# 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%)

## 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.
  **ACM MM 2024 Oral (Top 3.97%)** | Paper

- **DiffULD: Diffusive Universal Lesion Detection**
  **Peiang Zhao**, Han Li, Ruiyang Jin, S. Kevin Zhou.
  **MICCAI 2023** | Paper

## 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 V2 is an adaptable plugin for popular text-to-image models, such as SDXL.

- Designed an innovative lightweight connector to incorporate text-to-image diffusion models and powerful large language models (LLMs), enhancing the framework's prompt-following capability.

- Developed a LCM-based forecasting branch and an identity alignment loss to ensure precise identity preservation.

- FaceStudio V2 has been 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 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 cross-modality guided framework to guide the reconstruction process with both text and image features.
- Designed a Retrieval-Augmentation Module (RAM) to enhance the quality of reconstructed images with retrieved samples. RAM effectively mitigates the impact of noisy fMRI signals on reconstruction results.
- Extensive experiments demonstrate the superiority of BrainRAM over previous methods.

## HONORS AND AWARDS

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| 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