

## Multimedia in Social Networks (MM)

Place: Room 108, Old Building, IIS, AS / Delta Building 601, NTHU

Time: Tue, 09:00-12:00

### Course Teachers:

Dr. Yi-Hsuan Yang / Chair	(CITI)	Dr. Wen-Hung Liao	(NCCU)
Dr. Yen-Yu Lin	(CITI)	Dr. Chia-Wen Lin	(NTHU)
Dr. Jun-Cheng Chen	(CITI)		

### 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. Audio/Music Analysis in Multimedia
  - 5.1. Introduction to music information research
  - 5.2. Short-Time Fourier Transform
  - 5.3. Nonnegative matrix factorization and its application to audio signal analysis
6. Fundamentals of Deep Learning
  - 6.1. Introduction to Deep learning
  - 6.2. Deep Learning Basics
7. Social Multimedia Analytics
  - 7.1. Sentiment, Opinion, Locations, and Multimedia
  - 7.2. Search and Recommendation in Social Media
  - 7.3. User Understanding
  - 7.4. Using Social Multimedia for Prediction and Forecast
8. CNNs for Computer Vision Applications
  - 8.1. Convolutional neural networks
  - 8.2. Representative CNN models
  - 8.3. CNN-based computer vision applications

### 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_to_Social_Network_Methods.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
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**Grades:**

- Exam and Assignment (50%)
- Final Project (50%)    Proposal: 10%    Demo: 30%    Report (in IEEE Format): 10%

Week	Date	Topics/Brief Description	Lecturers
1	2019/02/19	Introduction to Multimedia	Yi-Hsuan Yang
2	2019/02/26	Multimedia Basics (I)	Wen-Hung Liao
3	2019/03/05	Multimedia Basics (II)	Wen-Hung Liao
4	2019/03/12	Visual Content Processing & Coding (I)	Chia-Wen Lin @ Delta 601, NTHU
5	2019/03/19	Visual Content Processing & Coding (II)	
6	2019/03/26	Image/Video Coding Standards	
7	2019/04/02	Audio/Music Analysis in Multimedia (I)	Li Su
8	2019/04/09	Audio/Music Analysis in Multimedia (II)	Li Su
9	2019/04/16	Project Proposal Preparation	No_Class
10	2019/04/23	Project Proposal Presentation	Yi-Hsuan Yang
11	2019/04/30	Fundamentals of Deep Learning	Jun-Cheng Chen
12	2019/05/07	Exam	
13	2019/05/14	Deep Learning for Computer Vision Applications (I)	Yen-Yu Lin
14	2019/05/21	Deep Learning for Computer Vision Applications (II)	Yen-Yu Lin
15	2019/05/28	Deep Learning for Computer Vision Applications (III)	Yen-Yu Lin
16	2019/06/04	Social Multimedia Applications (I)	Jun-Cheng Chen
17	2019/06/11	Social Multimedia Applications (II)	Jun-Cheng Chen
18	2019/06/18	Project Preparation	No Class
19	2019/06/25	Final Project Demo and Presentation	MM Faculty