Tianze Luo

ltz22@mails.tsinghua.edu.cn luotianze666.github.io luotianze666

Education

Institute for Interdisciplinary Information Sciences, Tsinghua University *Sep. 2022 – Present*
BE in Computer Science and Technology (Yao Class)
∘ GPA: 3.91/4.00, Rank: 16/94

Research Interests

My research interests mainly focus on generative models across various data modalities, including image, video, audio, speech, and language.

Publications & Preprints

[1] **WaveFM: A High-Fidelity and Efficient Vocoder Based on Flow Matching**
Tianze Luo, Xingchen Miao, Wenbo Duan
NAACL 2025, Main Conference
[PDF] [Code]

[2] **BSLM: A Bi-Level Speech-Language Model for the Joint Modeling of Discrete and Continuous Tokens**
Tianze Luo, Zixin Wang, Kaizhi Qian, Yang Zhang, Chuang Gan
AAAI 2026 Workshop on Audio-Centric AI
[PDF] [Demo]

[3] **SoFlow: Solution Flow Models for One-Step Generative Modeling**
Tianze Luo, Haotian Yuan, Zhuang Liu
Under Review at ICLR 2026 (Review Score: **Top 20%** among 19619 submissions)
[PDF] [Code]

[4] **SoundVCM: Efficient Video-to-Audio Generation with Velocity Consistency Models**
Tianze Luo, Xingchen Miao, Yang Zhang, Lie Lu, Chuang Gan
Under Review at CVPR 2026
[PDF] [Code]

Research Experiences

Research Assistant (Image Generative Models)
Advisor: Prof. Zhuang Liu, Princeton University *Jun. 2025 – Present*

- Proposed a novel framework that learns the ODE **solution function** directly, enabling high-quality **one-step generation** without iteratively solving the flow matching velocity ODE.
- Designed a **Solution Consistency Loss** to eliminate the computationally expensive **Jacobian-Vector Product (JVP)** calculation, increasing training speed by around 23% and reducing GPU memory consumption by around 31% compared to MeanFlow models.
- Incorporated **Training-time CFG** into the flow matching objective, consistently achieving superior performance on ImageNet 256×256 across various parameter scales compared to MeanFlow counterparts when trained from scratch.

Research Assistant (Speech-Language Models & Audio Generation)
Advisor: Prof. Chuang Gan, UMass Amherst | MIT-IBM Watson AI Lab *Mar. 2025 – Nov. 2025*

- **Project BSLM:** Proposed a bi-level architecture integrating a large transformer with a flow-matching model to jointly generate discrete text and continuous speech tokens, thereby eliminating vector quantization errors. This achieved comparable performance to discrete Speech Language Models with fewer training tokens via a novel **grouped token mechanism**.

- **Project SoundVCM:** Developed a velocity consistency model for high-quality, **single-step** foley audio generation from video. Designed a novel training objective compatible with Classifier-Free Guidance that learns the ground-truth average velocity field, significantly outperforming previous few-step baselines in audio quality and audio-visual alignment.

Independent Researcher (Speech and Audio Synthesis)
Independent Project (No advisor), Tsinghua University *Jun. 2024 – Feb. 2025*

- **Spearheaded** a self-directed project without faculty supervision, leading two peers to develop a novel vocoder that has attracted **114 stars** on GitHub.
- Proposed **WaveFM**, a reparameterized flow matching model that utilizes a **mel-conditioned prior** to achieve high-quality, efficient generation at over **300**× real-time speed.
- Enhanced model performance by designing a novel multi-resolution STFT loss and a specialized consistency distillation method, leading to results that outperform baselines and generalize well to out-of-distribution music data.

Teaching Services

◦ **Teaching Assistant**: Object-Oriented Programming Course (by Prof. Ju Ren)

Honors and Awards

Technological Innovation Scholarship, Tsinghua University *2025*
Academic Excellence Scholarship, Tsinghua University *2023, 2024*
First Prize, Tencent Rhino Bird Science Talent Training Program (Middle School Track) *2021*
First Prize of Senior Group, National Olympiad in Informatics in Provinces (NOIP) *2020*
First Prize of Senior Group, CCF Certified Software Professional (Algorithmic Competition) *2020*

Selected Courses

CATEGORY	COURSE	GRADES
Major: Artificial Intelligence	Computer Vision	A+
	Natural Language Processing	A+
	Machine Learning	A
	Deep Learning	A
	Embodied Artificial Intelligence	A
	Advanced Computer Graphics	A
	AI+X Computing Acceleration	A
Minor: Mathematics	Calculus A(1) / A(2)	A+ / A
	Advanced Topics in Linear Algebra / Linear Algebra	A+ / A
	Algebra and Computation	A+
	Probability Theory(1)	A+
	Differential Geometry	A
	Ordinary Differential Equations	A
	Abstract Algebra	A
	Introduction to Complex Analysis	A
Research	Research Immersion Training	A