

DANIEL YANG

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EDUCATION

University of Southern California

Expected May 2028

Ph.D. in Computer Science, GPA: 3.90/4.0

Signal Analysis and Interpretation Laboratory (SAIL), advised by Shrikanth Narayanan

National Science Foundation Graduate Research Fellow

Harvey Mudd College

May 2022

B.S., Joint Major in Computer Science and Mathematics, GPA: 3.93/4.0

Graduated with High Distinction, Engineering Departmental Honors

RESEARCH INTERESTS

- multimodal transformers
- vision-language modeling
- media understanding and intelligence

WORK EXPERIENCE

Signal Analysis and Interpretation Laboratory (SAIL)

August 2022 - Present

PhD Researcher, Advisor: Professor Shrikanth Narayanan

University of Southern California

- Understanding the relationships in data that cause multimodal transformers to create constructive or destructive representations
- Distilling key insights on modality relationships into inductive biases for multimodal transformers

Music Information Retrieval Laboratory

January 2019 - May 2022

Undergraduate Researcher, Advisor: Professor TJ Tsai

Harvey Mudd College

Researched scalable cross-modal systems for music retrieval classification, and generation.

Collaborative Drug Discovery Clinic Team

August 2021 - May 2022

Project Manager

Harvey Mudd College

Led a team of six undergraduate students on a collaboration with CDD, a biotechnology company for proposing diffusion models for optimized, novel molecular synthesis.

RECENT PROJECTS

- *Extending V-Usable Information for Multimodal Models to Understand Modal Relationships:* Why are certain modal relationships easy for transformers to learn? Why are others hard? We use V-Usable Information to show that under certain conditions, having additional modalities may not improve classification performance. We propose an sample-varying dynamic transformer architecture to exploit this knowledge for more generalizable multimodal networks.
- *GTI-MM: Robust Visual Recognition through Generative Transformer Imputation in Multi-modal Learning with Visual Modality Missing* (Under Review at CVPR 2024): We show that data imputation using generative models can be effective at improving model robustness to missing modality, especially in low-resource settings.

- *Understanding Missing Modality through the lens of Pre-Training:* We study how to make multi-modal transformers robust to missing modality by addressing a problem of VLM initialization in pre-training.

PUBLICATIONS:

- Yoonsoo Nam, Adam Lehavi, Daniel Yang, Digbalay Bose, Swabha Swayamdipta, Shrikanth Narayanan. Context Unlocks Emotions: Text-based Emotion Classification Dataset Auditing with Large Language Models. *Affective Computing and Intelligent Interaction (ACII)*, 2023.
- Daniel Yang, Aditya Kommineni, Mohammad Alshehri, Nilamadabh Mohanty, Vedant Modi, Jonathan Gratch, Shrikanth Narayanan. Context Unlocks Emotions: Text-based Emotion Classification Dataset Auditing with Large Language Models. *Affective Computing and Intelligent Interaction (ACII)*, 2023.
- Daniel Yang, K. Ji, T. Tsai. A Study of Parallelizable Alternatives to Dynamic Time Warping for Aligning Long Sequences, *IEEE Transactions on Audio, Speech, and Language Processing (TASLP)*, 2022.
- Daniel Yang, Arya Goutam, Kevin Ji, and TJ Tsai. Large-Scale Multimodal Piano Music Identification Using Marketplace Fingerprinting. *Algorithms*, 15(5): 146, 2022.
- Daniel Yang, T. Tsai. Composer Classification with Cross-Modal Transfer Learning and Musically Informed Augmentation. *Proceedings of the International Society for Music Information Retrieval (ISMIR)*, 2021. Candidate for best student paper.
- Daniel Yang, Kevin Ji, and TJ Tsai. Aligning Unsynchronized Part Recordings to a Full Mix Using Iterative Subtractive Alignment. *Proceedings of the International Society for Music Information Retrieval Conference (ISMIR)*, 2021, pp. 810-817.
- Kevin Ji, Daniel Yang, and TJ Tsai. Piano Sheet Music Identification Using Marketplace Fingerprinting. *Proceedings of the International Society for Music Information Retrieval Conference (ISMIR)*, 2021, pp. 326-333.
- Kevin Ji, Daniel Yang, and TJ Tsai. Instrument Classification of Solo Sheet Music Images. *Proceedings of IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2021, pp. 546-550.
- Daniel Yang and TJ Tsai. Piano Sheet Music Identification Using Dynamic N-gram Fingerprinting. *Transactions of the International Society for Music Information Retrieval*, 4(1): 42-51, 2021.
- Daniel Yang, Kevin Ji, and TJ Tsai. A Deeper Look at Sheet Music Composer Classification Using Self-Supervised Pretraining. *Applied Sciences*, 11(4): 1387, 2021.
- Daniel Yang and TJ Tsai. Camera-Based Piano Sheet Music Identification. *Proceedings of the International Society for Music Information Retrieval Conference (ISMIR)*, 2020, pp. 481-488.
- TJ Tsai, Daniel Yang, Mengyi Shan, Thitaree Tanprasert, and Teerapat Jenrungrot. Using Cell Phone Pictures of Sheet Music To Retrieve MIDI Passages. *IEEE Transactions on Multimedia*, 22(5): 3115-3127, 2020.
- Daniel Yang, Thitaree Tanprasert, Teerapat Jenrungrot, Mengyi Shan, and TJ Tsai. MIDI Passage Retrieval Using Cell Phone Pictures of Sheet Music. *Proceedings of the International Society for Music Information Retrieval Conference (ISMIR)*, 2019, pp. 916-923.

AWARDS

- **NSF Graduate Research Fellowship:** Awarded for artificial intelligence
- **Best Student Paper Candidate:** “Composer Classification with Cross-Modal Transfer Learning and Musically Informed Augmentation” is one of three papers nominated as candidate for best student paper at ISMIR 2021
- **Harvey Mudd Shanahan Project Fund:** Ten-thousand dollar award for student-directed projects. Received three times for MuddSub in 2018, 2019, 2021