SEMINAR NOTICE:

Geographic Multipath Routing in Wireless Sensor Networks with Environmental Energy Harvesting

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CSL 301

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Abstract:

With developments of energy harvesting technologies, rechargeable Wireless Sensor Networks (WSNs) are increasing. Network-wide connectivity is not guaranteed in rechargeable WSNs, since the temporally dead status of a critical node may result in the partition of the whole network. Sleep scheduling strategy should be still applied to allow sensor nodes to get enough time to recharge energy. In this paper, an energy balanced sleep scheduling scheme (EC-CKN) is applied, which takes nodes' residual energy as the parameter to dynamically decide nodes to be active or asleep. On top of this, the challenging issue is: how to design an efficient geographic node-disjoint multi-path routing algorithm which allows higher sleep rate in the network.

This paper introduces a novel routing algorithm TPGFPlus1, in which a forwarding node chooses the next-hop node based on 2-hop neighbor information rather than 1-hop. Performance of TPGFPlus algorithm is evaluated under three different forwarding policies, to meet different application requirements. Simulations show that our proposed algorithm outperforms previous work TPGF on finding more average number of paths and shorter average length of paths, yet without causing additional energy consumption. Simulation results also prove that the TPGFPlus algorithm can allow higher sleep rate in the network, while achieving the same performance of that when using TPGF algorithm.

Biosketch:

Lei Shu received the B.Sc. degree in Computer Science from South Central University for Nationalities, China, in 2002 and the M.Sc. degree in Computer Engineering from Kyung Hee University, Korea, in 2005 and the Ph.D. degree in Digital Enterprise Research Institute, from National University of Ireland, Galway, in 2010. He is a Specially Assigned Researcher in Department of Multimedia Engineering, Graduate School of Information Science and Technology, Osaka University, Japan. He has published over 100 papers in the area of sensor networks. He had been awarded the MASS 2009 IEEE TCs Travel Grant and the Outstanding Leadership Award of EUC 2009 as Publicity Chair, the Globecom 2010 Best Paper Award. He has served as editor in chief of IEEE CommSoft E-letters, and as editors for Wiley, Transactions on Emerging Telecommunications Technologies, IET Communications, IET Networks, KSII Transactions on Internet and Information Systems (TIIS), Journal of Communications, Wiley, Wireless Communications and Mobile Computing, Inderscience, International Journal of Sensor Networks. His research interests include wireless sensor network, sensor network middleware, multimedia communication, and security. He is a member of IEEE and IEEE ComSoc.