Overview

- Course information (personnel, policy, schedule, misc.)
- What is happening in Multimedia domain?
- Review of Human Visual System and Digital Imaging
- Summary
Instructor

Klara Nahrstedt

- PhD 1995 from Department of Computer and Information Science, University of Pennsylvania

Research:

- **Multimedia networking** (routing, QoS management, pricing),
- **Multimedia distributed systems** (overlay multicast, peer-to-peer systems, service composition, resource management),
- **Mobile computing** – smart phones protocols – P2P, video streaming over mobile phones, group management, …
- **Multimedia operating systems** (soft-real-time scheduling, caching),
- **Multimedia applications** (multi-view 3D tele-immersive systems, multi-camera systems, collaborative environments, mobile multimedia, P2P IPTV)
- **Multimedia and critical infrastructure security** (watermarking, real-time security)
Course Logistics

Office Assistant:
- Tami Iren Fazio (tamiegri@illinois.edu)

Teaching Assistant: No TA
- Any questions you have, please, email instructor klara@illinois.edu with subject line “CS598KN”
- Postdoctoral fellow Dr. Haiming Jin (hjin8@illinois.edu) will proctor/evaluate the class presentations when I am on travel

Class Time:
- Tuesday and Thursday 2:00-3:15pm

Class Place:
- 1131 Siebel Center
Course Logistics

Instructor Office Hours:
- Tuesday and Thursday 3:15-4pm
- 3104 Siebel Centers
- Phone: 217-244-6624

Class Website – Reading List:
- https://courses.engr.illinois.edu/cs598kn/fa2017/

Discussion, Announcements, and Postings:
- https://piazza.com/illinois/fall2017/cs598kn/home

Grading Center:
- https://compass2g.illinois.edu/
Required Readings for CS 598kn

- Papers in Reading List (posted on class website)
  - https://courses.engr.illinois.edu/cs598kn/fa2017/ReadingList/ReadingList-cs598KN-Fall2017.htm

- Lectures and Discussion in class

- Auxiliary Text:
  - *Multimedia Systems*, Ralf Steinmetz, Klara Nahrstedt, Springer Verlag, 2004
Course Prerequisites

- It is helpful if you have taken at least one of these classes in your undergrad studies
  - CS 425 (distributed systems undergrad)
  - and/or
  - CS 438 (networking systems undergrad)
Goal of the Course

- **Expand breath of knowledge** in the area of multimedia systems through
  - Learn new multimedia-specific system and networking concepts
  - Learn new mathematical and design tools to model and design complex systems that run multimedia

- **Learn scientific tools for your MS/PhD theses**
  - Learn how to critique scientific papers
  - Learn how to prepare and present a scientific work as lecture
  - Learn how to present related work
  - Learn how to prepare project proposal
  - Learn how to prepare project presentation and final project report
Class Format

Class will consist of partially
- lecturing by instructor and
- lecturing by students based on reading list
- paper discussions

Students responsibility
- Attend lectures
- Read papers!!
- Work on reviews, evaluation, midterm exam, project, lectures
- Look for new material and post on piazza when you find interesting papers, tools, other material to share
Workload (1)

The course will have four major tasks to do:

- Lecturing
  - Student chooses and presents during the semester 3 papers from the reading list, but sends 6 papers selected to instructor (if the first three papers are not available, the following papers on the list will be considered in the order)
  - Paper assignment will be on a first-come-first-serve policy
  - Student presents the papers in class
  - Instructor evaluates the lectures
Workload (2)

Paper Reviews and Evaluation of Reviews

- **Peer-reviewed**
  - Everybody picks 3 papers to review (different from the 3 papers to present)
    - Send 3 additional papers that you want to review to make sure that there is no overlap
    - I will re-assign if I see overlaps
  - Reviewer posts the review on the piazza board for everybody to see.
  - The presenter of the paper evaluates the review, provides feedback and evaluation to reviewer, and instructor
Workload (3)

- Take-Home Midterm Exam (One Week)
  - Questions will be asked from Lectured material and papers presented prior to exam
  - Problems will require search through the covered papers to answer the midterm questions
Workload (4)

- **Final project** will include three parts:
  - 1. project proposal
  - 2. project presentation in class
  - 3. project paper
Lecturing

- Each student needs to present three papers during the semester
  - Each student submits her/his choice of papers
    - Provide primary (first 3) and secondary choices (other 3 papers) for each lecture
    - See class website for reading list and papers to be presented by students
    - Selection of papers will be based on First Come First Serve
      - IF THERE IS STILL OVERLAP, I WILL REASSIGN PAPERS
    - Submit the choices of papers by email to klara@illinois.edu
    - Assignments will be posted on the class website in the Reading List
  - Deadline of paper choices: September 1.
Lecture Format (1)

- Every paper presentation should be **25 minutes maximum** to leave at least 5-10 minute for discussion

