CNT 5109 Sensor Networks and Smart Systems

Credits: 3 credits

Textbook, title, author, and year: There is no required textbook for this course.

Reference materials: Students will be required to read portions from some of the latest research articles. Information about these articles will be provided in the class. A few typical research articles are listed here:

Vullers, R.J.M., et al, "Energy Harvesting for Autonomous Wireless Sensor Networks", IEEE Solid-State Circuits Magazine, Spring 2010.

Xu, L.D., He, W., and Li, S., "Internet of Things in Industries: A Survey", IEEE Transactions on Industrial Informatics, Vol. 10, No. 4, November 2010.

Specific course information

Catalog description: Smart systems are rapidly emerging in almost every aspect of life such as smart health, smart transportation, smart agriculture, smart energy, and many more. This course discusses sensor networks and their use in smart systems. The research oriented course focuses on smart system applications

Prerequisites: Graduate standing or permission of instructor, Corequisites: None

Specific goals for the course:

Upon completion of this course, students will:
Understand the concepts of smart systems
Understand the applications of sensor networks/Internet of Things in smart systems and associated implementation and technical details
Achieve competency to locate, understand, and critique current research in the field of sensor networks and smart systems
Achieve competency to understand and conduct research in the field of sensor networks and smart systems

Brief list of topics to be covered:

- Introduction to the class material and expectations
- Introduction to the basics of sensor networks and smart systems
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- Introduction to the basics of sensor networks and smart systems
- Radio Frequency Identification (RFID) and sensor networks

- Internet of Things (IoT)
- Typical applications of sensor networks and IoT in healthcare, transportation, agriculture, energy, environment etc.
- Technical and operational aspects of smart systems
- Interworking of sensor networks and smart systems
- Detailed discussion about the applications of sensor networks and smart systems such as smart cities, smart
- Guest lecture from industry – current industrial trends/projects related to smart systems
- Discussion on communication protocols related to sensor networks
- Discussion on performance evaluation/modeling and simulation of sensor networks and smart systems
- Discussion on open research aspects related to sensor networks, IoT, and smart systems
- Guest lecture from Industry – practical aspects, challenges, and opportunities in the field of smart systems
- Discussion on standards related to sensor networks and IoT
- Future directions/applications of sensor networks, IoT, and smart systems
- Societal implications of smart systems