Ubiquitous Networks

Introduction

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Class Information

- **Lecturer**
  - Prof. Lynn Choi, School of Electrical Eng.
  - Phone: 3290-3249, Kong-Hak-Kwan 411, *lchoi@korea.ac.kr*,
- **Time**
  - Fri 9:00am – 11:45am
  - Office Hour: Tue 5:00pm – 5:30pm
- **Place**
  - Chang-Yi-Kwan 127
- **Textbook**
  - Collection of research papers: refer to "Reading List"
- **References**
  - "Wireless Sensor Networks: An Information Processing Approach", Feng Zhao and Leonidas Guibas, Morgan Kaufmann, 2004.
  - "Ad Hoc Networking", Charles E. Perkins, Addison-Wesley, December 2000.
  - "Wireless Ad Hoc and Sensor Networks: Theory and Application", Li, Cambridge Press.
- **Class homepage: http://it.korea.ac.kr**

The Content of the Class

- **We will discuss wireless ad hoc networks.**

- **What is ad hoc networks?**
  - "Ad Hoc" means
    - "for this purpose only", "temporary"
  - "Ad Hoc Network" means
    - Infrastructure-less network
      - No wired infrastructure such as base stations, access points, or routers
    - Self-organizing
    - Short-lived
      - Temporary network just for the communication needs of the moment
    - Dynamic topology
      - The topology can be changed dynamically due to node mobility, node autonomy, power, failure, etc.

- **Main topics: networking issues in sensor networks/MANET**
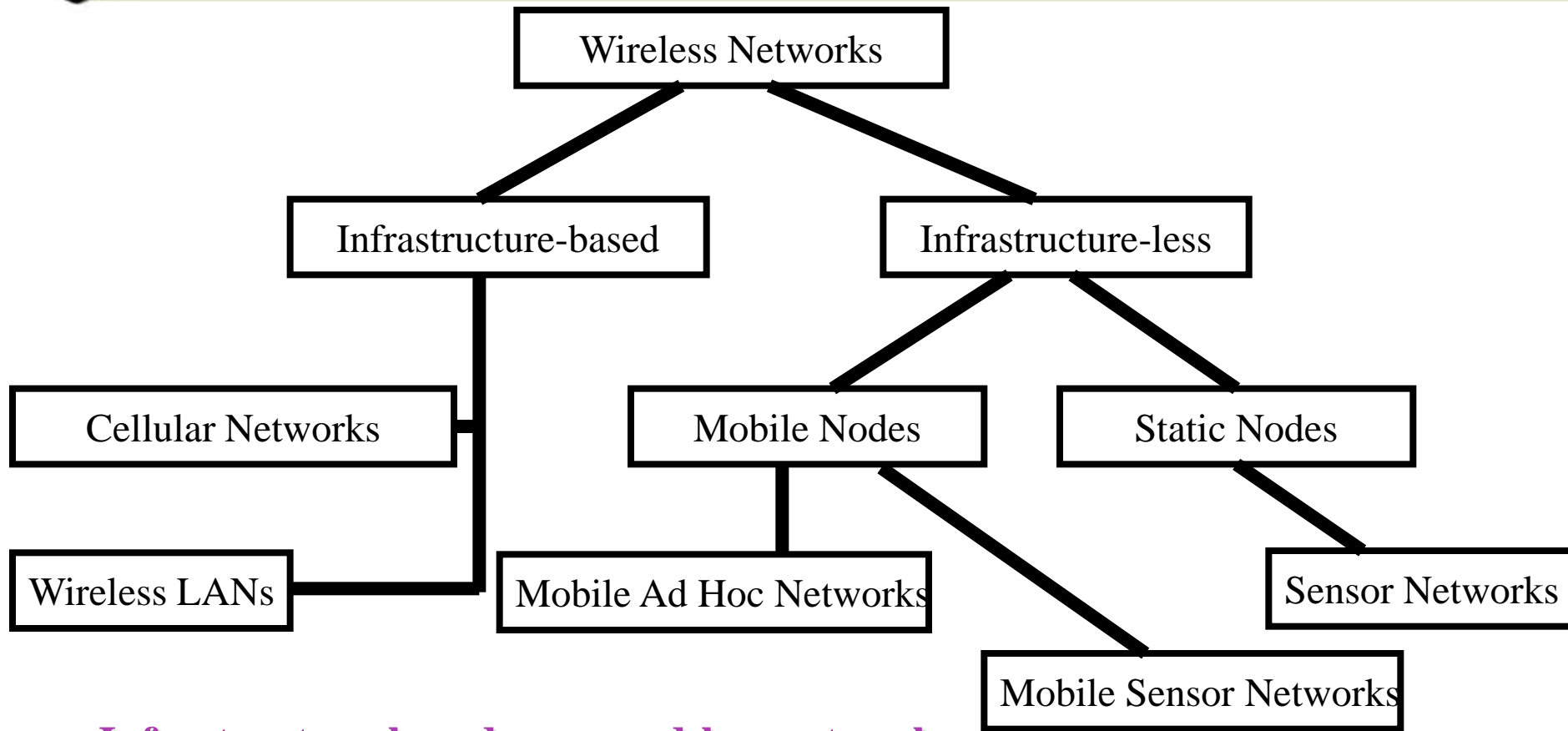
- **Infrastructure-based versus ad-hoc network**
  - ▸ Single-hop versus multi-hop wireless links
- **Hybrid wireless networks**
  - ▸ Integration of infrastructure-based and ad hoc networks

Class Schedule

- **Sensor Networks (9/6)**
  - *Introduction, Sensor Networks*
- **MAC basics (9/13)**
  - *WLAN Basics*
  - *WPAN (Bluetooth, 802.15.3, 802.15.4/Zigbee)*
- **MAC (9/20)**
  - *Introduction S-MAC, WiseMAC, A-MAC/A+MAC, Zero-MAC*
  - Sensor network MAC protocols
- **Wakeup Scheduling (9/27)**
  - *DMAC, SpeedMAC*
- **Clock Synchronization (10/4)**
  - Clock synchronization
  - *Introduction to NTP, TPSN, RBS, FTSP*
- **Routing issues (10/11)**
  - *Introduction to Directed Diffusion, TTDD, VSR*
  - Sensor network routing protocols

Class Schedule

- **Midterm Exam (10/18)**
- **MANET introduction (10/25)**
  - *Introduction to DSDV, DSR, AODV*
- **Geographic routing (11/1)**
  - *Introduction to GPSR, M-Geocast*
- **Recent MANET/MSN research issues (11/8, 11/15, 11/22)**
  - Mobile sensor networks, ad hoc network community: *TAR*
  - Aggregation, reliability, efficient broadcast, clustering
  - Operating system and programming environment
  - Cognitive radio, network coding, cooperative networking
  - QoS, vehicular ad hoc networks
- **Project presentation (11/29)**
- **Final exam (12/6)**

Grading

- **Midterm: 35%**
- **Final: 35%**
- **Presentation: 15%**
  - 3 presentations per person
- **Project: 15%**
  - Novel ideas
  - Experimentation: simulation
- **Class participation: +/-5%**