CSc 461/561
Multimedia Systems
Introduction

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About the course

- CSC 461: 201501 A01@connex.csc.uvic.ca
  - schedule: TWF 12:30--1:30pm, CLE A203
- Lecture Instructor
  - Jianping Pan, pan@uvic.ca, x5796, ECS566
  - O/H: TW 9:30--10:20am; or by appointment
- Teaching Assistant
  - Dawood Sajjadi (email available on connex)

* prerequisites?

* trouble getting on connex or seeing the tab?

Course materials

- Required textbook (digitally available@UVic)
  - Fundamentals of Multimedia, 2nd Ed, by ZN. Li, MS. Drew, and JC. Liu, Springer, 2014
    - http://link.springer.com/book/... (link on connex)
  - Supplementary reading list on connex
- Reference book (available in UVic Library)
  - Multimedia: Computing, Communications and Applications, by Ralf Steinmetz and Klara Nahrstedt, Prentice-Hall, 1995

* http://www.sigmm.org/news/tomccap_special_issue (2013)

About multimedia

- *Multi*media: it's more than just *one* medium
  - text, images, graphics, animation, audio, video
  - and many more…
- Why multimedia?
  - humans interact *much* better with multimedia
- Why need to know multimedia?
  - multimedia is the ~~*future of*~~ communication
  - Most networks now dominated by multimedia

* Cisco visual networking index (VNI) http://ciscovni.com

About multimedia systems

- Systems that handle multimedia content
  - *represent* (production, reproduction, etc)
  - *manipulate* (compression, transformation, etc)
  - *deliver* (storage, transmission, etc)
- Networked multimedia systems
  - involve: mathematics, signal processing, computing, communications, networking, hardware, software, services, applications, etc

* User-perceived quality of service (QoS) and quality of experience (QoE)

Course objectives

- To understand the fundamental issues and problems in the *representation*, *manipulation* and *delivery* of multimedia content such as images, audio and video, particularly in a *networked* environment
- First multimedia course with a *systems* perspective for CS/CE/EE/SE students

* Systems vs building blocks; fundamentals vs practices

Topics: mm representation

- Multimedia information is multidimensional
  - "read through the paper, see the whole picture, remember the last few scenes, …"
- Computer data are mostly one-dimension
  - 010010001...
  - how computers *represent* multimedia
- Selected topics
  - digital sound/audio, image/graphics, video

* Analog -> digital; digital -> analog; human perception & sensitivity

Topics: mm manipulation

- A picture is worth a thousand words
  - so is the amount of data
  - some formats are better than others
- There is a lot of *redundancy*. So compress!
  - some schemes are more efficient than others
- Selected topics
  - lossless or lossy compression
  - examples in audio, image, video compression

* Source coding vs channel coding; human perception considerations

Topics: mm delivery

- Multimedia data are *difficult* to handle
  - how to store them at one location
  - how to move them across multiple locations
- There are multimedia-specific requirements
  - quality of service (bandwidth, delay, jitter, etc)
  - multimedia synchronization, etc
- Selected topics
    - OS/network support, session management

* QoS-demanding MM apps vs best-effort Internet and challenging WMN

Course evaluation

- Written assignments on paper
  - Three written assignments (5% each)
- Exams on paper and in class
  - Two midterms (15% each)
- Term project (55%): exam a MM system
  - CSc 461: some research flavors suggested
  - CSc 561: some research work required

Term project

- CSc 461 (55%): individual or team of <=3
  - Survey a multimedia system of your interest
  - Let us know what you think is “cool” and why
- CSc 561 (55%): individual or team <=2
  - Survey and evaluate a multimedia system
  - Find out what has been done & to be improved
- Term project report due by end of March
  - Have your project confirmed by midterm 1

Your feedback

- Teaching/learning is interactive
  - two-way communications
- Let me know
  - what you think about lectures, assignments, projects, exams, topics, …
  - What you want to know or probe further
- You can reach me
  - in class, during office hours, by email/phone

So let us know a bit about you

- What do you go by?
  - Name, program and taking it as 461 or 561
- What are your interests in multimedia?
  - Any image/photo, audio/music, or video apps?
- What do you want to know more on MM?
  - Send in "[csc461/561] A0" to pan@uvic.ca
  - By Friday, January 9, 2015
  - Help shape the focus of the course as well

Course policies

- See official course outline
  - late assignments, mark appeals, etc
  - academic integrity, accommodation, etc
- No group assignments
  - discussion encouraged on and off connex
  - responsibility: your submitted work is yours
  - obligation: give credit to references
- If group project, individual work be stated

This lecture

- An introduction to the course
  - who, when, what
  - course materials
  - course objectives
  - course topics
  - you and the course

Next lecture

- An overview on multimedia
  - audio/image/video representation
  - lossless/lossy compression and examples
  - multimedia communication technologies