Yun-Ning (Amy) Hung

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Education

M.S. in Music Technology, Georgia Institute of Technology, USA *'19 - '21*

- First year master project - **Music source separation**: developed a multitask frameworks to integrate instrument activation detection with music source separation
- Second year master project - **Transfer learning**: developed several systems utilizing reprogramming and knowledge distillation methods to integrate pre-trained embedding on various MIR downstream tasks
- Relevant courses: Audio Content Analysis, Machine Learning, Interactive Music

B.S. in Electrical Engineering, National Cheng Kung University (NCKU), Taiwan *'12 - '16*

UW-Madison Exchange Program, University of Wisconsin-Madison, USA *Fall '15*

Work Experience

Sr Audio Machine Learning Researcher at Moises Systems Inc. *'24 - Present*

- Research and develop deep learning systems for music/audio source separation.

Research Engineer at TikTok Inc. *'22 - '24*

- Research and develop deep learning systems to retrieve information (e.g. beat, chord, musical score, structure, etc) from music audio.
- Prototype research idea and deploy deep learning systems into production.

Research Intern at ByteDance Inc. *'21 Summer*

- Incorporated transformer architecture with two proposed knowledge-based loss functions for music structure analysis, resulting in 12% improvement on boundary segmentation.
- Developed a novel transformer-based architecture to better model time and frequency information for beat/downbeat tracking, resulting in 12% improvement on downbeat tracking.

Audio Algorithm Intern at Netflix Inc. *'20 Fall*

- Built a large-scale (~1600hr) dataset for speech/music detection in production TV shows' audio. Trained a CRNN model with this dataset as the speech/music detector. Deployed the detector as a python package used within the company. This work has been open sourced.

Research Assistant at Georgia Institute of Technology *'19 - '21*

- Developed three novel deep learning models to automatically assess musical performance based on musical score and performance recording, resulting in 10+% improvement compared to the baseline system.

Research Intern at Mitsubishi Electric Research Laboratories (MERL) *'20 Summer*

- Developed two novel source separation frameworks that leverages adversarial training to separate a mixture of music only with the guidance of weak labels.

Research Assistant at Academia Sinica, the National Academy of Taiwan *'17 - '19*

- Developed two novel CNN models incorporating prior knowledge and multitask framework for automatic instrument recognition.
- Presented at several seminar talks, and one invited talk at the *6th Taiwanese Music and Audio Computing workshop.*

Research Assistant at KKBOX Inc., the largest online music streaming company in Taiwan *'17 - '19*

- Analyzed large-scale audio and lyrics data with Python framework (Numpy, Scikit-learn, Matplotlib, etc).
- Developed several music classification models, including instrument recognition, mood classification, and music scene classification, in PyTorch to assist music recommendation.
- Developed a musical composition style transfer systems using encoder/decoder architecture and adversarial training to attain pitch and timbre disentangled representations to assist controllable AI music creation tools.

Academic Experience

Journal Articles

1. **Hung, Y. N.**, Wu, C. W., Orife, I., Hipple, A., Wolcott, W., & Lerch, A., "A large TV dataset for speech and music activity detection." Journal on Audio, Speech, and Music Processing (**EURASIP**), 2022.

