Peiang Zhao

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Education

University of Science and Technology of China Sep. 2022 – Jun. 2025 (Expected)

M.Eng. in Electronic Information. **Supervisor: Prof. S. Kevin Zhou**

Hefei University of Technology Sep. 2018 – Jun. 2022

B.S. in Computer Science and Technology. Rank: 16/256 (Top 6%)

Research Projects

ID-Preserving Image Generation with Multi-Modal Prompts *Primary Contributor*

Put forward **FaceStudio V2**, a cutting-edge approach for zero-shot *identity-preserving image synthesis*. FaceStudio is an adaptable plugin for popular text-to-image models, capable of various tasks such as stylized portrait generation and subject-driven image generation.

- Developed a novel hybrid guidance framework that integrates information from multi-modal instructions, including text, style images, and identity images, ensuring precise identity preservation.
- Enhanced the framework's prompt-following capability with an innovative lightweight connector, which incorporates text-to-image diffusion models and powerful large language models (LLMs) to better interpret long dense textual prompts.
- FaceStudio has been successfully integrated into several high-profile products, such as QQ and QZone.

Semantic Image Generation with Diffusion Models. *First Author*

Proposed **LoCo**, a training-free approach to *improve the compositional capabilities* of text-to-image diffusion models. LoCo guides the generation process with attention-based constraints.

- Proposed a Localized Attention Constraint that utilizes the semantic affinity in self-attention maps to create precise representations of objects, ensuring their accurate placement within designated regions.
- Introduced a Padding Token Constraint to leverage the semantic information embedded in previously overlooked padding tokens, further improve the compositional capability.
- LoCo achieved state-of-the-art performance and can be applied to enhance the spatial control capabilities of existing models such as GLIGEN and ControlNet.

Text-Guided Image Editing. *First Author*

Proposed **Mojo**, a plug-and-play approach for *text-guided image editing*. Mojo delves into the skip connection features within the diffusion U-Net to achieve precise image modifications.

- Introduced Skip Connection Modulation (SCM), which modulates the skip connection features during the image editing process. SCM effectively maintains the image structure while performing edits.
- Explored the self-attention maps of the diffusion U-Net and introduced Cross Image Self-Attention (CISA) to further enhance the quality of edited images via self-attention transfer.
- Mojo delivers superior results in versatile image editing scenarios compared to previous arts.

Image Reconstruction from Human Brain Activities. *Primary Contributor*

Put forward **BrainRAM**, a dual-guided framework that reconstructs visual stimuli from fMRI scans of human brains, inspired by the mechanism of human memory.

- Designed a Retrieval-Augmentation Module (RAM) to enhance the quality of reconstructed images. RAM effectively mitigates the impact of noisy fMRI signals on reconstruction results.
- Extensive experiments demonstrate the superiority of BrainRAM over previous methods.

Publications

- **Mojo: Training-Free Text-guided Image Editing via Skip Connection Modulation**.
  Peiang Zhao, Han Li, Ruiyang Jin, S. Kevin Zhou.
  Submitted to NeurIPS 2024 | Paper
- **LoCo: Locally Constrained Training-Free Layout-to-Image Synthesis**.
  Peiang Zhao, Han Li, Ruiyang Jin, S. Kevin Zhou.
  Submitted to NeurIPS 2024 | Paper | Project Page
- **BrainRAM: Cross-Modality Retrieval-Augmented Image Reconstruction from Human Brain Activity**.
  Dian Xie*, **Peiang Zhao***, Jiarui Zhang, Kangqi Wei, Xiaobao Ni, Jiong Xia.
  Submitted to MM 2024 | Paper
- **DiffULD: Diffusive Universal Lesion Detection**.
  Peiang Zhao, Han Li, Ruiyang Jin, S. Kevin Zhou.
  MICCAI 2023 | Paper

Honors and awards

First Class Scholarship, University of Science and Technology of China	2022, 2023
Suzhou Industrial Park Scholarship	2023
Outstanding Graduate of Hefei University of Technology	2022
Merit Student of Hefei University of Technology	2019, 2020, 2021
2nd Prize, National Intelligent Car Race for University Students	2021, 2022
1st Prize, Competition of Embedded Systems of Anhui Province	2019
3rd Prize, China Software Cup Software Developing Contest	2022, 2023

Internships

Tencent - QQ Image Lab May 2024 – Present
Research Intern, working with Yuxuan Yan and Chi Zhang on identity-preserving image generation.

References

Prof. S. Kevin Zhou Supervisor, IEEE Fellow skevinzhou@ustc.edu.cn