

# Sheng Wang

☎ (+852) 9416 5127 | ✉ wang00sheng@gmail.com | 🌐 Forence1999

## Education

**The University of Hong Kong** MPhil.Eng. • COMPUTER SCIENCE Hong Kong, China 2022.09 - present

- Supervisor: Prof. Chuan Wu (Academically guided by Prof. Lingpeng Kong)

**Huazhong University of Science and Technology** B.Eng. • AUTOMATION Wuhan, China 2017.09 - 2021.07

- Grade: 91.5/100 | GPA: 3.95/4 | Rank: 2/28 (special class) | English: IELTS (7.0) | Monitor

## Skills

**Programming Language** Python (PyTorch, TensorFlow, Scikit-Learn), C++, C, Matlab, R, LaTeX

**Professional Software** Anaconda, Docker, Git, Vim, Visual Studio Code, PyCharm, Visual Studio

## Research

**Interests** My current research interests focus on LLM-based dialogue systems, especially instruction tuning and reasoning in dialogues.

### Publications

2023

- **A Cognitive Stimulation Therapy Dialogue System with Multi-Source Knowledge Fusion for Elders with Cognitive Impairment**

Jiyue Jiang, Sheng Wang, Qintong Li, Lingpeng Kong, and Chuan Wu

*In Proceedings of the Annual Meeting of the Association for Computational Linguistics (ACL 2023)*, Toronto, Canada, 2023.7

- **HiddenKey: Parameter-Efficient FineTuning Meets Dropout under a Unified Framework**

Sheng Wang, Liheng Chen, Jiyue Jiang, Lingpeng Kong, Chuan Wu

Preprint.

- **A Better PEFT Method than LoRA with Enhanced Parameter Efficiency**

This idea is being developed now and will come soon. It has been tested in SuperNI, CoT and GSM8K datasets, and shows promising performance, which will be extended to more instruction tuning datasets for better generalization in the following days.

## Experience

**Smart Speaker** MAIN CONTRIBUTOR

2022.03 - present

- Investigate the latest advances in automatic speech recognition (ASR) and text-to-speech (TTS) techniques, and write a research proposal.
- Extract audio from 1939 hours of dysarthric video before converting it into transcripts with Tencent's speech service, and take the audio-text pairs as a preliminary version of dataset which will be revised by psychotherapists further.
- Implement an end-to-end MoChA model for ASR and improve it with modules specifically designed for dysarthric speech.
- Compare various parameter-efficient finetuning methods (including LoRA, Adapter, prefix-tuning, prompt-tuning, P-tuning, etc.) in the field of speech to better fine-tune large pretrained self-supervised models for our scenario.
- Train a transformer-based acoustic model and HiFi-GAN vocoder for TTS based on the "aidatang\_200zh" corpus before injecting customized voice with a speaker encoder.

**Smart Robotic Walker - Sound Source Localization** ONLY MAJOR CONTRIBUTOR

2021.09 - 2022.12

- Set 14 sound source positions in one of the buildings of HKU, and collect 1984 pieces of multi-channel microphone data, amounting to about 500 minutes. Process it with voice signal framing, windowing, filtering, normalization and other preprocessing techniques.
- Investigate and test traditional and learning-based noise suppression and speech separation algorithms, and finally select the NSNet2 model to denoise the preprocessed signals.
- Extract GCC-PHAT and MFCC features, and innovatively design a parallel module (improving the accuracy from 88.2% to 93.6%) following the spirit of ensemble learning to enhance RD3Net for sound source localization (SSL). In the real scene, combined with the above noise suppression module, RD3Net performs satisfactorily and realizes the basic indoor voice navigation.
- Utilize A2C and D3QN reinforcement learning algorithms to fine-tune the model online and obtain the expected effect in both the simulation and real environment.
- Follow the idea of TDOA and design traditional SSL algorithm with low computational load, which could accurately detect the positions of near-field sound sources for user fall detection.
- Participate in the commercialization development of our walker and provide constructive suggestions.

**Mathematical Contest in Modeling** TEAM LEADER

2020.03 - 2020.04

- Learn data mining and mathematical modeling methods, and deepen the understanding of data processing and scenario modeling.
- Analyze the rating and review data of products on Amazon, identify key patterns and relationships, design indicators, explore potential function designs and formulate e-commerce sales strategies to promote product reputation and sales.
- Organize the team for efficient preparation, assign tasks reasonably, collect literature, design the modeling scheme, and write the final paper.

## AI Summer Experience in National University of Singapore

MAIN CONTRIBUTOR

2019.07 - 2019.07

- Collaborate to complete the “Heaven’s Scrutiny” project, a basic criminal arrest system based on face recognition and skeleton detection.
- Design feature extraction module, optimize AlphaPose algorithm, and integrate all the modules of team members.
- Rank first in the course evaluation system, be recognized by the panel of judges and win the double titles of “Best Team” and “Best Individual”.
- Complete high-intensity learning tasks and projects, and cultivate team spirit and the ability to work under high pressure.

### Monitor

2017.09 - 2020.07

- Organize various activities of the class and improve the ability of organization and coordination.
- Communicate with teachers and classmates proactively, and improve communication skills.
- Handle multiple affairs of class and individual at the same time, and cultivate self-management ability.

## Honours

---

<b>Honours Degree (9/300) &amp; Outstanding Graduate</b> , Huazhong University of Science and Technology	Wuhan	2021
<b>National Scholarship &amp; Xiaomi Scholarship &amp; Merit Student</b>	Wuhan	2020
<b>Meritorious Winner</b> , Mathematical Contest in Modeling	Wuhan	2020
<b>Best Team &amp; Best Individual</b> , AI Summer Experience in National University of Singapore	Singapore	2019
<b>Samsung Scholarship &amp; Merit Student</b>	Wuhan	2019
<b>National Encouragement Scholarship &amp; Model Freshman of Academic Records</b>	Wuhan	2018