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

- 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](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!