CS529
Multimedia Networking

Admin

Topics

- Background
- Admin Stuff
- Motivation
- Objectives
- Multimedia!

Professor Background
(Who am I?)

- Dr. Mark Claypool ("professor", "Mark")
  - MS: "Effects of Silence Detection on CPU Load of Audioconference"
  - PhD: "Quality Planning for Distributed, Collaborative Multimedia Applications"
  - Systems guy
- Research interests
  - Congestion control (protocols, AQM)
  - Wireless networking
  - Network games
  - Streaming audio/video over Internet
  - Performance evaluation

Student Background
(Who are you?)

- Name
- Year (1st, 2nd, 3rd ...)
- Degree (BS, MS, PhD, Other)
- Area (CS, ECE, IMGD, Other)
- Courses:
  - cs513? cs502?
- Programming experience and language(s)
  - C/C++ (1 to 5), Java (1 to 5), Other?
- Regular computer-based multimedia use?
  - Skype, YouTube, Computer Games, Nothing ...
- Other...

Objectives

- **Broadly understand** issues related to multimedia over computer networks
- Understand **in-depth** issues of multimedia related to several key areas (e.g., perceptual quality, repair, streaming, and buffering)
- Understand **basic audio and video encoding**
- Understand the impact of **fundamental networking aspects** on multimedia performance
- Demonstrate understanding of streaming audio by **building** a Voice over IP (**VoIP**) application from scratch
- Demonstrate understanding of how to **conduct performance evaluation** through a basic evaluation of the VoIP application
- Do **independent, in-depth exploration** of an individually selected multimedia networking project
- Disseminate project results through a **written report** and a **presentation**.

Syllabus Stuff

- http://www.cs.wpi.edu/~cs529/s15/
- Class:
  - Tu & Fr, 4:20pm - 5:40pm
- Office hours:
  - By appointment
  - My office (FLB24b)
- Email
  - claypool@cs.wpi.edu (me)
  - cs529-all@cs.wpi.edu (class)

Text Book

- None. Instead, research papers, book chapters
  - Select copies provided by me
  - Others accessible online
    - From WPI campus (e.g., Library) or through WPI proxy server
  - See reading list
- Learned
  - Read by you
  - Presented by me
  - Tested for exam
- "Recommended" texts for projects

Topics

- Introduction
  - Digital audio
  - Graphics and Video
  - Multimedia over networks
  - Speech detection
  - Video compression
- Multimedia Perceptual Quality
- Media Scaling
- Delay Buffering
- Multimedia Repair
- HTTP Streaming
- Network Games

Course Structure

- Prerequisites
  - Operating Systems (CS502, recommended)
  - Computer Networks (CS513, recommended)
  - Good programming skills (required)
  - No multimedia experience required
- Grading
  - Exams (45%)
  - Projects (25%)
  - Class participation (10%)

Grading: Exams

- 2 exams
- 45% of grade
- Non-cumulative
- In-class
  - Closed-note, Closed-paper, Closed-friend
- Possible take-home
  - 2 days
  - On new paper, not covered in class
  - Open-note, Open-paper, Closed-friend

Grading: Projects

- 3 projects
  - "b" component has evaluation
- Implementation in Linux or Windows
  - Other platforms need prior approval
- Programming individual, evaluation groups of 2
  - Programming worth 2x evaluation
- Voice over IP (*VoIP*, aka *audioconference*)
  - 1- audio with silence detection …
  - 2-multi-person
- 3rd project is one *you* pick

Grading: Class Participation

- Attendance and discussion
  - Questions and contributions to class discussions
- Presentation of research paper
  - Selected by you aligned with topics
    - Or assigned by me
  - At appropriate time in class (depending upon topic)

Slides

- On the Web, usually after class
- PPT and PDF
- Caution! Don't rely upon the slides alone! Use them as supplementary material
  - (come to class)

Timeline

- Online: http://web.cs.wpi.edu/~cs529/s15/timeline.html
- Tentative, but use it to help plan
  - Will notify you if updated
- Note exams on calendar
- Note "No class" days
  - Will makeup as needed

Why This Class?

- WPI CS requirements
  - (In Networks bin, and Networks is "essential" bin)
- Multimedia is cool!
  - Algorithms, HCI, Networks, Hardware…
  - (Sex-appeal)
- Multimedia networking increasingly important
  - Computers connected
  - Computers can easily do audio, video graphics
- Programming
  - The more you do, the better a computer scientist you become
- Fun!