, discuss important issues relevant for practical implementation, and evaluate its performance through simulations comparing with other scheduling policies such as centralized *GMS* and *Q-CSMA*.

COMPARISION OF GMS WITH RESPECT TO LGS

LGS is a low-complexity scheduling algorithm which has been observed to achieve near-optimal throughput performance in a variety of wireless network simulations. However, theoretical bounds to date on the performance of LGS only show that it can achieve a fraction of the capacity region.

Nevertheless, we can show that, for networks with general link weights and under a randomized mechanism, LGS and GMS will produce the same set of schedules. The proof is omitted here due to the limitation of space.

A lower-bound on its throughput efficiency in larger networks which improves previous bounds. Furthermore, we showed that GMS is equivalent to LGS, which is amenable to distributed implementation. This means a simple, distributed scheduling algorithm like GMS/LGS is suitable for many applications in wireless networks.

V SIMULATION MODEL

ns2- Network Simulator

One of the most popular simulator among networking researchers. Discrete event, Packet level simulator. Events like 'received an *ack* packet', 'enqueued a data packet' .Network protocol stack written in C++ and Tcl (Tool Command Language) used for specifying scenarios events.

NETWORK SIMULATOR VERSION 2

ns-2 stands for Network Simulator version 2. Is a discrete event simulator for networking research. Work at packet level and Provide substantial support to simulate bunch of protocols like FTP, HTTP,TCP,UDP and DSR Simulate wired and wireless network and it is primarily Unix based.It use TCL as its scripting language. ns-2 is a standard experiment environment in research community**.**

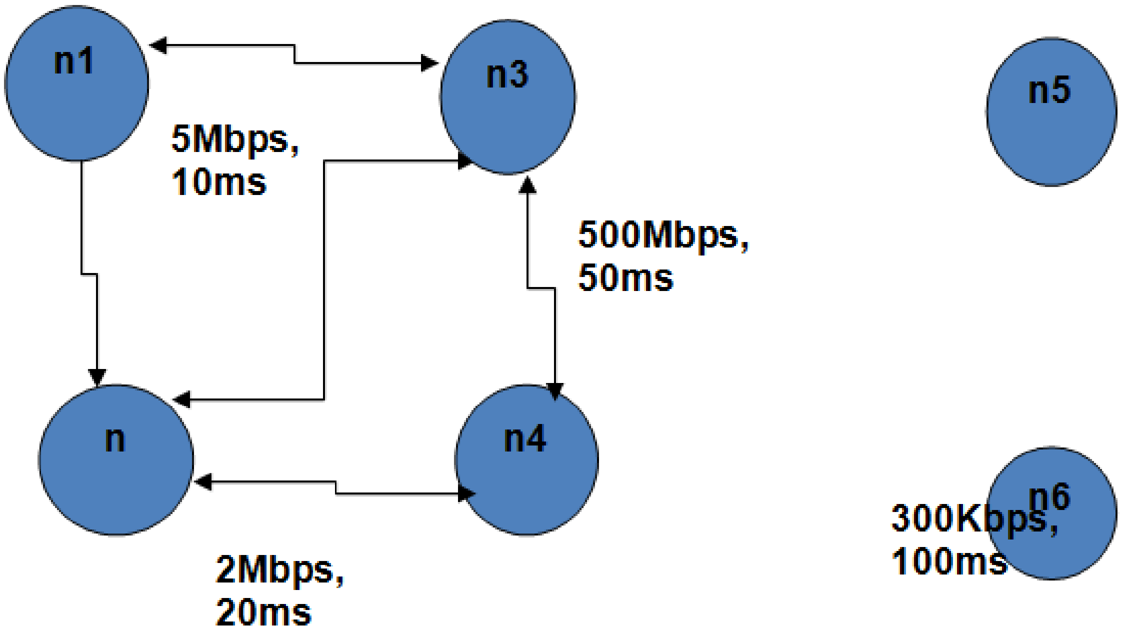

Fig.2. creating network nodes

LGS SIMULATION GRAPH GENERATION

A multi hop wireless network of hundred have been created. From that one of the node we assume source and another node as destination. Then path is created from which the data packets are transferred with limited time interval. The stimulation is done and X graph is plotted with respect to time and data packets.

Comparing results on delay, packet lost, output in the graph of LGS,CEN GMS,QL-RAS,Q-CSMA .Result values to shown on the tabular column. From the above four algorithm local greedy algorithm is better than all the other three algorithm. But it more possible for the noise, interference and high computational complexity value. These disadvantages must be removed in the proposed GMS algorithm.

