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Link-Reliability Based Two-Hop Routing for Wireless Sensor Networks

T Shiva Prakash[a], K B Raja[b], K R Venugopal[c], S S Iyengar[d], L M Patnaik[e]

[a]Department of Computer Science and Engineering, University Visvesvaraya College of Engineering, Bangalore University, Bangalore 560 001 India, Contact: spt@ieee.org

[b]Department of Electronics and Communication Engineering, University Visvesvaraya College of Engineering, Bangalore University, Bangalore 560 001 India.

[c]Department of Computer Science and Engineering, University Visvesvaraya College of Engineering, Bangalore University, Bangalore 560 001 India.

[d]Department of Computer Science, Louisiana State University, Baton Rouge, LA 70803, USA.

[e]Honorary Professor, Indian Institute of Science, Bangalore 560 012, India

Wireless Sensor Networks (WSNs) emerge as underlying infrastructures for new classes of large scale networked embedded systems. However, WSNs system designers must fulfill the Quality-of-Service (QoS) requirements imposed by the applications (and users). Very harsh and dynamic physical environments and extremely limited energy/computing/memory/communication node resources are major obstacles for satisfying QoS metrics such as reliability, timeliness and system lifetime. The limited communication range of WSN nodes, link asymmetry and the characteristics of the physical environment lead to a major source of QoS degradation in WSNs. This paper proposes a Link Reliability based Two-Hop Routing protocol for wireless Sensor Networks (WSNs). The protocol achieves to reduce packet deadline miss ratio while considering link reliability, two-hop velocity and power efficiency and utilizes memory and computational effective methods for estimating the link metrics. Numerical results provide insights that the protocol has a lower packet deadline miss ratio and longer sensor network lifetime. The results show that the proposed protocol is a feasible solution to the QoS routing problem in wireless sensor networks that support real-time applications.

Keywords : Deadline Miss Ratio (DMR), Energy Efficiency, Link Reliability, Quality-of-Service(QoS), Two-hop Neighbors, Wireless Sensor Networks.

1. INTRODUCTION

Wireless Sensor Networks (WSNs) form a framework to accumulate and analyze real time data in smart environment applications. WSNs are composed of inexpensive low-powered micro sensing devices called *motes* [1], having limited computational capability, memory size, radio transmission range and energy supply. Sensors are spread in an environment without any predetermined infrastructure and cooperate to accomplish common monitoring tasks which usually involves sensing environmental data. With WSNs, it is possible to assimilate a variety of physical and environmental information in near real time from inaccessible and hostile locations.

WSNs have a wide variety of applications in military, industry, environment monitoring and health care. WSNs operate unattended in harsh environments, such as border protection and battlefield reconnaissance hence help to minimize the risk to human life. used of WSNs are used extensively in the industry for factory automation, process control, real-time monitoring of machines, detection of radiation and leakages and remote monitoring of con-

6. CONCLUSIONS

In this paper, we propose a link reliability based two-hop neighborhood based quality of service (QoS) routing protocol for WSN. Our proposed protocol is different from THVR, as it considers reliability and dynamic velocity that can be adjusted for each packet according to the required deadline. It balances the load only among nodes estimated to offer the required QoS. The LRTHR protocol is able to augment real-time delivery by an able integration of link reliability, two-hop information and dynamic velocity. Future work can be carried out to support differentiated service and consider transmission power as a metric in forward node selection.

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T Shiv Prakash is an Assistant Professor in the Department of Computer Science and Engineering at Vijaya Vittala Institute of Technology, Bangalore, India. He obtained his B.E and M.S Degrees in Computer Science and Engineering from Bangalore University, Bangalore. He is presently pursuing his Ph.D. programme in the area of Wireless Sensor Networks in Bangalore University. His research interest is in the area of Sensor Networks, Embedded Systems and Digital Multimedia.

K B Raja is an Associate Professor, Dept. of Electronics and Communication Engg, University Visvesvaraya college of Engg, Bangalore University, Bangalore. He obtained his Bachelor of Engineering and Master of Engineering in Electronics and Communication Engineering from University Visvesvaraya College of Engineering, Bangalore. He was awarded Ph.D. in Computer Science and Engineering from Bangalore University. He has over 100 research publications in refereed International Journals and Conference Proceedings. His research interests include Image Processing, Biometrics, VLSI Signal Processing, Computer Networks.

Venugopal K R is currently the Principal, University Visvesvaraya College of Engineering, Bangalore University, Bangalore. He obtained his Bachelor of Engineering from University Visvesvaraya College of Engineering. He received his Masters degree in Computer Science and Automation from Indian Institute of Science Bangalore. He was awarded Ph.D. in Economics from Bangalore University and Ph.D. in Computer Science from Indian Institute of Technology, Madras. He has a distinguished academic career and has degrees in Electronics, Economics, Law, Business Finance, Public Relations, Communications, Industrial Relations, Computer Science and Journalism. He has authored and edited 35 books on Computer Science and Economics, which include Petrodollar and the World Economy, C Aptitude, Mastering C, Microprocessor Programming, Mastering C++ and Digital Circuits and Systems etc.. During his three decades of service at UVCE he has over 300 research papers to his credit. His research interests include Computer Networks, Wireless Sensor Networks, Parallel and Distributed Systems, Digital Signal Processing and Data Mining.

S S Iyengar is currently the Roy Paul Daniels Professor and Chairman of the Computer Science Department at Louisiana State University. He heads the Wireless Sensor Networks Laboratory and the Robotics Research Laboratory at LSU. He has been involved with research in High Performance Algorithms, Data Structures, Sensor Fusion and Intelligent Systems, since receiving his Ph.D degree in 1974 from MSU, USA. He is Fellow of IEEE and ACM. He has directed over 40 Ph.D students and 100 Post Graduate students, many of whom are faculty at Major Universities worldwide or Scientists or Engineers at National Labs/Industries around the world. He has published more than 500 research papers and has authored/co-authored 6 books and edited 7 books. His books are published by John Wiley & Sons, CRC Press, Prentice Hall, Springer Verlag, IEEE Computer Society Press etc.. One of his books titled Introduction to Parallel Algorithms has been translated to Chinese.

L M Patnaik is currently Honorary Professor, Indian Institute of Science, Bangalore, India. He was a Vice Chancellor, Defense Institute of Advanced Technology, Pune, India and was a Professor since 1986 with the Department of Computer Science and Automation, Indian Institute of Science, Bangalore. During the past 35 years of his service at the Institute he has over 700 research publications in refereed International Journals and refereed International Conference Proceedings. He is a Fellow of all the four leading Science and Engineering Academies in India; Fellow of the IEEE and the Academy of Science for the Developing World. He has received twenty national and international awards; notable among them is the IEEE Technical Achievement Award for his significant contributions to High Performance Computing and Soft Computing. His areas of research interest have been Parallel and Distributed Computing, Mobile Computing, CAD for VLSI circuits, Soft Computing and Computational Neuroscience.