

< For the most updated syllabus, please visit <http://tigpsnhcc.iis.sinica.edu.tw/course.html#s1>>

Multimedia in Social Networks (MM)

Place: Room 107, New Building, IIS, AS / Delta Building, NTHU

Time: Wed, 09:00-12:00

Chair: Dr. Jun-Cheng Chen (Chair)

Dr. Chia-Wen Lin

Dr. Wen-Hung Liao

Dr. Yan-Tsung Peng

Dr. Li Su

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. Machine Learning and Deep Learning in Social Multimedia Analytics
 - 3.1. Machine learning Basics
 - 3.2. Deep Learning Basics
 - 3.3. Unsupervised/Semi-supervised/Supervised Learning, etc.
4. Multimedia Processing & Coding
 - 4.1. Video coding fundamentals
 - 4.2. Lossless Compression & Lossy Compression
 - 4.3. Transform Coding
 - 4.4. Motion Compensated Predictive Coding
 - 4.5. Multimedia Coding Standards
 - 4.5.1. JPEG, JPEG-2000
 - 4.5.2. H.261, H.263, MPEG-1, MPEG-2, MPEG-4, and H.264
5. Audio Information Analysis
 - 5.1. Audio Signal Processing fundamentals
 - 5.2. Deep Learning for Audio Multimedia Analysis
6. Social Network Basics
 - 6.1. An Introduction to Social Networks
 - 6.2. Properties and Models of Social Networks
 - 6.3. Centrality Analysis and Community Detection
 - 6.4. Information Diffusion in Social Networks
 - 6.5. Social Multimedia Analytics
 - 6.5.1. Sentiment, Opinion, Locations, and Multimedia
 - 6.5.2 Search and Recommendation in Social Media
7. Advanced Multimedia and Image Processing
 - 7.1. Image Manipulation Techniques
 - 7.2. 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
 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.
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11. Selected research papers.

12. Ian Goodfellow, Yoshua Bengio, and Aaron Courville, "Deep Learning" (<https://www.deeplearningbook.org/>), 2016
 Mehryar Mohri, Afshin Rostamizadeh, and Ameet Talwalkar, "Foundation of Machine Learning 2nd edition" (<https://cs.nyu.edu/~mohri/mlbook/>), 2018

Office hours: by appointment

Grades:

- Exam 50%
- Final Project 50%

Week	Date	Topics/Brief Description	Lecturers
1	2021/02/24	Introduction to Multimedia	Jun-Cheng Chen
2	2021/03/03	Multimedia Basics (I)	Wen-Hung Liao
3	2021/03/10	Multimedia Basics (II)	Wen-Hung Liao
4	2021/03/17	Audio Analysis in Multimedia (I)	Li Su
5	2021/03/24	Audio Analysis in Multimedia (II)	Li Su
6	2021/03/31	Fundamental of Deep Learning (I)	Jun-Cheng Chen
7	2021/04/07	Fundamental of Deep Learning (II) Final-Project Proposal Explanation (Milestone I)	Jun-Cheng Chen
8	2021/04/14	Visual Content Processing & Coding (I)	Chia-Wen Lin
9	2021/04/21	Visual Content Processing & Coding (II)	Chia-Wen Lin
10	2021/04/28	Image/Video Coding Standards	Chia-Wen Lin
11	2021/05/05	Final-Project Proposal Presentation (Milestone II)	Jun-Cheng Chen
12	2021/05/12	Midterm Exam	
13	2021/05/19	Deep Learning for Image Processing Applications (I)	Yan-Tsung Peng
14	2021/05/26	Deep Learning for Image Processing Applications (II)	Yan-Tsung Peng
15	2021/06/02	Deep Learning for Image Processing Applications (III)	Yan-Tsung Peng
16	2021/06/09	Social Multimedia and Related Applications Final-Project Clinic (Milestone III)	Jun-Cheng Chen
17	2021/06/16	Polishing Up your Demo No Class	
18	2021/06/23	Final	MM Faculty