

Introduction to Seminar “Advanced Topics in Mobile Communications”

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Goal

- Gain experience in ***reading, writing and presentation in English***
- Learn knowledge about *advanced topics in telematics/mobile communications*
- Further thoughts in CS/telematics

Forms

- Part 1: Working together: reading and writing
- Part 2: Trial talks and discussions (20%)
- Part 3: Presentation and 10-page essay (80%)

In each session:

- ➔ Active participation from both sides!
- ➔ Opportunity to practice everyone's presentation & reading skills!

How to read

- Preparation: pencil, paper photocopy of article
- Decide what to read: read title, abstract
- Rough round: what're the major points?
 - Introduction, conclusion and first paragraph of the main work
 - React to the what you read: write down/put note
- Read in depth:
 - build a structure of the problem/system
 - challenge/verify the credibility of the idea: do the assumption, method, statistics & conclusion sound?
 - construct your own example
- Summarize what you read

How to present

- Read the article beforehand, sketch your impressions about the author's idea
- Decide which is the best idea in the paper
 - Write it down and justify with a line sentence
- Figure out how to get your audience as quickly as possible to the point where they can understand this idea
- Elaborate the idea in details
 - Background, proof, benefits/difference over others
- Summary: thinking/justification of the paper in your own words

Essay coverage

- Title
- Abstract: a broad overview of the report, end with a short statement of the major results of your investigation
- Introduction (or Motivation of the work): expands the abstract, get specific about your investigation
- Related work: unlikely invented sth completely new
- Methodology/Technical approach: what's important idea of the work? Bring your reader to the method
- Advantages and improvements of the work:
- Major results
- Future research along the direction

Topics

- Business models
- Mobility management
- Sensor networks
- Location services

Business models

- Problem:
 - How can hotspots or other mobile operators sustain themselves – generate revenue?
- Pricing:
 - Prepaid, usage-sensitive, transaction-based, others...
- Billing:
 - central, third-party
 - relate to authentication problem

Mobility management

- Problem:
 - How a mobile device can remain **connectivity** with the communicating peer during its movement?
- Network layer:
 - mobile IP, multicast-based mobility, mobile ATM
- Transport layer:
 - TCP, UDP, SCTP for mobility
 - HIP
 - TCP performance in mobile environments
- Application layer: SIP mobility

Location services

- Problem:
 - How do we keep track of the location of the mobile host in a mobile network rapidly so as to improve the performance of the communication network?
- Location Management
 - Attempt to keep **track** of the mobile hosts in real time, as the hosts move through the network.
 - The location records have to be **updated** frequently so as to keep the location management in real-time.
- Location Prediction
 - Attempt to predict the location of the mobile host at a future instant so as to provide services to the user without break or interruption.
 - Good **mobility models** have to be used for accurate predictions.

Sensor networks

- Problem:
 - How can low cost, low power, wireless smart sensors interconnect and cooperate?
- Data link layer and network layer
 - Power efficiency MAC and routing
- Transport layer: probably only UDP
- Application layer: SMP, TADAP, SQDDP
- Design tradeoffs for smart sensing nodes
 - Energy v.s. hop length, bandwidth limitation, robustness, different topology (scalability); node collaboration; cost-effective

References

- Jochen Schiller, Mobile Communications (2nd ed.). Addison Wesley, 2003. ISBN 0-321-12381-6
- Alan E. Wiseman, Economic Perspectives on the Internet. Nova Science Publishers, Inc., 2003. ISBN 1-590-33716-6
- Edgar H., Jr. Callaway, Edgar H. Callaway, Wireless Sensor Networks: Architectures and Protocols. CRC Press, August 2003. ISBN 0-849-31823-8
- Recent papers (see course website, will be updated in studIP as needed)