SHU ZHAO

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RESEARCH INTERESTS

My research interests lie at the intersection of Multimodal Large Language Models, Information Retrieval, and Long-Context Understanding, with a particular focus on developing advanced Multimodal Retrieval-Augmented Generation (MM-RAG) systems. I am passionate about designing intelligent systems that can effectively retrieve and reason across different modalities to create robust, adaptable, and efficient AI systems.

EDUCATION

The Pennsylvania State University–University Park *Aug. 2022 - May. 2026 (Expected)*
Ph.D. in Computer Science *Pennsylvania, USA*

University of Chinese Academy of Sciences *Sep. 2018 - Jun. 2021*
M.E. in Computer Technology *Beijing, China*

Anhui University *Sep. 2013 - Jun. 2017*
B.E. in Information Security *Anhui, China*

PUBLICATIONS

1. **SafeMap: Robust HD Map Construction from Incomplete Observations**.
   International Conference on Machine Learning (**ICML**), 2025.
   Xiaoshuai Hao, Lingyu Liu, Yunfeng Diao, Rong Yin, Pengwei Wang, Jing Zhang, Lingdong Kong, **Shu Zhao**.
2. **KALAHash: Knowledge-Anchored Low-Resource Adaptation for Deep Hashing**.
   AAAI Conference on Artificial Intelligence (**AAAI**), 2025.
   Shu Zhao, Tan Yu, Xiaoshuai Hao, Wenchao Ma, Vijaykrishnan Narayanan.
3. **MapFusion: A Novel BEV Feature Fusion Network for Multi-modal Map Construction**.
   Information Fusion. 2025.
   Xiaoshuai Hao, Yunfeng Diao, Mengchuan Wei, Yifan Yang, Peng Hao, Rong Yin, Hui Zhang, Weiming Li, **Shu Zhao**, Yu Liu.
4. **NEUCORE: Neural Concept Reasoning for Composed Image Retrieval**.
   UniReps Workshop @ Neural Information Processing Systems (**NeurIPS Workshop**), 2023.
   Shu Zhao, Huijuan Xu.
5. **Rescuing Deep Hashing from Dead Bits Problem**.
   International Joint Conference on Artificial Intelligence (**IJCAI**), 2021.
   Shu Zhao, Dayan Wu, Yucan Zhou, Bo Li, Weiping Wang.
6. **Asymmetric Deep Hashing for Efficient Hash Code Compression**.
   ACM International Conference on Multimedia (**ACM MM, Oral**), 2020.
   Shu Zhao, Dayan Wu, Wanqian Zhang, Yu Zhou, Bo Li, Weiping Wang.
7. **Technical Report for EPIC-KITCHENS-100 2021 Multi-Instance Retrieval Challenge**.
   EPIC-Kitchens Challenges @ Computer Vision and Pattern Recognition (**CVPR Workshop, Ranked 1st**), 2021.
   Xiaoshuai Hao, Wanqian Zhang, Dejie Yang, **Shu Zhao**, Dayan Wu, Bo Li, Weiping Wang.

PREPRINTS

1. **Less is More: Toward Zero-Shot Local Scene Graph Generation via Foundation Models**.
   arXiv:2310.01358. 2023.
   Shu Zhao, Huijuan Xu.

RESEARCH EXPERIENCE

Research Intern. Baidu Research, Beijing *Apr. 2022 - Jul. 2022*
Advised by Dr. Tan Yu

Topic: Large Multimodal Models for Image Retrieval

Research Assistant. IIE, Chinese Academy of Sciences, Beijing *Mar. 2019 - Jun. 2021*
Advised by Prof. Dayan Wu and Prof. Bo Li

Topic: Deep Image Hashing

INTERDISCIPLINARITY

InsectEye *2024*
Collaboration with Entomology Department, Penn State

Description: we are developing an AI system for automated insect recognition and classification as part of the InsectEye project, a non-lethal biodiversity monitoring initiative at Penn State's Arboretum. We are working on engineering robust computer vision algorithms to overcome challenging environmental conditions, including variable lighting and background noise while achieving accurate identification of small insects with subtle morphological differences.

Textural Threshold: Dreadlock *2023*
Collaboration with Architecture Department, Penn State

Description: a user's hair texture is acquired through a camera, and similar and dissimilar images are retrieved through deep retrieval techniques and stitched together to form an art painting. Our work was presented at the Central Pavilion Exhibition, the 18th Architectural Venice Biennale.

REVIEW SERVICES

Computer Vision and Pattern Recognition (CVPR)	2024-2025
International Conference on Computer Vision (ICCV)	2025
ACM International Conference on Multimedia (ACM MM)	2022-2025
Annual Conference on Neural Information Processing Systems (NeurIPS)	2023-2025

TEACHING ASSISTANT

Deep Learning for Computer Vision, Undergraduate	2024
Vision and Language, Graduate	2023

SKILLS

Python, PyTorch, LaTeX, Linux, MATLAB, C++