

Muqiao Yang

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EDUCATION

Carnegie Mellon University

Ph.D. in Electrical and Computer Engineering

Pittsburgh, PA, USA

Expected: Early 2024

Carnegie Mellon University

M.S. in Electrical and Computer Engineering

Pittsburgh, PA, USA

Dec. 2019

The Hong Kong Polytechnic University

B.E. in Electronic and Information Engineering, Minor in Computer Science

Hong Kong

May 2018

PUBLICATIONS

- **Muqiao Yang**, Chunlei Zhang, Yong Xu, Zhongweiyang Xu, Heming Wang, Bhiksha Raj, Dong Yu. uSee: Unified Speech Enhancement and Editing with Conditional Diffusion Models. *In submission to ICASSP 2024*.
- Heming Wang, Meng Yu, Hao Zhang, Chunlei Zhang, Zhongweiyang Xu, **Muqiao Yang**, Yixuan Zhang, Dong Yu. Unifying Robustness and Fidelity: A Comprehensive Study of Pretrained Generative Methods for Speech Enhancement in Adverse Conditions. *In submission to ICASSP 2024*.
- **Muqiao Yang**, Umberto Cappellazzo, Xiang Li, Shinji Watanabe, Bhiksha Raj. Improving Continual Learning in Acoustic Scene Classification via Mutual Information. *In submission to ICASSP 2024*.
- Zhongweiyang Xu, Yong Xu, Vinay Kothapally, Heming Wang, **Muqiao Yang**, Dong Yu. SpatialCodec: Neural Spatial Speech Coding. *In submission to ICASSP 2024*.
- **Muqiao Yang**, Xiang Li, Umberto Cappellazzo, Shinji Watanabe, Bhiksha Raj. Evaluating and Improving Continual Learning in Spoken Language Understanding. *In submission, 2023*.
- Xiang Li, Yandong Wen, **Muqiao Yang**, Jinglu Wang, Rita Singh, Bhiksha Raj. Rethinking Voice-Face Correlation: A Geometry View. *ACM Multimedia (MM)*, 2023.
- Umberto Cappellazzo, **Muqiao Yang**, Falavigna Daniele, Alessio Brutti. Sequence-Level Knowledge Distillation for Class-Incremental End-to-End Spoken Language Understanding. *Conference of the International Speech Communication Association (Interspeech)*, 2023.
- Xukun Zhou, Jiwei Li, Tianwei Zhang, Lingjuan Lyu, **Muqiao Yang**, Jun He. Backdoor Attacks with Input-unique Triggers in NLP. *arxiv preprint arXiv:2303.14325*, 2023.
- **Muqiao Yang**, Joseph Konan, David Bick, Yunyang Zeng, Shuo Han, Anurag Kumar, Shinji Watanabe, Bhiksha Raj. PAAPLoss: A Phonetic-Aligned Acoustic Parameter Loss for Speech Enhancement. *International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2023.
- **Muqiao Yang**, Naoyuki Kanda, Xiaofei Wang, Jian Wu, Sunit Sivasankaran, Zhuo Chen, Jinyu Li, Takuya Yoshioka. Simulating realistic speech overlaps improves multi-talker ASR. *International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2023.
- Yunyang Zeng, Joseph Konan, Shuo Han, David Bick, **Muqiao Yang**, Anurag Kumar, Shinji Watanabe, Bhiksha Raj. TAPLoss: A Temporal Acoustic Parameter Loss for Speech Enhancement. *International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2023.
- **Muqiao Yang**^{*}, Joseph Konan^{*}, David Bick^{*}, Anurag Kumar, Shinji Watanabe, Bhiksha Raj. Improving Speech Enhancement through Fine-Grained Speech Characteristics. *Conference of the International Speech Communication Association (Interspeech)*, 2022.
- **Muqiao Yang**, Ian Lane, Shinji Watanabe. Online Continual Learning of End-to-end Speech Recognition Models. *Conference of the International Speech Communication Association (Interspeech)*, 2022.
- Ying Peng, Yihong Dong, **Muqiao Yang**, Songtao Lu, Qingjiang Shi. Signal Transformer: Complex-valued Attention and Meta-Learning for Signal Recognition. *arxiv preprint arXiv:2106.04392*, 2021.
- Xingbo Wang, Jianben He, Zhihua Jin, **Muqiao Yang**, Yong Wang, Huamin Qu. M²Lens: Visualizing and Explaining Multimodal Models for Sentiment Analysis. *IEEE Visualization Conference (VIS)*, 2021. (*Honorable Mention Award)
- Ryan Mohr, Allan Avila, Soham Gosh, Ananta Bhattarai, **Muqiao Yang**, Xintian Feng, Martin Head-Gordon, Ruslan Salakhutdinov, Maria Fonoberova, Igor Mezic. Combining Programmable Potentials and Neural Networks for Materials Problems. *AAAI Spring Symposium: MLPS 2021*.
- Yao-Hung Hubert Tsai^{*}, Martin Q. Ma^{*}, **Muqiao Yang**^{*}, Han Zhao, Louis-Philippe Morency, Ruslan Salakhutdinov. Self-supervised Representation Learning with Relative Predictive Coding. *International Conference on Learning Representations (ICLR)*, 2021.

