Multimedia Technologies and Applications

(CS4185)

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Reference Books

- ***Fundamentals of Multimedia***

  Z. Li and M. Drew, Prentice Hall, 2004.

- ***Multimedia Systems***

  John Buford, Pearson, 2002.

- ***Multimedia Signal Coding and Transmission***

  Jens-Rainer Ohm, Springer, 2015.

- ***Multimedia Communications and Networking***

  Mario Marques da Silva, CRC Press, 2012.

General Course Information

Course Aims

The course aims at providing students with theoretical and technical understanding on multimedia components and systems. It covers contemporary, interactive multimedia technology systems, focusing on types, applications, and theories of operation. Basic technologies such as multimedia data representation, compression, retrieval and communication will be covered in an integrated manner.

On completion of the course, students should be able to understand the fundamental concepts and make critique to the technologies associated with various multimedia data types such as image, video, audio, graphics and animation.

Course Intended Learning Outcomes (CILOs)

- Explain approaches for representing multimedia data in digital format and identify their properties.
- Describe the rational of the multimedia representation format and compression algorithms based on human visual and auditory perceptions.
- Understand images, videos and audios in the frequency domain to identify important components to be encoded.
- Explain the major steps in some of the image, video and audio compression standards.
- Apply lossless/lossy compression techniques on multimedia data.

Syllabus

- Multimedia Systems
- Graphics and Animation
- Image Representation
- Sampling, Media Communications and Streaming
- Media Retrieval
- Basic Compression
- Image Compression
- Video Compression
- Audio Compression

Grading Criteria

Course Work – 40%

Quiz – 20%

Course Project – 20%

Examination – 60%

Some key issues to consider:

1. The programme committee of BScCM explicitly requests that this course should include a project using OpenCV.

   Hence, if you decide to take this course, you need to prepare to do this project which involves using OpenCV. It is an image retrieval project.

To make it easier for you, I will give you a demo program for you to start from to create your work.

Since this course has both CS and SCM students, just in case you have difficulties with the programming, CS runs a programming clinic to help students with programming problems:

https://courses.cs.cityu.edu.hk/clinic

2. Some students think that they need to get 100% in the course project, and forget that 70% leads to approx. A-. So, some may feel that the loading of the project is high. When we offered this course last time, 64% of the students received a project mark of 70% or above.

3. It is the department's requirement that each student must achieve at least 30% of the course project in order to pass a course.

4. It is the university's requirement that you need to achieve at least 30% of the examination in order to pass a course.

5. The course notes will begin from simple knowledge, but will graduate go deeper into imaging and video technologies/applications.

6. There are two main focusses of this course. One is on **media retrieval**, which is covered by the course project.

7. The other is on **media compression**. An important topic is image compression, which involves a complex but important equation. Will try to avoid examining you on maths, but still need to prepare to understand a bit of maths.

8. It is difficult to cover both ***retrieval*** and ***compression*** in detail in the lecture. It will be too much for you to learn. To make it easier for you, we have the lecture to cover compression, while the course project to cover retrieval.

9. Over the years, I have been putting a lot of efforts to make the course notes more detailed and with more visual information. However, you will still need to prepare to attend my lectures in order to understand the notes, in particular for the lectures after the first two weeks.

10. The best way for you to learn is through interactions. I encourage you to ask me in the class, whenever you have questions.

Course URL:

www.cs.cityu.edu.hk/~rynson/info-mm/mm.html

Course notes and tutorial notes will be available on Canvas.

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