Cyber-Physical Systems (CPS)

Lecturer: Yan Zhang
Tor Skeie
Teaching Assistant: Sabita M. Khadka
Lectures

• Time: 13:15-16:00
• Seminar room: 3C, IFI
• First time right now...
• Totally 12 lectures
• Last lecture: 3 December
Outline

• Seminar Overview
• Introduction to Cyber-Physical Systems
• Introduction to Wireless Sensor Networks
• Introduction to RFID and Internet of Things (IOT)
Motivation

• Observations
  – Computers become faster and cheaper
  – Computing capabilities will be embedded in all types of objects in the physical environment.

• It is urgent to bridge the cyber-world of computing and communications with the physical systems as cyber-physical systems.

• Cyber-physical systems (CPSs) are physical systems whose operations are monitored, coordinated, controlled and integrated by a computing and communication core.

• CPS will
  – revolutionize how and where information is accessed
  – change how people buy and sell in the marketplace.
  – transform how humans interact with and control the physical world around us
Learning goals

• The seminar provides students with a basic understanding of state-of-the-art in the area of cyber physical systems and detailed knowledge within chosen sub-areas.

• The seminar covers:
  – Cyber physical systems basics, systems and applications
  – Wireless sensor networks
    • Routing
    • Medium access control
    • Localization
    • Data fusion
    • Clustering
  – RFID systems: anti-collision and applications
  – Mobile social networks
  – Internet of Things (IOT)
  – Emerging applications and services
  – Optimization and analysis approach in protocols performance evaluation
Seminar Elements

- 1-2 lectures
  - overview and challenges
- Paper pool
  - About 20+ papers of various lengths
- One/two presentation per student
  - Other students act as opponents
  - One student makes notes
- Self-organizing reading group
- Student presentation
  - Paper presentation
  - Criticism of paper
  - Discussion
  - Guidelines for the above
Exam and Grading

• Oral exam
  – paper pool and other results of seminar activity

• Grading based on a weighted combination of
  – Presentations (~ 30%)
  – Class participation (~ 20%)
  – Oral examination (~ 50%)
Plan for Student Presentations

• A detailed plan will be provided during this week

• 2nd Lecture
  – On reading and presenting research papers
  – Presentation demo (by Sabita)

• First student presentations: 1 October 2010
  – Decide today (or during this week) who will do the presentation
  – Topic: *Cyber physical systems: introduction, applications and systems*
  – Read background and overview papers
Quality Assurance at IFI

• As a student you have the right and duty to contribute to the quality assurance of your study program. This is done primarily by participating in mid-term evaluation. The course lecturer will initiate the mid term evaluation for each course.

• The mid term evaluation provides you with the opportunity to give feedback and suggestions regarding the teaching during the semester, to ensure that improvements can be done during the course.

• You may find more information on the main page of Institutt for informatikk under ”Annet” –”Kvalitetssikring”, or by following the link: http://www.ifi.uio.no/studinf/kvalitetssikring/studenter
Contact

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