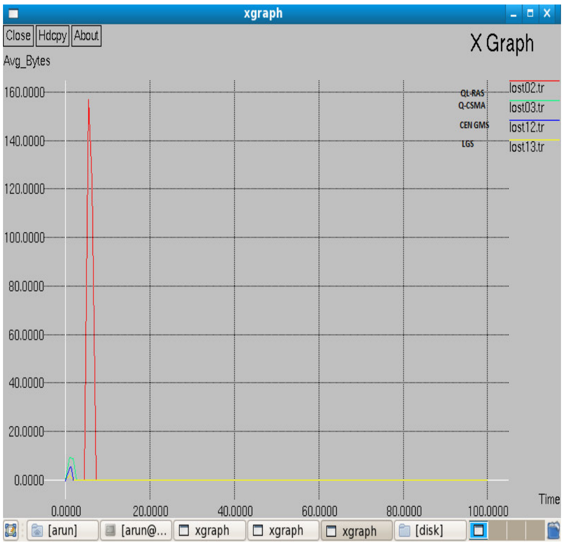

Fig.3.Simulation graph for packet loss of four algorithm

ALGORITHM	QL-RAS	Q-CSMA	CEN-GMS	LGS
Maximum no of packets lost (bytes)	156	5	6	3
Output (bytes)	90	120	160	185

TABLE .1. Algorithm Comparision Of four algorithm

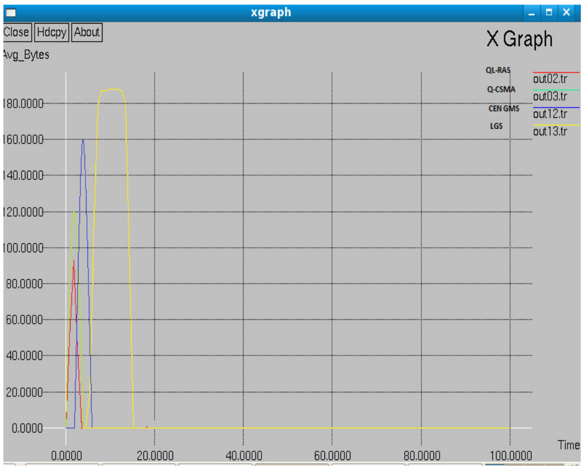

Fig.4.Simulation graph for output of four algorithm

GMS SIMULATION GRAPH GENERATION

A multi hop wireless network of hundred have been created. From that one of the node we assume source and another node as destination. Then path is created from which the data packets are transferred with limited time interval. The stimulation is done and X graph is plotted with respect to time and data packets.

Comparing results on delay, packet lost, output in the graph of LGS and GMS. Result values to shown on the tabular column. From the above two algorithm Greedy maximal algorithm is better than all the other local greedy algorithm. It is less possible for the noise, interference and high computational complexity value. These are the advantages in the proposed GMS algorithm.

