



INSTITUTE OF SPACE TECHNOLOGY ISLAMABAD

Wireless Sensor Networks: Theory, Challenges & Applications

Resource Person:

Dr Aamir Habib, Dr Khurram Khurshid

April 14-15, 2014

Course Description:

The advances in the fields of semiconductor devices and large scale transistor integration coupled with the development of high speed broadband wireless technologies such as MIMO-OFDM have led to the birth of Wireless sensor networks (WSN). Envisioned as the bridge between the modern broadband packet data networks and the physical world, WSNs have made possible real-time data aggregation and analysis on an unprecedented scale. Naturally, they have attracted the attention and garnered wide spread appeal towards applications in diverse areas such as distributed vision processing, remote sensing, disaster warning systems, health care, safety and strategic areas such as defense reconnaissance, surveillance, intruder detection etc. However, WSNs pose unique challenges towards successful design and implementation of pervasive sensing networks. On one hand ensuring sensor data integrity over the error prone fading wireless channels is a substantial hindrance, especially in the context of energy constrained wireless sensor nodes. On the other hand, aggregation and analysis of massive data sets is logistically

complex in such large scale WSNs. Further, topology management and route discovery hold the key to robust WSN deployment for military applications.

WSNs necessitate the development of innovative algorithms for power management, sensor communication, ranging, localization, distributed processing and dynamic routing. Beginning with an introduction to the foundations and background of WSNs, this course is expected to cover the research aspects necessary for WSN deployment with focus on sensor data fusion, topology optimization, optimal power management policies, distributed processing as well as its applications specifically in Computer Vision domain using vision sensors. A WSN demonstration session towards the end provides practical exposure to WSN technology.

Who Should Attend?

- Researchers working in domains of Wireless Communication, Networks or Computer Vision
- Graduate/undergraduate (senior level) students
- Teachers of engineering colleges

Lunch and refreshments will be served during the course to all registered participants. Participation Certificates will be given to the participants at the end of the course.

About the Instructors:



Dr Aamir Habib received his PhD degree from Vienna University of Technology Austria in Wireless Communication. Currently, he is Assistant Professor at the Electrical Engineering Department and is also heading the research group WiCom. His research interests include communications theory & systems and mobile communications. He has been also actively involved in different research projects in the field of Wireless Communications and Satellite Communications. He has over Twelve years of experience teaching courses on wireless communications and has published extensively in reputed journals and conferences.



Dr Khurram Khurshid received his PhD in Signal & Image Processing from Paris Descartes University, France. Currently he is working as Assistant Professor at the Electrical Engineering Department of IST. He is the project manager of ICUBE-1, the first CubeSat satellite launched by any university in Pakistan. He is also the editor of the annual peer reviewed HEC recognized 'Journal of Space technology'. His research interests include Computer Vision, Image Processing and robotics.



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Program Outline:

Day 1
Introduction to WSNs
Design Challenges
Node Architecture
Operating Systems
Physical Layer
MAC Layer
Routing Protocols
Dynamic Power Management
Localization
Security
Programming Environments
Day 2
Vision Sensors
Smart Camera deployment
Distributed Vision Processing
Event detection & tracking
Virtual Reality
Practical Session

■ Professionals ■ Students
Fee: Rs. 15,000/- Fee: Rs. 5,000/-

Completed forms should be returned to:

Institute of Space Technology
Near Rawat Toll Plaza, Islamabad Highway,
Islamabad 44000

For further information, please contact:

Telephone: (051) 9075489, 9075412
aamir.habib@ist.edu.pk
khurram.khurshid@ist.edu.pk
www.ist.edu.pk

Registration:

Requests for participation on the prescribed form (or photocopy) should reach the office a week prior to the commencement of course. List of selected participants will be uploaded on the website. The final selection, however, is subject to receipt of the course fee. Forms can be downloaded from <http://www.ist.edu.pk>

Course Timings:

9:00 am - 04:00 pm

Venue:

Institute of Space Technology,
Near Rawat Toll Plaza, 1 Islamabad Highway,
Islamabad.

