# Junkang Yang

School of Communications and Information Engineering, Chongqing University of Posts and Telecommunications (CQUPT)
Chongqing, China
E-Mail: junkangyang@outlook.com

## RESEARCH INTERESTS

Audio Signal Processing, Bandwidth Extension, Speech Enhancement, Audio Restoration, Deep Learning, ......

## EDUCATION

**Chongqing University of Posts and Telecommunications**, Chongqing, China — Sep. 2022— Present
Master of Science — Information and Communications Engineering — Cumulative GPA: 3.55/4.00
Thesis Title: Research on Robust Speech Super-Resolution Methods under Noisy Environments — Average Score: 86.00/100

**Chongqing University of Posts and Telecommunications**, Chongqing, China — Sep. 2018 — Jun. 2022
Bachelor of Science — Communications and Information Engineering — Cumulative GPA: 3.58/4.00
Thesis Title: Implementation of Audio Super-Resolution Based on Deep Learning — Average Score: 86.67/100

## ACADEMIC EXPERIENCE

**Intelligent Speech and Audio Research Laboratory,** — Chongqing, China
**Chongqing University of Posts and Telecommunications** — Sep. 2022 — Present

**Artificial Intelligence Laboratory, vivo Mobile Communication Co., Ltd** — Nanjing, China
*Research Intern for Audio Algorithm* — Dec. 2023 — Apr. 2024

## PROJECTS

**Research Intern at vivo AI Lab** — Nanjing, China   Dec. 2023 — Apr. 2024

- Responsible for the research and development of the audio super-resolution project, proposing a two-stage network that handles denoise and super-resolution respectively, using a staged training approach combined with spectral multiplexing to improve the training efficiency by about 20% compared to the same-sized baseline model, and to improve the PESQ by 0.38, the STOI by 1%, and the LSD by 0.25 on the real voice test data.
- Tuning the self-developed audio super-scoring model to meet the company's actual business needs, including language adaptation, phoneme-level performance optimisation, model compression, optimisation for non-human audio (sound effects, music, etc.), etc., and ultimately outputting a cloud Demo that adapts to different sampling rates and significantly improves the quality of signals in English, Mandarin, speech, and non-human audio.
- Responsible for data capture, cleaning and enhancement of the department's voice conversion, speech synthesis, and audio large model services, using VAD, neural network and other methods to assess the quality of speech, and filtering and enhancement to improve the accuracy of downstream models.

**Joint Processing of Speech Super-Resolution and Noise Reduction** — Chongqing, China
**in Low Sampling Rate Noisy Environment** — Mar. 2023 — Dec. 2023

- Unlike the previous models, the input is first upsampled, keeping the input and output scales constant, making the model predict the full frequency band and be adaptive to different input sampling rates.
- Introducing gated convolution and lattice convolution blocks, using the data provided by DNS Challenge, a distortion simulation algorithm with stochastic filtering was used to produce a noisy dataset of about 500 hours for adversarial training of the network, which solved the problem of significant artefacts in the results generated by previous models.
- The network's PESQ increased from 2.79 to 3.52, STOI increased from 92% to 97.2%, and MOS increased from 3.83 to 4.38 on the test set compared to baseline.

**Collaborative Project with xx Company:** — Chongqing, China
**Noise Reduction for Wireless Communication and Sonar Signals** — Sep. 2022 — Nov. 2023

- Based on Pytorch, a deep learning model is built to implement noise reduction for wireless communication speech signals as well as submarine sonar signals using an improved DCCRN.
- Optimise the network and reduce the model parameters from 5M to 0.9M, which still maintains good quality of noise reduction and meets the deployment standard despite the reduced computation.
- Demonstration of quasi real-time processing of noise reduction of two types of signals through PyAudio, real-time reasoning effect is consistent with the expected effect, the target recognition rate in the audio after noise reduction rises significantly, and passes the test of the relevant companies successfully.

## PUBLICATIONS

**Journal Papers**

- **Junkang Yang**, Hongqing Liu, Lu Gan and Xiaorong Jing, "Spectral Network Based on Lattice Convolution and Adversarial Training for Noise-Robust Speech Super-Resolution," The Journal of the Acoustical Society of America. (Accepted)

**Conference Papers**

- **Junkang Yang**, Hongqing Liu, Xing Li and Jie Jia, "Speech Super Resolution and Noise Suppression System Using a Two-Stage Neural Network," 2024 5th International Seminar on Artificial Intelligence, Networking and Information Technology (AINIT), Nanjing, China, 2024, pp. 1171-1175, doi: https://doi.org/10.1109/AINIT61980.2024.10581580.
- **Junkang Yang**, Hongqing Liu, Lu Gan, Yi Zhou, Xing Li, Jie Jia and Jinzhuo Yao, "SDNet: Noise-Robust Bandwidth Extension under Flexible Sampling Rates," 2024 Asia Pacific Signal and Information Processing Association Annual Summit and Conference (APSIPA ASC), Macau, China, 2024. (Accepted)
- Jinzhuo Yao, Hongqing Liu, Yi Zhou, Lu Gan and **Junkang Yang**, "Diverse Time-Frequency Attention Neural Network for Acoustic Echo Cancellation," 2024 Asia Pacific Signal and Information Processing Association Annual Summit and Conference (APSIPA ASC), Macau, China, 2024. (Accepted)

## AWARDS

| | |
|---|---:|
| Global Top 10 of URGENT Challenge in NeurIPS 2024 Competition Track | Oct. 2024 |
| Outstanding Poster Award of AINIT 2024 | Apr. 2024 |
| Technical Breakthrough Award of vivo | Feb. 2024 |
| Second-Class Academic Scholarship of CQUPT | Dec. 2022, Nov. 2023 |
| Third-Class Award in the Graduate Group of the Lanqiao Cup (Python) | Apr. 2023 |
| Second-Class Award in the Chongqing Division of the Chinese College Student Mathematical Modeling Competition | Nov. 2020 |

## SKILLS

- **Programming:** Python, C, Shell.
- **Software:** PyTorch, Tensorflow, Linux platforms, Office, server clusters and network equipment maintenance.
- **Soft Skills:** problem-solving, team collaboration, effective communication.