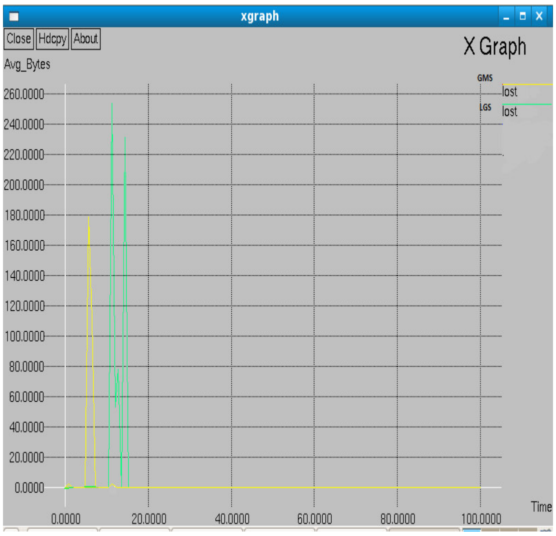

Fig.5.Simulation graph for packet loss of LGS ,GMS

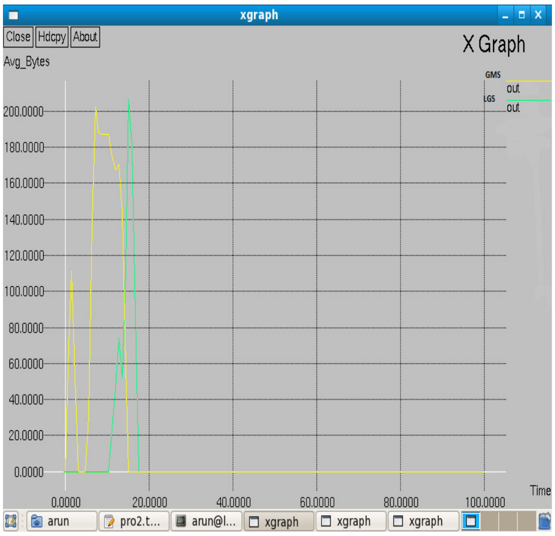

Fig.6.Simulation graph for output of LGS,GMS

ALGORITHM	LGS	GMS
LOST packets (Bytes)	255	185
OUTPUT (Bytes)	205	205

TABLE .2. Algorithm Comparison Of LGS AND GMS

VI CONCLUSION

Greedy Maximal Scheduling (*GMS*) is a promising scheduling solution in multi-hop wireless networks that provably outperforms many distributed scheduling policies appears to empirically achieve optimal performance over a variety of different network topologies and traffic distributions. However, its distributed implementation requires high computational complexity. The proposed algorithms reduce the complexity of *LGS* by excluding from the schedule links with a smaller queue length than their neighbors. It comes from the intuition that the links with locally longest queues are important to characterize the capacity region.

The proposed algorithms acquire this property in a distributed and collision-free fashion with minimal complexity by pre-assigning an index to each link conforming to the interference constraints. New approach on the greedy algorithm must be implemented and stimulated on the network simulator. X-graph is generated in the network simulator with respect to the LGS and GMS, we can analysis the delay , packet loss must be reduced and total output value of GMS must be improved compared to the previous LGS method. To overcome the disadvantages on the LGS scheduling algorithm by the new greedy algorithm.

VII REFERENCES

1. Changhee Joo and Ness B. Shroff, " Local Greedy Approximation for Scheduling in Multi-hop Wireless Networks," IEEE Trans ,vol no 11,pp 1536-1233/11,June 2011.
2. L. Bui, S.Sanghavi, and R. Srikant, "Distributed Link Scheduling with Constant Overhead," in *ACM Sigmetrics*, June 2007, pp. 313–324.
3. P. Chaporkar, K. Kar, and S. Sarkar,"Throughput Guarantees in Maximal Scheduling in Wireless Networks," in *the 43rd Annual Allert Conference on Communication, Control and Computing*, September 2005.
4. A. Dimakis and J. Walrand , " Sufficient Conditions for Stability of Longest-Queue-First Scheduling: Second-order Properties using Fluid Limits," *Advances in Applied Probability*, vol. 38, no. 2, pp.505–521, 2006
5. .A.Ephremides, and L.Tassiulas, "Stability Properties of ConstrainedQueueing Systems and Scheduling Policies for MaximalThroughput in Multihop Radio Networks," *IEEE Trans. Autom Control*, vol. 37, no. 12, pp. 1936–1948, December 1999
6. Gupta, X. Lin, and R. Srikant, "Low-Complexity Distributed Scheduling Algorithms for Wireless Networks," in *IEEE INFOCOM*, May 2007, pp. 1631–1639
7. Joo and N. B. Shroff, "Performance of Random Access Scheduling Schemes in Multi-hop Wireless Networks," *IEEE/ACM Trans.Netw.*, vol. 17, no. 5, October 2009.
8. M. Leconte, J. Ni, and R. Srikant, "Improved Bounds on the Throughput Efficiency of Greedy Maximal Scheduling in Wireless Networks," *ACM MOBIHOC*, 2009, pp. 165–174.
9. R. R. Mazumdar G. Sharma, N. B. Shroff, "Joint Congestion Control and Distributed Scheduling for Throughput Guarantees in Wireless Networks," in *IEEE INFOCOM*, May 2007, pp. 2072–2080.
10. E. Modiano, D. Shah, and G. Zussman, "Maximizing Throughput in Wireless Networks via Gossiping," *Sigmetrics Performanc Evaluation Review*, vol. 34, no. 1, pp. 27–38, 2006.
11. ——, "Greedy Maximal Matching: Performance Limits for Arbitrary Network Graphs Under the Node-exclusive Interference Model," *IEEE Trans. Autom. Control*, vol. 54, no. 2, pp. 1132–1145, August 2009.

The IISTE is a pioneer in the Open-Access hosting service and academic event management. The aim of the firm is Accelerating Global Knowledge Sharing.

More information about the firm can be found on the homepage:
http://www.iiste.org

CALL FOR JOURNAL PAPERS

There are more than 30 peer-reviewed academic journals hosted under the hosting platform.

Prospective authors of journals can find the submission instruction on the following page: http://www.iiste.org/journals/ All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Paper version of the journals is also available upon request of readers and authors.

MORE RESOURCES

Book publication information: http://www.iiste.org/book/

Academic conference: http://www.iiste.org/conference/upcoming-conferences-call-for-paper/

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digtial Library , NewJour, Google Scholar