

Recent Advances in Wireless Sensor Networks

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Tutorial

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Abstract:

A large number of wireless sensor nodes (SNs) are used in a Wireless Sensor Network (WSN) and information from all SNs are collected at a Base Station (BS) or a sink. After introducing a SN, various characteristics of a WSN are covered in monitoring an unattended area. There is a need to learn about how regular WSN topologies can be effectively used for physically accessible areas. Results are presented on numerous advantages of using a regression polynomial. Impact of using powerful SNs on the system coverage and connectivity are also examined. Another scheme of minimizing packet traffic by collecting data using a mobile Base Station is also considered. Energy consumption throughout the area can be equalized by controlling data packet generation rate based on how far away the SNs are with respect to the BS. An innovative technique of distributing keys for shared secret key based communication in a WSN is described and various characteristics including resiliency are outlined. Monitoring of a battle-field using a WSN is also illustrated using boundary detection of a wild forest fire. Analytical model is introduced and are compared with simulation results. The need for layered sensing in secured communication is also investigated.

Speaker Bio:

Dharma Agrawal is the Ohio Board of Regents Distinguished Professor in the School of Computing Sciences and Informatics. He has been a faculty member at the ECE Dept., Carnegie Mellon University (on sabbatical leave). His current research interests include resource allocation in wireless mesh networks, query processing and secured communication in sensor networks,

environmental monitoring using sensor networks, and effective traffic handling in integrated wireless networks. He is a co-author of an introductory text book on Wireless and Mobile Computing, third edition and Ad hoc and Sensor Networks, 2nd edition. He was awarded a Third Millennium Medal by the IEEE for his outstanding contributions. He has given 38 different tutorials and extensive training courses in various conferences in USA, and numerous institutions in Taiwan, Korea, Jordan, UAE, Malaysia, and India in the areas of Ad hoc and Sensor Networks and Mesh Networks, including security issues. He has been named as an ISI Highly Cited Researcher, is a Fellow of the IEEE, the ACM, the AAAS and the World Innovation Foundation, and a recent recipient of 2008 IEEE CS Harry Goode Award. University of Cincinnati has been given him an award for 2011 year Excellence in Doctoral mentoring.

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