- You should plan 1-2 minutes per slide, so having around 15-20 slides
  - Use simple strong contrast colors
  - Do not make the slide too busy

- **Post your slides on piazza before lecture**
  - Piazza -> cs598kn -> resources -> Lecture notes
Lecture Format (2)

Your presentation should include

- Motivation of the problem (why are we looking at this issue? What is the environment where the problem resides?)
- Problem Description (What is the problem and what are the challenges of the problem?)
- Background (How did other people solve this problem and why isn’t this enough?)
- Novel approach (solution described in the paper)
- Validation of approach
- Conclusion with Pros and Cons of Paper
Paper Reviews

- Each student **reviews 3 papers** (different from presented papers) from the class reading list
  - Use the review format as specified in this lecture
  - Post the review on piazza under reviews_comments folder

- Deadline for each Review is **day before the paper is presented**

- Presenter of the paper evaluates the quality of the review and sends the evaluation comments to klara@Illinois.edu and the reviewer **day after the paper was presented**
  - Peer-evaluation
Peer Reviews Format

Review should include:

- Title, authors, venue of the published paper
- **Short overview of the paper** (what is the main idea of the paper) – few sentences
- 3-5 pros items – positive sides of the paper – why was the paper accepted
- 3-5 cons items – negative sides of the paper – what are still missing pieces of the work;
- Comments on how would you improve the paper?

Note: review should be ½-1 page long; write full sentences and be clear (don’t just put keywords)
Evaluation of Reviews

- Comment on summary of the paper (concise description of the idea)
- Comment on the pros and cons items if they are valid
- Comment on improvement suggestions to the paper
- Specify what the reviewer has done well and what could be improved
Take-Home Midterm Exam

- Midterm exam will be
  - Posted on October 23 (Monday)
  - Due on October 30 (Monday)
- Use lectures, web material and papers to find answers
- Submit midterm-exam solutions in pdf format
Final Project (1)

- Each student must work on a **class project** in multimedia system/network area
  - Consider continuation of your research projects if it has multimedia context
  - Consider exploring new topic towards your research
  - Come and see instructor during office hours if you need suggestions for class project
  - You can work **alone** or in **group of 2 students**

- **Deadlines of Project Phases:**
  - Project Proposal: **October 6, 2017**
  - Project Feedback: meet with instructor during **October 9-13, 2017** (office hours or by appointment via Tami)
  - Project Presentation: Tuesday, **December 12, 2017**
  - Project Final Report: Wednesday, **December 20, 5pm, 2017**
Final Project (2)

The project should have research flavor (so no survey for final project)

You are encouraged to
- develop new algorithm/protocol and/or application and/or
- improve existing algorithm/protocol/application and
- validate via comparative simulation or real implementation
- run QoE experiments on Video 360
Project Proposal Format (1)

Format:
- ACM format, single column, font 11 Arial (or Times New Roman), pdf
- Specify name, title, class number
- Length: 2-3 pages;

Proposal: Introduction
- Motivation and description of problem
  - explain why it is a problem
  - How did others solve the problem?
  - How do you plan to solve the problem?
  - What is broader impact of your solution?
Project Proposal Format (2)

Proposal: **Possible Approaches** you consider to take
- Picture of framework/architecture you want to explore
- Algorithm you want to explore and compare/improve
- Experiment(s) you want to conduct

Proposal: **Action Plan**
- By when you want to do what?

Proposal: **References**
- Papers you want to read and use in your research
Project Presentation and Report Formats

- **Presentation format** should be similar to the lecture format
  - Talk about your problem, challenges, solution and validation.
  - Conclude with lessons learned

- **Report format** should be written like a scientific conference/workshop paper in ACM format (available on web)
  - Read and review papers carefully
Facilities and Equipment

- Engineering workstations-linux machines
- Use laptop cameras or mobile phones cameras or just images/videos on Internet
- Software: gstreamer and ffmpeg – multimedia capturing/display software is installed on engineering workstations-linux machines
- More software can be installed based on project demands – email for help to engrit-help@illinois.edu (and klara@illinois.edu)
- Any problems with engineering workstations/multimedia software – email for help to engrit-help@illinois.edu (and klara@illinois.edu)
Grading

- **Take-Home Midterm Exam**: 20%
- **3 Papers Presentation**: 27% (each paper presentation 9%)
- **3 Reviews**: 3% (each review 1%)
- **Final Project**: 50%
  - Project Proposal (10%)
  - Project Presentation (15%)
  - Project Final Report (25%)
Grading policy

- Gradebook system:
  - https://compass2g.illinois.edu/

- Late policy
  - No Late Policy, but 3 Bonus Days for Reviews posting!!!

- It is your responsibility!
  - Check announcements in lectures, piazza, or class website

- Projects can be done alone or in group of 2
Re-grading policy

- Students have 1 week (after the grade is released into the gradebook) to request for re-grading
- Re-grading requests need to be in writing to the instructor
- After the re-grading period, no re-grading request will be granted.