Yinghao Ma

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EDUCATION

Carnegie Mellon University (CMU) 09/2020 – 05/2022

MS: Music & Technology, School of Music. Supervised by Prof. Richard Stern

- Overall GPA: 3.9/4.0
- Research interests: ***Music Information Retrieval, Speech Signal Processing, Sound Event Detection***
- Music Background: Recorded Chinese musical version of Beethoven's serenade for 250th anniversary of his birth during COVID to cheer others up. Released on Deep Learning course web of CMU
- Selected Courses: Speech Understanding; Convex Optimization; NLP; Introduction to Computer Music

Peking University (PKU) 09/2016 – 07/2020

BS: Mathematics & Applied Mathematics (Probability Theory), School of Mathematical Sciences

- Overall GPA: 3.4/4.0
- Music Background: Conductor in the orchestra of Chinese Music Institute, PKU
  Amateur Highest Performance Level of Chinese flute, China Conservatory of Music
- Awards and Honors: Outstanding graduates of School of Mathematical Science, PKU
  Excellence in the preliminary prize for S.-T.Yau College Student Mathematics Contests
- Selected Courses: Advanced Theory of Probability; Statistics; Intro to Stochastic Processes; Topology

RESEARCH

Learnable Frontend for Music, Speech and Audio 09/2021 – Present

Research Assistant, Supervised by Prof. Richard Stern, Carnegie Mellon University

- Construct 2-layers learnable frontends based on extractor from raw wave and modulation on time and frequency.
- Utilize low-pass filters and denoising auto-encoder to increase robustness by blurring the signal before max-pool.
- Review whether learnable frontends can capture more information than Mel by signals reconstruction with VAE.

(undergraduate thesis) Chinese Flute Playing Technique Classification Based on FCNN 02/2020 – 05/2020

Research Assistant, Supervised by Prof. Xiaoou Chen, Peking University

- Established music technique detectors based on a series of CNN with different layers as well as FCNN.
- Extended models with transpose convolution to support variable length inputs and pixel level classification.

Correspondence between Speech Melody and Pitch Contour in Sichuan Folk Song 07/2019 – 09/2019

Research Assistant, Supervised by Prof. Zhiyao Duan, University of Rochester

- Analyzed the correspondence among the tone, change on fundamental frequency and the change of music notes.

Automatic Musical Instrument Recognition and Timbre Recognition 02/2019 – 07/2019

Research Assistant, Supervised by Prof. Xiaoou Chen, Peking University

- Implemented an audio event detection model based on CRNN on Chinese instruments recognition.
- Assessed and reported the result of our model with percussion, recall rate and F-measure with the baseline of CNN.
- Submitted to Conference on Sound & Music Tech (CSMT), published on Fudan Journal of Natural Sciences.

WORK EXPERIENCE

Teaching Assistant Guest Lecturer of Machine Learning for Signal Processing 08/2021 – 12/2021

- Delivered lectures on ICA; designed quizzes and assignment on NMF, SVM, EM, HMM, Compressive sensing etc.

(internship) Cover Song Detection & Evaluation of Automatic Speech Recognition 05/2021 – 08/2021

*Algorithm Engineer, **Tencent** Holdings Limited. (Beijing)*

- Examined and analyzed existed models with learnable frontends on private music datasets.

(internship) Tempo, Beats and Downbeats Detection in Chinese Pop Songs 06/2020 – 08/2020

Algorithm Engineer, Beijing Deepmusic Technology Co.

- Built a pip-line on (down)beat detection based on BLSTM, which significantly outperforms librosa & madmom.
- Estimated tempo and beat of Chinese pop songs with the beat probability on each frame, with 98% accuracy.
- Developed new model based on TCN for rhythmically instability to further improve tempo / beats detection.

PUBLICATION & CONFERENCE

- Ding, M., & Ma, Y. (LNEE 2020). *A Transformer Based Pitch Sequence Autoencoder with MIDI Augmentation*.
- Zijin Li, et al. (Conference on Sound & Music Tech 2019). *Chinese Instrumental Quartet Detection with CRNN*.

ACADEMIC ACHIEVEMENT

Introduction to Deep Learning (A, Course project with β-VAE, help write lecture notes)

Advanced Digital Signal Processing (1st rank of the class, help with lecture notes' errata, listed in acknowledgements)

LEADERSHIP

- One of Student Conductors in Chinese Music Institute, PKU. Guided rehearsals of philharmonic chamber & concert.
- Organized seminar on music theory, music signal processing, stochastic processing and music information retrieval.