Yicheng Gu

yichenggu@link.cuhk.edu.cn | github.com/VocodexElysium

Key Skills

Solid Domain Knowledge: Extensive knowledge of Deep Learning and Digital Signal Processing; specifically applied to Neural Vocoder, Neural Audio Codec, and Digital Audio Effects.
Multi-disciplinary: Experience encompassing Research, Open Source Systems, Dataset Development, Commercial Sound Design, and Music Production.

Education

The Chinese University of Hong Kong, Shenzhen — Shenzhen, China
Bachelor of Engineering in Computer Science and Engineering — *Sep. 2022 – Present*

- GPA: 3.965 / 4.0, Ranking: 2 / 308 (Top 1%)

Aalto University — Espoo, Finland
Exchange Student in Computer Science — *Sep. 2024 – Present*

Experience

Human Language Technology Lab — Shenzhen, China
Research Assistant, School of Data Science, CUHK-Shenzhen — *Oct. 2022 – Present*
Supervisor: Prof. Zhizheng Wu

- Singing Voice Conversion
  - Investigated characteristics and the complementary role of different Content-Based Features for the Singing Voice Conversion system.
- Neural Vocoder
  - Built a Discriminator based on the Constant-Q Transform (CQT) and Continuous Wavelet Transform (CWT) via Representation Learning and explored their complementary role with the Short-Time Fourier Transform (STFT) to improve the Vocoder's synthesis quality. The methods have been implemented and supported by NVIDIA BigVGAN .

Shanghai AI Laboratory — Shanghai, China
Research Assistant — *Dec. 2023 – Present*
Supervisor: Dr. Yanhong Zeng

- Video-to-Audio Generation
  - Integrated IP-Adapter and Sound Event Detection model to existing Audio Generation pipeline, obtaining both Audio-Visual Synchronization and Text-Controllability.

Aalto University — Espoo, Finland
Visiting Scholar — *Sep. 2024 – Present*
Supervisor: Prof.Lauri Juvela

- Differentiable Digital Signal Processing

Projects

Amphion

An Open-Source Audio, Music and Speech Generation Toolkit

- Migrate and adapt various well-known, widely used, or SOTA vocoders into our system, including: MelGAN, HiFi-GAN, BigVGAN, NSF-HiFiGAN, APNet, etc.
- Integrate comprehensive Objective Evaluation Metrics to the framework.

FoleyCrafter

Bring Silent Videos to Life with Lifelike and Synchronized Sounds

- Integrate baseline model and develop the temporal adapter for controlling timestamp details.

Publications

Yicheng Gu, Xueyao Zhang, Liumeng Xue, Haizhou Li, Zhizheng Wu, "An Investigation of Time-Frequency Representation Discriminators for High-Fidelity Vocoder," TASLP.

Yicheng Gu, Xueyao Zhang, Liumeng Xue, Zhizheng Wu, "Multi-Scale Sub-Band Constant-Q Transform Discriminator for High-Fidelity Vocoder," ICASSP 2024.

Xueyao Zhang*, Liumeng Xue*, **Yicheng Gu***, Yuancheng Wang*, et al., "Amphion: An Open-Source Audio, Music and Speech Generation Toolkit," SLT 2024.

Haorui He*, Zengqiang Shang*, Chaoren Wang*, Xuyuan Li*, **Yicheng Gu**, et al., "Emilia: An Extensive Multilingual and Diverse Speech Dataset for Large-Scale Speech Generation," SLT 2024.

Xueyao Zhang, **Yicheng Gu**, et al., "Leveraging Content-based Features from Multiple Acoustic Models for Singing Voice Conversion," Machine Learning for Audio Workshop at NeurIPS 2023.

Xueyao Zhang, Zihao Fang, **Yicheng Gu**, et al., "Leveraging Diverse Semantic-based Audio Pretrained Models for Singing Voice Conversion," SLT 2024.

Yiming Zhang, **Yicheng Gu**, Yanhong Zeng, et al., "FoleyCrafter: Bring Silent Videos to Life with Lifelike and Synchronized Sounds," Submitted to NeurIPS 2024.

Yicheng Gu*, Chaoren Wang*, Junan Zhang*, Xueyao Zhang, et al., "SingNet: Towards a Large-Scale, Diverse, and In-the-Wild Singing Voice Dataset," Submitted to ICLR 2025.

Honors and Awards

- The Nobel Class (Top 1, 2024)
- The Academic Performance Scholarship, Class A (Top 1%, 2024)
- The Academic Performance Scholarship, Class B (Top 3%, 2023)
- "LanHuaYing" Scholarship (Top 10 admitted students in Zhejiang Province, 2022)
- University Entrance Scholarship (Top 0.7% in Zhejiang Province, 2022)
- Deans List (Top 10%, 2022-2024)
- Bowen Entrance Scholarship (2022)
- Undergraduate Research Award (2023-2024)

Cross-disciplinary Abilities

Music Production: experienced in Composing, Mixing, and Mastering for different genres including Pop, Electronic, etc.
Sound Design: experienced in Sound Designing for movie, game, etc.