



CENTER RESEARCH SEMINAR

Small Sensor and Big Data

Lily Wu, Ph.D.

**Department of Computer Science
University of Texas at Dallas**

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3:00 p.m. – 4:30 p.m.

Room 303H at Science Building

Abstract

This talk focuses on research issues in data engineering, especially in data collection, aggregation, and analysis. For data collection and aggregation, a sequence of research results is included on coverage and connected coverage problems in sensor systems. For data analysis, a research work is presented on the shortest path in big data networks. In every system involving sensors, sensor coverage is an important research issue as it directly influences the quality of service and efficiency of a sensor system. The minimum connected sensor cover problem involves two issues, coverage and connectivity. It has been also a long-standing open problem whether there exists or not a polynomial-time constant-approximation solution. However, we made a significant progress by constructing two approximation solutions. One approximation solution has a performance ratio depending on the number of sensors, but independent of the link radius. The second approximation solution has a performance ratio depending on the link radius, but independent of the number of sensors. The existence of these two approximation solutions means that either the link radius has a close relationship with the number of sensors or an efficient constant-approximation solution exists. Since the former unlikely holds, the latter is possibly true. Thus, it suggests that this open problem is most likely to have a positive answer. This work is based on a new finding of a relationship between the minimum connected sensor cover problem and the group Steiner tree problem. This talk contains a new improvement, a polynomial-time 3-approximation, which is based on several new algorithm design techniques. This improvement is also extended to the maximum connected coverage problem for sensors with two active phases.

Biography

Dr. Lily Wu is a full professor in Department of Computer Science, University of Texas at Dallas. She received her Ph. D. in 2002 and M.S. in 1998 from Department of Computer Science, University of Minnesota, Twin City. Her research mainly deals with the general research area of data communication and data management. Her research focuses on the design and analysis of algorithms for optimization problems that occur in wireless networking environments and various database systems. She has published more than 200 research papers in various prestigious journals and conferences such as IEEE Transaction on Knowledge and Data Engineering, IEEE Transactions on Mobile Computing, IEEE Transactions on Multimedia, ACM Transactions on Sensor Networks, IEEE Transactions on Parallel and Distributed Systems, IEEE/ACM Transactions on Networking, Journal of Global Optimization, Journal of Optical Communications and Networking, Journal of Parallel and Distributed Computing, Social Network Analysis and Mining, IEEE International Conference on Computer Communications, ACM International Conference on Knowledge Discovery & Data Mining, International Conference on Distributed Computing Systems, etc. Dr Wu is associate editors of SOP Transactions on Wireless Communications (STOWC), Computational Social Networks, Springer, and International Journal of Bioinformatics Research and Applications (IJBRA). Dr. Wu is a senior member of IEEE.