

Place: Room 107, New Building, IIS, AS

Time: 09:00-12:00 Tue

Chair: Dr. Wen-Huang Cheng
Dr. Hwann-Tzong Chen
Dr. Cheng-Te Li
Dr. Wen-Hung Liao
Dr. Chia-Wen Lin

Outline:

1. Introduction to Multimedia
 - 1.1. What is Multimedia?
 - 1.2. Overview of Multimedia Applications
 - 1.3. Multimedia Research Resources
2. Multimedia Basics
 - 2.1. Graphics and Image Data Representations
 - 2.2. Color in Image and Video
 - 2.3. Fundamental Concepts in Video
 - 2.4. Basics of Digital Audio
3. Multimedia Processing & Coding
 - 3.1. Video coding fundamentals
 - 3.2. Lossless Compression & Lossy Compression
 - 3.3. Transform Coding
 - 3.4. Motion Compensated Predictive Coding
4. Multimedia Coding Standards
 - 4.1. JPEG, JPEG-2000
 - 4.2. H.261, H.263, MPEG-1, MPEG-2, MPEG-4, and H.264
5. Social Network Basics
 - 5.1. An Introduction to Social Networks
 - 5.2. Properties and Models of Social Networks
 - 5.3. Centrality Analysis and Community Detection
 - 5.4. Information Diffusion in Social Networks
6. Social Multimedia Analytics
 - 6.1. Sentiment, Opinion, Locations, and Multimedia
 - 6.2. Search and Recommendation in Social Media
7. Machine Learning in Social Multimedia Analytics
 - 7.1. Unsupervised Learning
 - 7.2. Discriminative Models
 - 7.3. Generative Graphical Models
8. Advanced Multimedia Processing
 - 8.1. Image Manipulation Techniques
 - 8.2. Interactive Multimedia Editing

Textbook/Reference:

1. Ze-Nian Li, Mark S. Drew, and Jiangchuan Liu, *Fundamentals of Multimedia*, 2nd edition, Springer, 2014.
2. Gonzalez and Woods, *Digital Image Processing*, 3rd edition, Prentice Hall, 2008.
3. Christopher M. Bishop, *Pattern Recognition and Machine Learning*, Springer, 2007.
4. Richard Szeliski, *Computer Vision: Algorithms and Applications*, Springer, 2010.
5. Richard J. Radke, *Computer Vision for Visual Effects*, Cambridge University Press, 2012.
6. S. Wasserman and K. Faust, *Social Network Analysis: Methods and Applications*, Cambridge University Press, 1994.
7. R. A. Hanneman and M. Riddle, *Introduction to Social Network Methods*, University of California, 2005.

[http://faculty.ucr.edu/~hanneman/nettext/Introduction to Social Network Methods.pdf](http://faculty.ucr.edu/~hanneman/nettext/Introduction%20to%20Social%20Network%20Methods.pdf)

8. R. Zafarani, M. A. Abbasi, and H. Liu, *Social Media Mining: An Introduction*, Cambridge University Press, 2014.
9. Charu C. Aggarwal, *Social Network Data Analytics*, Springer, 2011.
10. W. Chen, L. V.S. Lakshmanan, and C. Castillo, *Information and Influence Propagation in Social Networks*, Morgan & Claypool Publishers, 2013.
11. Selected research papers.

Office hours: by appointment

Grades:

- **Class Participation (10%)**
- **Homework Assignments: (20%)**
- **Midterm Exam (30%)**
- **Final Project (40%)**
 - **Proposal: 10%**
 - **Demo: 20%**
 - **Report: 10%**
 - **Bonus: 3 points (for the best three demos)**

Week	Date	Topics/Brief Description	Lecturers
1	2015/02/24	Introduction to Multimedia	Wen-Huang Cheng
2	2015/03/03	Multimedia Basics (I)	Wen-Hung Liao
3	2015/03/10	Multimedia Basics (II)	Wen-Hung Liao
4	2015/03/17	Multimedia Processing & Coding (I)	Chia-Wen Lin
5	2015/03/24	Multimedia Processing & Coding (II)	Chia-Wen Lin
6	2015/03/31	Multimedia Coding Standards	Chia-Wen Lin
7	2015/04/07	Social Network Basics (I)	Cheng-Te Li
8	2015/04/14	Social Network Basics (II)	Cheng-Te Li
9	2015/04/21	Midterm Exam	
10	2015/04/28	Social Multimedia Analytics	Cheng-Te Li
11	2015/05/05	Machine Learning in Social Multimedia Analytics: Unsupervised Learning	Wen-Hung Liao
12	2015/05/12	Final-Project Proposal Presentation Machine Learning in Social Multimedia Analytics: Discriminative Models	Wen-Huang Cheng
13	2015/05/19	Machine Learning in Social Multimedia Analytics: Graphical Models	Wen-Huang Cheng
14	2015/05/26	Advanced Multimedia Processing (I)	Hwann-Tzong Chen
15	2015/06/02	Advanced Multimedia Processing (II)	Hwann-Tzong Chen
16	2015/06/09	Advanced Multimedia Processing (III)	Hwann-Tzong Chen
17	2015/06/16	Review Week	
18	2015/06/23	Final Project Demo and Presentation	