Peer-reviewed Conference Papers

2. Lu, W. T., Wang, J. C., Kong, Q., & **Hung, Y. N**., "Music source separation with band-split rope transformer", IEEE Int. Conf. Acoustics, Speech and Signal Processing (**ICASSP**), 2024.
3. Won, Minz, **Yun-Ning Hung**, and Duc Le., "A Foundation Model for Music Informatics.", IEEE Int. Conf. Acoustics, Speech and Signal Processing (**ICASSP**), 2024.
4. **Hung, Y. N.**, Yang, C. H., Chen, P. Y., & Lerch, A., "Low-Resource Music Genre Classification with Cross-Modal Neural Model Reprogramming", IEEE Int. Conf. Acoustics, Speech and Signal Processing (**ICASSP**), 2023.
5. Lu, W. T., Wang, J. C., & **Hung, Y. N.,** "Multitrack Music Transcription with a Time-Frequency Perceiver", IEEE Int. Conf. Acoustics, Speech and Signal Processing (**ICASSP**), 2023.
6. **Hung, Y. N.**, & Lerch, A., "Feature-informed Embedding Space Regularization For Audio Classification", European Signal Processing Conference (**EUSIPCO**), 2022.
7. **Hung, Y. N.**, & Lerch, A., "Feature-informed Latent Space Regularization for Music Source Separation", Digital Audio Effect Conference (**DAFx)**, 2022.
8. **Hung, Y. N.**, Wang, J. C., Song, X., Lu, W. T., & Won, M., "Modeling Beats and Downbeats with a Time-Frequency Transformer", IEEE Int. Conf. Acoustics, Speech and Signal Processing (**ICASSP**), 2022.
9. Wang, J. C., **Hung, Y. N.**, & Smith, J. B. L., "To catch a chorus, verse, intro, or anything else: Analyzing a song with structural functions", IEEE Int. Conf. Acoustics, Speech and Signal Processing (**ICASSP**), 2022.
10. **Hung, Y. N.**, Wichern, G., & Roux, J. L., "Transcription Is All You Need: Learning to Separate Musical Mixtures with Score as Supervision", IEEE Int. Conf. Acoustics, Speech and Signal Processing (**ICASSP**), 2021.
11. **Hung, Y. N.**, & Lerch, A., "Multitask learning for instrument activation aware music source separation", International Society for Music Information Retrieval Conference (**ISMIR**), 2020
12. Huang, J., **Hung, Y. N.**, Pati, A., Gururani, S. K., & Lerch, A., "Score-informed Networks for Music Performance Assessment", International Society for Music Information Retrieval Conference (**ISMIR**), 2020
13. **Hung, Y. N.**, Chiang, I., Chen, Y. A., & Yang, Y. H., "Musical Composition Style Transfer via Disentangled Timbre Representations", International Joint Conferences on Artificial Intelligence (**IJCAI**), 2019 ***(17% acceptance rate)***
14. **Hung, Y. N.**, Chen, Y. A., & Yang, Y. H., "Multitask learning for frame-level instrument recognition", IEEE Int. Conf. Acoustics, Speech and Signal Processing (**ICASSP**), 2019.
15. **Hung, Y. N.**, & Yang, Y. H., "Frame-level Instrument Recognition by Timbre and Pitch", International Society for Music Information Retrieval Conference (**ISMIR**), 2018

Others

14. **Hung, Y. N**., Yang, C. H. H., Chen, P. Y., & Lerch, A., "Low-Resource Music Genre Classification with Advanced Neural Model Reprogramming", *arXiv preprint arXiv:2211.01317*.
15. **Hung, Y. N**., Watcharasupat, K. N., Wu, C. W., Orife, I., Li, K., Seshadri, P., & Lee, J., "AVASpeech-SMAD: A Strongly Labelled Speech and Music Activity Detection Dataset with Label Co-Occurrence", International Society for Music Information Retrieval Conference Late Breaking Demo, 2021
16. **Hung, Y. N.**, Chen, Y. A., & Yang, Y. H., "Learning Disentangled Representations for Timber and Pitch in Music Audio", arXiv preprint arXiv: 1811.03271, Nov. 2018.
17. Yu, L. C., Yang, Y. H., **Hung, Y. N.**, & Chen, Y. A., Hit Song Prediction for Pop Music by Siamese CNN with Ranking Loss, arXiv preprint arXiv: 1710.10814, Oct. 2017.

Reviewed Journals/Papers

- IEEE International Conference on Acoustics, Speech and Signal Processing, 2023, 2024
- IEEE International Conference on Multimedia & Expo, 2022
- IEEE Transactions on Audio, Speech and Language Processing, 2020, 2021, 2023

Skills

Machine Learning	Language: Python Tools: PyTorch, Pytorch-lightning, TFLearn, Numpy, Scikit-learn, Matplotlib, Librosa
Web & Applications	Language: HTML, Javascript, CSS, Typescript, PHP, SQL, Java, Object-C Tools: Ionic, Unity
Musical Tools	Sonic Visualiser, Max/MSP, FFmpeg
Others	Git, Linux, Latex
Spoken	Chinese (mother tongue), English (fluent), Taiwanese (listen), Spanish (read & listen)
Musical Instruments	Piano, Flute, Guitar, Ukulele, Double Bass, Cajon

Awards

Government Scholarship to Study Abroad, Ministry of Education, Taiwan 2020-2021

WIMIR Travel Grant, International Society for Music Information Retrieval Conference *2018*

Study Abroad Scholarship, Electrical Engineering Department, National Cheng Kung University *Fall 2015*

Academic Excellence Award (Top 10% students in the department), National Cheng Kung University *2013 - 2014*