

Education

- **KAUST - AI Initiative** Saudi Arabia
• *PhD Candidate in CS under the supervision of Juergen Schmidhuber* Aug. 2022 - Present
 - GPA:4.0/4.0
 - Research Interests: Explainable, Efficient, and Responsible Generative Model

Selected Publications

1. **Liu, H.**, Liu, D., Zhuge, M., Zhou, Z., Xie, T., He, S., ... & Schmidhuber, J. (2024). Mixture of States: Routing Token-Level Dynamics for Multimodal Generation. Technical Report [\[pdf\]](#)
2. **Liu, H.**, Liu, S., Zhou, Z., ... & Pérez-Rúa, J. M. (2024). MarDini: Masked Autoregressive Diffusion for Video Generation at Scale. TMLR [\[pdf\]](#)
3. **Liu, H.**, Zhang, W., Xie, J., Faccio, F., Xu, M., Xiang, T., Shou, Mike., Perez-Rua & J., Schmidhuber, J. Faster Diffusion Through Temporal Attention Decomposition. ICLR & TMLR [\[pdf\]](#)[\[code\]](#)
4. **Liu, H.**, Zhang, W., Li, B., Ghanem, B. & Schmidhuber, J. "Lazy" Layers Make Fine-tuned Diffusion Models More Traceable. Technical Report [\[pdf\]](#)
5. **Liu, H.**, Zhuge, M., Li, B., Wang, Y., Faccio, F., Ghanem, B. & Schmidhuber, J. Learning to Identify Critical States for Reinforcement Learning from Videos. ICCV'2023 [\[pdf\]](#) [\[code\]](#)
6. **Liu, H.**, Zhang W., Li, B., Wu, H., He, N., Huang, Y., Li, Y., Ghanem, B. & Zheng, Y. AdaptiveMix: Improving GAN Training via Feature Space Shrinkage. CVPR'2023 [\[pdf\]](#) [\[code\]](#)
7. **Liu, H.**, Li, B., Wu, H., Liang, H., Huang, Y., Li, Y., ... & Zheng, Y. Combating Mode Collapse in GANs via Manifold Entropy Estimation. AAAI'2023 [\[pdf\]](#) [\[code\]](#)
8. **Liu, H.**, Wu, H., Xie, W., Liu, F., & Shen, L. (2021). Group-wise Inhibition-based Feature Regularization for Robust Classification. ICCV'2021 [\[pdf\]](#) [\[code\]](#)
9. **Liu, H.**, Zhang, W., Liu, F., Wu, H., & Shen, L. Fingerprint Presentation Attack Detector Using Global-Local Model. IEEE T-Cybernetics. [\[pdf\]](#) [\[code\]](#)
10. **Liu, H.**, Zhang, W., Xie J., Wu, H., Li, B., Zhang, Z., Li, Y., Huang, Y., Ghanem, B., & Y. Zheng. Decoupled Mixup for Out-of-Distribution Visual Recognition. ECCV'2022 Workshop [\[pdf\]](#) [\[code\]](#)
11. Zhang, W., **Liu, H.**, Li, B., ..., Y. Zheng & Ghanem, B.. Dynamically Masked Discriminator for Generative Adversarial Networks NeurIPS'2023. (**Equal Contribution**)[\[pdf\]](#) [\[code\]](#)
12. Zhang W., **Liu, H.**, Liu, F., Ramachandra, R., & Busch, C. Effective Presentation Attack Detection Driven by Face Related Task. ECCV'2022 (**Equal Contribution**) [\[pdf\]](#) [\[code\]](#)
13. Zhuge, M., **Liu, H.**, ..., & Schmidhuber, J. Mindstorms in Natural Language-Based Societies of Mind. NIPSW'2023 (**Best Workshop Paper**).(**Equal Contribution**) [\[pdf\]](#)[\[code\]](#)

Awards, Grants & Honors

Best Paper on "Robustness of Zero/Few-shot Learning in Foundation Models" @ NIPSW . 2023
Co-PI of Grant on "Efficient Generative Models" @ SDAIA-KAUST (**200k SAR**) 2023
Outstanding Graduate Award @ SZU (**Rate \leq 5%**) 2022
China National Scholarship @ SZU (**Rate \leq 0.02%**) 2021

Research Experience

- **BizAI, Meta** MPK, United States
Research Scientist Internship working with Ding Liu and Wei Liu 2025 - 2025
 - Research Topic: Large-scale Pre-training, Text-to-Image Generation, Mixed-Modality Generation
 - Publication Records: Under Review \times 5.
 - Co-developing a commercial 7B text-to-image model trained on over 1B image-text pairs, deployed in several widely used products.
 - Built a 20B native LLM-driven multimodal generation prototype from scratch.
 - Contributed to developing a native unified model for both visual understanding and generation tasks.
- **MGenAI, Meta** London, United Kindom
Research Scientist Internship working with J.-M. Perez-Rua and T. Xiang 2024 - 2024
 - Research Topic: Foundational Training, Image-to-Video Generation, Text-to-Image Generation.
 - Publication Records: TMLR \times 2; ICCV \times 1; CVPR \times 1.
 - Co-Developing a foundational text-to-image model to support several well-known products.
 - Scaling auto-regressive diffusion to video generation.
- **GenAI, KAUST** Saudi Arabia
PhD Candidate supervised by Prof. Juergen Schmidhuber 2022 - Present
 - Research Topic: Neural Networks with Multiple-Step Inferences, e.g., Diffusion Model, Auto-Regressive Model, and RL Agents.
 - Publication Records: ICCV \times 1; CVPR \times 2; NIPSW \times 1; TMLR \times 2, Under Review \times 1.
 - Highlight: NLSOM is awarded **Best paper@NIPS'23 Ro-FoMo Workshop**.
 - Highlight: TGate is merged into Diffusers Library and received over **300** stars on GitHub.
- **Jarvis Lab, Tencent** Shenzhen, China
Internship working with Mentor: N. He & Y. Li and Director: Y. Zheng 2021 - 2022
 - Research Topic: Generative Model and Medical Imaging.
 - Publication Records: NIPS \times 1, CVPR \times 1; ICCV \times 1; AAAI \times 1; MICCAI \times 2; MIA \times 1; PR \times 1; ECCVW \times 1.
 - Highlight: MaF-GAN is recognized as **Oral** paper@AAAI.
 - Highlight: Ranked 4th in ECCV'2022 NICO Challenge.
- **Norwegian Biometrics Laboratory, NTNU** Gjøvik, Norway
Visiting Student supervised by Prof. C. Busch and Prof. R. Ramachandra 2021 - 2022
 - Research Topic: AI Safety, Facial/Fingerprint Recognition System.
 - Publication Records: ECCV \times 1, IEEE TNNLS \times 1.