Nana Hou

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Work Experiences

- **Zoom Video Communications, Inc.** — Singapore
  Audio AI Scientist — *February 2022 - Present*
- **Internship at Institute for Infocomm Research (A*STAR-I2R)** — Singapore
  Research Intern (Adivsor: Dr. Lei Wang) — *October 2018 - October 2019*

Education

- **Nanyang Technological University** — Singapore
  Ph.D. in Computer Science; School of Computer Science and Engineering — *January 2017 - December 2021*
- **Sichuan University** — Chengdu, China
  B.Sc. in Computer Science (Special Class); College of Computer Science — *September 2012 - June 2016*

Research Interests

Echo Cancellation; Speech Enhancement; Speech Bandwidth Extension; Noise-robust Automatic Speech Recognition; Deep Learning

Publication

- **Noise-robust Speech Recognition with 10 Minutes Unparalleled In-domain Data**
  *Chen Chen, **Nana Hou**, Hu Yuchen and Eng Siong Chng*
  IEEE International Conference on Acoustics, Speech and Signal Processing. **(ICASSP 2022)**
- **Interactive Feature Fusion for End-to-End Noise-Robust Speech Recognition**
  *Hu Yuchen, **Nana Hou**, Chen Chen and Eng Siong Chng*
  IEEE International Conference on Acoustics, Speech and Signal Processing. **(ICASSP 2022)**
- **Progressive Continual Learning for Spoken Keyword Spotting**
  *Huang Yizheng, **Nana Hou**, and Nancy F. Chen*
  IEEE International Conference on Acoustics, Speech and Signal Processing. **(ICASSP 2022)**
- **Self-Critical Sequence Training for Automatic Speech Recognition**
  *Chen Chen, Hu Yuchen, **Nana Hou**, Xiaofeng Qi, Heqing Zou, and Eng Siong Chng*
  IEEE International Conference on Acoustics, Speech and Signal Processing. **(ICASSP 2022)**
- **Rainbow Keywords: Efficient Incremental Learning for Online Spoken Keyword Spotting**
  *Yang Xiao, **Nana Hou** and Eng Siong Chng*
  INTERSPEECH. **(INTERSPEECH 2022)**
- **Learning Disentangled Feature Representations for Speech Enhancement via Adversarial Training**
  ***Nana Hou**, Chenglin Xu, Eng Siong Chng, and Haizhou Li.*
  IEEE International Conference on Acoustics, Speech and Signal Processing. **(ICASSP 2021)**
- **Multitask-Based Joint Learning Approach to Robust ASR For Radio Communication Speech**
  *Duo Ma, **Nana Hou**, Van Tung Pham, Haihua Xu, and Eng Siong Chng*
  Asia-Pacific Signal and Information Processing Association Annual Summit and Conference. **(APSIPA 2021)**
- **Time Domain Speech Enhancement with Attentive Multi-scale Approach**
  *Chen Chen, **Nana Hou**, Duo Ma, and Eng Siong Chng*
  Asia-Pacific Signal and Information Processing Association Annual Summit and Conference. **(APSIPA 2021)**
- **Speaker and Phoneme-Aware Speech Bandwidth Extension with Residual Dual-Path Network**
  ***Nana Hou**, Chenglin Xu, Joey Tianyi Zhou, Van Tung Pham, Eng Siong Chng, and Haizhou Li.*
  INTERSPEECH. **(INTERSPEECH 2020)**
- **Multi-task Learning for End-to-end Noise-robust Bandwidth Extension**
  ***Nana Hou**, Chenglin Xu, Joey Tianyi Zhou, Eng Siong Chng, and Haizhou Li.*
  INTERSPEECH. **(INTERSPEECH 2020)**

- **Time-Domain Neural Network Approach for Speech Bandwidth Extension**
  Hao Xiang, Chenglin Xu, ***Nana Hou****, Lei Xie, Eng Siong Chng, and Haizhou Li.*
  IEEE International Conference on Acoustics, Speech and Signal Processing. **(ICASSP 2020)**
- **Domain Adversarial Training for Speech Enhancement**
  Nana Hou*, Chenglin Xu, Eng Siong Chng, and Haizhou Li.*
  Asia-Pacific Signal and Information Processing Association Annual Summit and Conference. **(APSIPA 2019)**
- **Improving Air Traffic Control Speech Intelligibility by Reducing Speaking Rate Effectively**
  Nana Hou*, Xiaohai Tian, Eng Siong Chng, Bin Ma, and Haizhou Li.*
  International Conference on Asian Language Processing. **(IALP 2017)**

Project Experience

- **Awesome Speech Enhancement (Founder)**
  ◦ Built a curated list of research in Speech Enhancement, including tutorials, top-conference papers, open-source datasets, popular analysis tools, and state-of-the-art results.
  ◦ **Achievements: 300 stars** and over **70 forks** in Github.
- **Maison2: Low Resource ASR under Cross-domain/Channel Condition for Real-world Applications (Leader)**
  ◦ Developed a corpus (RATS) for SE and ASR training and simulated high frequency (HF), very high frequency (VHF), Ultra high frequency (UHF) cross-channel dataset as out-of-domain data; **(Delivery 1 of 4 deliveries)**
  ◦ Built four advanced speech enhancement models with RATS database utilizing two state-of-the-art speech enhancement algorithms and two speech separation algorithms; **(Delivery 2 of 4 deliveries)**
  ◦ Helped develop joint-training end-to-end system for speech enhancement and ASR optimization and proposed the idea of "noise-robust end-to-end speech recognition with attentive dual channel knowledge" to improve the noise-robust ASR performances; **(Delivery 3&4 of 4 deliveries)**
  ◦ Prepared the delivery reports and slides for each delivery of the project and reported progress updates monthly to Singapore DSO National Laboratories.)
  ◦ **Achievements:** Lead two Master students to successfully delivery the Masion2 project (S$600k) to Singapore DSO National Laboratories.
- **Robust Speech Recognition System for Air Traffic Control Domain**
  ◦ Analyzed and simulated HF, VHF, UHF air traffic speech and air traffic command transcripts;
  ◦ Adapted the Language model for the ASR system in air traffic domain.
  ◦ **Achievements:** Successfully delivery a robust speech recognition system for air traffic control domain to Air Traffic Management Research Institute (ATMRI) of Nanyang Technological University.

Skills

PyTorch, Python, ESPNet, Matlab

Services

- **Reviewer**: ICASSP 2021, INTERSPEECH 2020, ICASSP 2020, ICNLP 2023, Speech Communication 2022, IEEE Access 2022, ISCSLP 2022
- **Student Volunteer**: ASRU 2019, Singapore.