Longshen Ou

PhD Candidate (2nd year, Graduating in December 2026)

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Education

Jan 2022 – Ongoing
National University of Singapore, Singapore
PhD Program in Computer Science
- Research Focus: Currently working at the Sound and Music Computing Lab (SMC Lab) under the guidance of Professor Wang Ye. My research is centered around audio content analysis, including music transcription, lyric transcription, and NLP tasks related to lyrics.
- Selected Courses: • Neural Networks and Deep Learning, • AI Planning and Decision Making, • Sound and Music Computing, • Advanced Topics in Artificial Intelligence

Aug 2017 – Apr 2021
Harbin Institute of Technology, China
Bachelor's Degree with Honors in Computer Science and Technology
Selected Courses: • Visual and Audio Information Understanding, • Pattern Recognition and Deep Learning, • Sentiment Analysis and Computing, • Data Mining, • Software Construction

Jul 2019 – Dec 2019
University of California, San Diego, United States
Exchange Program in Computer Science
Selected Courses: • Discrete Signal Processing, • Introduction to Machine Learning

Publications

ACL 2023 Oct 2023
Songs Across Borders: Singable and Controllable Neural Lyric Translation
Longshen Ou, Xichu Ma, Min-Yen Kan, Ye Wang
- Developed an automatic lyric translation method with control over length, rhyme, and word boundary to maintain singability across languages.
- Achieved 95%+ accuracy in controlling of each aspect with a minor trade-off in quality, enhancing singability by 75% compared to baseline methods.

ISMIR 2022 Dec 2022
Transfer Learning of wav2vec 2.0 for Automatic Lyric Transcription
Longshen Ou*, Xiangming Gu*, and Ye Wang
- Applied knowledge transfer from speech to singing domains, greatly reducing labeled data needs and demonstrating strong low-resource performance.

ACM MM 2022 Oct 2022
MM-ALT: A Multimodal Automatic Lyric Transcription System (Oral, Top Paper Award)
Xiangming Gu*, **Longshen Ou***, Danielle Ong, and Ye Wang
- Enhanced lyric transcription by integrating video and inertial measurement unit (IMU) signals, improving noise robustness and overall performance.
- Showcased IMU signals' efficacy in detecting singing activity.

ICASSP 2022 May 2022
Exploring Transformer's Potential on Automatic Piano Transcription
Longshen Ou, Ziyi Guo, Emmanouil Benetos, Jiqing Han, and Ye Wang
- Investigated multi-task learning and Transformer networks in automatic piano transcription, achieving performance gain in velocity detection, the highest note-level F1 score for "onset & pitch" and second-best performance for multi-pitch estimation.

Conference Demo

ISMIR 2023 Late Breaking Demo Nov 2023
Singable and Controllable Neural Lyric Translation: A Late-Breaking Showcase
Longshen Ou, Xichu Ma, Ye Wang
- Presented a concise version of the ACL 2023 paper on lyric translation.

Preprints

Jul 2023 | **LOAF-M2L: Joint Learning of Wording and Formatting for Singable Melody-to-Lyric Generation**
Longshen Ou, Xichu Ma, and Ye Wang
- Enhanced the compatibility of generated lyrics with the input melody through syllable-wise prediction of stress levels, melody peaks, and word importance, significantly improving the singability of generated lyrics.
- Demonstrated the distinct roles and the necessity of both unsupervised and supervised learning phases in the model's training process.

Apr 2023 | **Deep Audio-Visual Singing Voice Transcription Based on Self-Supervised Learning Models**
Xiangming Gu, Wei Zeng, Jianan Zhang, **Longshen Ou**, and Ye Wang
- Introduced multimodal learning to singing voice transcription, showcasing the potential for video modality to detect note onsets, enhancing performance and robustness.
- Engineered a self-supervised pre-trained model into a state-of-the-art, note-level singing voice transcription system.

Mar 2020 | **Automatic Hyper-Parameter Optimization Based on Mapping Discovery from Data to Hyper-Parameters**
Bozhou Chen, Kaixin Zhang, **Longshen Ou**, Chenmin Ba, Hongzhi Wang, and Chunnan Wang.
- Proposed an efficient automatic hyper-parameter optimization method based on a neural network model that maps data to corresponding optimal hyper-parameters, combined with a local search algorithm to further refine the optimization.

Selected Projects

Dec 2022 | **GNN-based Music Recommender**
- Developed a Graph Convolutional Network (GCN) for music artist recommendations by analyzing user-artist interactions and predicting affinity scores for personalized music discovery.

Apr 2023 | **DNA Storage Simulation**
- Developed a simulation framework for DNA-based storage systems with a sequence-to-sequence attention-based RNN, accurately modeling the alterations of information during read/write operations in wet lab, demonstrated by experiments on the Microsoft Nanopore dataset.

Experience: Research and Working

Jul 2022 - Ongoing | **PhD Candidate, School of Computing, National University of Singapore**
Advisor: Prof. Ye Wang

Aug 2020 - Sep 2020 | **Research Intern, Data Systems Laboratory (DASLab), Harvard University, United States**
Advisor: Prof. Stratos Idreos
- Contributed to the research *More or Less: When and How to Build Convolutional Neural Network Ensembles*, The paper has been accepted by ICLR 2021.

Jul 2020 - Aug 2020 | **Back End Developer Intern, Tencent, Shenzhen, China**
- Enhanced the performance of a distributed online analytical processing system for analyzing user engagement data, accelerating query processing through a distributed storage caching strategy.

Experience: Teaching

2023 – 2024 Sem 1
2022 – 2023 Sem 1
CS 4347 Sound and Music Computing, National University of Singapore
Teaching Assistant.

2022 – 2023 Sem 2
CS 4248 Natural Language Processing, National University of Singapore
Teaching Assistant.

Honors and Awards

Oct 2023
SoC Research Incentive Award
Issued by the School of Computing, National University of Singapore

May 2023
Research Achievement Award (2022/2023)
Issued by the School of Computing, National University of Singapore

Nov 2022
Top Paper Award (Top 2% of accepted full papers)
Issued by ACM Multimedia 2022

Jun 2020
Honor Degree of Bachelor of Engineering
Conferred by Harbin Institute of Technology Honors School

Oct 2018
Sogou Innovative Practice Project for College Students
Third Prize

Skills

Programming Skills
Proficient in Deep Learning Coding
- Experienced with deep learning frameworks including Huggingface, SpeechBrain, PyTorch, TensorFlow.
- Familiar with Python, Java, C, JavaScript, SQL, JSON, YAML.

Music Performance
Violin Performance
- Professionally proficient with over 20 years of experience.
- Held a solo concert at the Harbin Institute of Technology, China, in Oct 2018.

Guitar Performance
- Proficient in percussion fingerstyle guitar.