- Yao-Hung Hubert Tsai*, Martin Q. Ma*, **Muqiao Yang***, Ruslan Salakhutdinov, Louis-Philippe Morency. Multimodal Routing: Improving Local and Global Interpretability of Multimodal Language Analysis. *Conference on Empirical Methods in Natural Language Processing (EMNLP)*, 2020.
- **Muqiao Yang***, Martin Q. Ma*, Dongyu Li*, Yao-Hung Hubert Tsai, Ruslan Salakhutdinov. Complex Transformer: A Framework for Modeling Complex-valued Sequence. *International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2020.
- Mengsu Ding, **Muqiao Yang**, Shimin Chen. Storing and Querying Large-Scale Spatio-Temporal Graphs with High-Throughput Edge Insertions. *arxiv preprint arXiv:1904.09610*, 2019.

EXPERIENCE

- Research Intern** Sept. 2023 – present
Google Deepmind, Mountain View, CA
- Research Intern** May. 2023 – Aug. 2023
Tencent AI Lab, Bellevue, WA *Mentor: Chunlei Zhang, Yong Xu*
- Worked on Unified Speech Enhancement and Generation with diffusion models.
- Research Intern** May. 2022 – Aug. 2022
Microsoft, Redmond, WA *Mentor: Naoyuki Kanda, Xiaofei Wang*
- Worked on improving multi-talker Automatic Speech Recognition by simulating realistic conversations.
- Graduate Research Assistant** Jan. 2022 – present
Carnegie Mellon University *Advisor: Bhiksha Raj, Shinji Watanabe*
- Working on speech enhancement with an optimization on fine-grained speech characteristic features.
 - Improved both objective and subjective evaluation metrics by finetuning existing well-trained speech enhancement models with optimization on the extended Geneva Minimal Parameter Set.
- Graduate Research Assistant** Sept. 2020 – Apr. 2021
Carnegie Mellon University *Advisor: Ian Lane, Shinji Watanabe*
- Developed end-to-end spoken language understanding to perform intent classification and dialog state tracking.
 - Applied pretrained ASR encoder and natural language understanding teacher for cross-modal learning.
 - Working on lifelong learning in Automatic Speech Recognition.
- Research Associate** Feb. 2020 – Sept. 2020
Carnegie Mellon University *Advisor: Ruslan Salakhutdinov*
- Replaced Kullback-Leibler divergence with Pearson Chi-square divergence and applied relative ratio estimation to solve robustness problem in mutual information-based representation learning models.
- Graduate Research Assistant** Sept. 2018 – Feb. 2020
Carnegie Mellon University *Advisor: Ruslan Salakhutdinov, Louis-Philippe Morency*
- Developed Retrieval-based approach to generate realistic audios from text with ConceptNet and optimize the audio transformation model with an adversarial loss.
 - Developed multimodal Capsule network for emotion recognition tasks and increased interpretability to identify contributions of each modality by routing coefficients.
 - Proposed complex transformer and conducted sequence prediction and generation tasks on both datasets and achieved state-of-the-art result on MusicNet automatic transcription.
- Research Intern** May. 2018 – Aug. 2018
Chinese Academy of Sciences *Advisor: Shimin Chen*
- Developed PAST, a framework for efficient PArtitioning and query processing of Spatial-Temporal graphs with Apache Cassandra and Apache Spark.
- Undergraduate Research Assistant** Apr. 2017 – May. 2018
The Hong Kong Polytechnic University *Advisor: Man-Wai Mak*
- Developed a recommendation system on large-scale Yahoo! datasets with Apache Hadoop and Apache Spark.

TEACHING

- 11-785, Introduction to Deep Learning, Carnegie Mellon University, Spring 2023.
- 18-661, Introduction to Machine Learning for Engineers, Carnegie Mellon University, Fall 2022.
- 18-660, Optimization, Carnegie Mellon University, Spring 2022.
- 10-605, Machine Learning with Large Datasets, Carnegie Mellon University, Fall 2021.

SKILLS

Programming Languages: Python, HTML/CSS
Languages: English, Mandarin, Cantonese