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 [7]
- 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 [2] [3] [12]
- 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

Research Engineer at TikTok Inc.   *'22 - Present*
- 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 TikTok Inc.   *'20 Summer*
- Incorporated transformer architecture with two proposed knowledge-based loss functions for music structure analysis, resulting in 12% improvement on boundary segmentation. [5]
- Developed a novel transformer-based architecture to better model time and frequency information for beat/downbeat tracking, resulting in 12% improvement on downbeat tracking. [6]

Audio Algorithm Intern at Netflix   *'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. [1] [13]

Research Assistant at Georgia Institute of Technology   *'19 - '22*
- 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. [8]

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. [6]

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. [10] [11]
- 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. [15]
- 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. [9] [14]

Software Engineer Intern at Amy.app, a New Zealand based online AI tutoring company *'19 Summer*
- Developed a RNN architecture to model math equations and automatically solve junior and senior high school math questions.
- Developed typescript algorithms to automatically generate interactive feedback.

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. **Hung, Y. N.**, & Lerch, A., "Feature-informed Embedding Space Regularization For Audio Classification", European Signal Processing Conference (**EUSIPCO**), 2022.

3. **Hung, Y. N.**, & Lerch, A., "Feature-informed Latent Space Regularization for Music Source Separation", Digital Audio Effect Conference (**DAFx)**, 2022.

4. **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.

5. 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.

6. **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.

7. **Hung, Y. N.**, & Lerch, A., "Multitask learning for instrument activation aware music source separation", International Society for Music Information Retrieval Conference (**ISMIR**), 2020

8. 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

9. **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)*

10. **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.

11. **Hung, Y. N.**, & Yang, Y. H., "Frame-level Instrument Recognition by Timbre and Pitch", International Society for Music Information Retrieval Conference (**ISMIR**), 2018

Others

12. **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*.

13. **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

14. **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.

15. 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.

<u>Reviewed Journals/Papers</u>

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

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*