

Zhifeng Kong

Email: z4kong@eng.ucsd.edu

Website: <https://cseweb.ucsd.edu/~z4kong>

Education

University of California San Diego, U.S. <i>Ph.D. in Computer Science</i> Advisor: Professor Kamalika Chaudhuri	2018 - 2023
Xi'an Jiaotong University, China <i>B.S. in Mathematics and Applied Mathematics (Honors Science Program)</i>	2014 - 2018
Georgia Institute of Technology, U.S. (Visiting School of Math)	Jan. 2017 - May. 2017
University of Alberta, Canada (Visiting School of Math)	July 2016

Current Research

I am a 5-th year Ph.D. student working on machine learning with Prof. Kamalika Chaudhuri at UC San Diego. I work on deep generative models, including Diffusion Model, GAN, Normalizing Flow, and VAE. Specifically, I build state-of-the-art generative (diffusion) models for different applications. Besides diffusion models, I conduct research on interpretability, privacy, controllability, and expressivity of deep generative models. I am also widely interested in conditional and multi-modal generative models. My doctorate dissertation is about expressivity and trustworthiness of deep generative models.

Publications & Papers

Deep Generative Models (Diffusion Models)

- **Zhifeng Kong**, Wei Ping, Jiaji Huang, Kexin Zhao, Bryan Catanzaro. *DiffWave: A Versatile Diffusion Model for Audio Synthesis*. In ICLR 2021 (**oral presentation, top 6.2%**). <https://arxiv.org/abs/2009.09761>
- Zhaoyang Lyu*, **Zhifeng Kong***, Xudong Xu, Liang Pan, Dahua Lin. *A conditional point diffusion-refinement paradigm for 3d point cloud completion*. In ICLR 2022. (* equal contribution) <https://arxiv.org/abs/2112.03530>
- **Zhifeng Kong**, Wei Ping. *On Fast Sampling of Diffusion Probabilistic Models*. In ICML Workshop on Invertible Neural Networks, Normalizing Flows, and Explicit Likelihood Models (2021). <https://arxiv.org/abs/2106.00132>

Deep Generative Models (GANs, VAEs, Flows, or Conditional Models)

- **Zhifeng Kong**, Kamalika Chaudhuri. *Data Redaction from Conditional Generative Models*. <https://arxiv.org/abs/2305.11351>
- **Zhifeng Kong**, Kamalika Chaudhuri. *Data Redaction from Pre-trained GANs*. In IEEE SaTML 2023. <https://arxiv.org/abs/2206.14389>
- **Zhifeng Kong**, Scott Alfeld. *Approximate Data Deletion in Generative Models*. <https://arxiv.org/abs/2206.14439>
- **Zhifeng Kong**, Kamalika Chaudhuri. *Understanding Instance-based Interpretability of Variational Auto-Encoders*. In NeurIPS 2021. <https://arxiv.org/abs/2105.14203>

- **Zhifeng Kong**, Kamalika Chaudhuri. *Universal Approximation of Residual Flows in Maximum Mean Discrepancy*. In ICML Workshop on Invertible Neural Networks, Normalizing Flows, and Explicit Likelihood Models (2021). <https://arxiv.org/abs/2103.05793>
- **Zhifeng Kong**, Kamalika Chaudhuri. *The Expressive Power of a Class of Normalizing Flow Models*. In AISTATS 2020. <https://arxiv.org/abs/2006.00392>

Trustworthy ML (Supervised Learning)

- **Zhifeng Kong**, Amrita Roy Chowdhury, Kamalika Chaudhuri. *Can Membership Inferencing be Refuted?*. <https://arxiv.org/abs/2303.03648>
- Zhaoyang Lyu, Ching-Yun Ko, **Zhifeng Kong**, Ngai Wong, Dahua Lin, Luca Daniel. *Fastened CROWN: Tightened Neural Network Robustness Certificates*. In AAAI 2020. <https://arxiv.org/abs/1912.00574>

Speech Enhancement

- **Zhifeng Kong**, Wei Ping, Amrith Dantrey, Bryan Catanzaro. *CleanUNet 2: A Hybrid Speech Denoising Model on Waveform and Spectrogram*. In INTERSPEECH 2023.
- **Zhifeng Kong**, Wei Ping, Amrith Dantrey, Bryan Catanzaro. *Speech Denoising in the Waveform Domain with Self-Attention*. In ICASSP 2022. <https://arxiv.org/abs/2202.07790>

Others

- **Zhifeng Kong**. *Convergence Analysis of Training Two-hidden-layer Partially Over-parameterized ReLU Networks vis Gradient Descent*. In ICNIP 2020. <https://publications.waset.org/10011232/pdf>
- Xingyu Wan, Qing Zhao, Jinjun Wang, Shunming Deng, **Zhifeng Kong**. *Multi-Object Tracking Using Online Metric Learning with Long Short-Term Memory*. IEEE ICIP 2018, 788-792. <https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=8451174>
- Lu Pengfei, Fan Ya, Zhou Linhua, Qian Jun, Liu Linna, Zhao Siyan, **Zhifeng Kong**. *Study on Feature Extraction and Classification of Animal Blood Spectra Based on Support Vector Machine*. In Spectroscopy and Spectral Analysis. <http://www.gpxygpfx.com/EN/Y2017/V37/I12/3828>

Internship

Baidu Research

Summer 2020

Intern in Baidu Research Institute, Baidu USA

- Conducted research on speech synthesis in the waveform domain.
- First author of *DiffWave: A Versatile Diffusion Model for Audio Synthesis*. <https://arxiv.org/abs/2009.09761>

NVIDIA

Summer 2021 and 2022

Intern in the Applied Deep Learning Research, NVIDIA

- Conducted research on speech denoising with self attention.
- First author of *CleanUNet: Speech Denoising in the Waveform Domain with Self-Attention*. <https://arxiv.org/abs/2202.07790>; <https://github.com/NVIDIA/CleanUNet>
- First author of *CleanUNet 2: A Hybrid Speech Denoising Model on Waveform and Spectrogram*.
- Conducted research on speech denoising with diffusion models.

- Conducted research on MIDI-to-music synthesis with diffusion models.

Invited Talks

I gave invited talks at top conferences including *Machine Learning for Audio Synthesis* workshop at ICML 2022 and *Deep Generative Models and Downstream Applications* workshop at NeurIPS 2021, companies including NVIDIA (internal), and AI communities including AI-Time and TechBeat.

Services

I served as reviewers for JMLR, ICML 2023, ICLR 2023, AISTATS 2023, NeurIPS 2022, ICLR 2022, ICML 2022, ECCV 2022 Workshop UNCV, UAI 2022 Workshop TPM, NeurIPS 2021, ICML 2020 Workshop WHI. I was an outstanding reviewer at ICML 2022.

Honor

- Departmental Fellowship at UCSD Sep. 2018
 - Student Representative at DeeCamp Aug. 2018
 - The First-Class Scholarship of the Mount Everest Plan Nov. 2015, 2016 and 2017
 - The First-Class Scholarship at Xi'an Jiaotong University Oct. 2015, 2016 and 2017
 - The Outstanding Student Winner at Xi'an Jiaotong University Oct. 2015, 2016 and 2017
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