ZIXIN LIU

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EDUCATION

Shandong University **Qingdao, China**
M.Eng, Computer Technology *Sept. 2019 to June 2022*
- Advised by Dr. Xuemeng Song and Prof. Liqiang Nie
- GPA 3.35/4

Xi'an University of Posts and Telecommunications **Xi'an, China**
B.S, Computer Science and Technology *Sept. 2014 to June 2018*
- GPA 3.28/4

RESEARCH INTERESTS

Multi-modal Learning, Computer Vision, Knowledge Distillation

TECHNICAL SKILLS

- **Computational:** Python, C++, C, CUDA, Verilog, LaTeX
- **Deep Learning Tools:** PyTorch, TensorFlow, PaddlePaddle, MindSpore

PUBLICATIONS

Multi-Factor Adaptive Vision Selection for Egocentric Video Question Answering
Haoyu Zhang, Meng Liu, **Zixin Liu**, Xuemeng Song, Yaowei Wang, Liqiang Nie.
International Conference on Machine Learning (ICML), 2024.

Multi-modal Emotion Recognition via Hierarchical Knowledge Distillation
Teng sun, Yinwei Wei, Juntong Ni, **Zixin Liu**, Xuemeng Song, Liqiang Nie.
IEEE Transactions on Multimedia (TMM), 2024.

Fashion Graph-enhanced Personalized Complementary Clothing Recommendation
Jinwan Shi, Xuemeng Song, **Zixin Liu**, Liqiang Nie.
Journal of Cyber Security, 2021.

Method and System for Automatic Conversion of Algorithm Models on Heterogeneous Platforms
Zixin Liu, Hongyu Chi, Yaowei Wang, Qingfang Zheng
Patent, China, 2024

Method for Egocentric Video Question Answering Based on Multi-Factor Adaptive Vision Selection
Zixin Liu, Haoyu Zhang, Yaowei Wang, Weili Guan, Liqiang Nie
Patent, China, 2024

Method for Collaborative Scheduling and Execution of Algorithms Across Devices
Yaowei Wang, **Zixin Liu**, Xinbei Bai, Qingfang Zheng
Patent, China, 2024

RESEARCH

Multi-modal Egocentric Video Question Answering **Shenzhen, China**
Advised by Prof. Liqiang Nie, Institute of Computer Vision *Aug. 2023 - Jan. 2024*
- Proposed a prior-guided patch selection module within the MFAS framework, effectively reducing spatial redundancy and highlighting crucial visual regions by integrating prior knowledge with spatial and temporal cues.
- Partly developed the MFAS model using PyTorch, optimizing it on the EgoTaskQA and QAEgo4D datasets.
- Contributed to a co-authored paper (accepted by ICML 2024) and a first-author patent.

Multi-modal Emotion Recognition **Qingdao, China**
Advised by Prof. Liqiang Nie, Intelligent Media Research Center *Dec. 2021 - June 2022*
- Proposed a Hierarchical Knowledge Distillation module for multi-modal tasks, effectively narrowing the gap between the dominant modality and others.
- Enhanced the framework design and Independently developed the model using PyTorch.
- Contributed to a co-authored paper (accepted by IEEE TMM).

Research on Error Correction-Oriented Knowledge Distillation **Qingdao, China**
Advised by Dr. Xuemeng Song, Intelligent Media Research Center *Sept. 2021 - May 2022*
- Independently developed an innovative knowledge distillation method for image classification, focusing on error correction to enhance the accuracy of distilled models.
- Conducted extensive experiments to validate the proposed method, achieving a significant improvement in CIFAR accuracy compared to traditional knowledge distillation approaches.
- Authored and successfully defended a master's thesis detailing the methodology, experimental results, and implications for future research in knowledge distillation.

EXPERIENCE

Peng Cheng National Laboratory **Shenzhen, China**
Machine Learning Engineer, Team Leader *July 2022 - Present*

- Responsible for the design and development of algorithms in the fields of *computer vision* and *knowledge distillation*, and deployed these algorithms in real-world scenarios such as urban and industrial applications.
- Led an algorithm team of 7 members, overseeing algorithm development and participating in the management of public affairs within the research institute.

PROJECTS

Digital Retina Systems *Apr. 2023 to Present*

- Responsible for the writing and optimization of algorithms in standards, specifically for knowledge distillation systems.
- Designed and developed a plug-and-play distillation framework compatible with various model architectures (e.g., CNN, Transformer), parameters (e.g. tiny, large) and hardware platforms (e.g., GPU, NPU).
- Developed an Image Enhancement algorithm tailored for urban traffic scenarios, featuring de-noising, low-light enhancement, and de-blurring (motion blur, focus blur) capabilities[News!].
- Contributed to *IEEE Standard PAR P3161.5* for Algorithm and Model Repository of Digital Retina Systems.
- Contributed to the second edition of Association Standard *Digital Retina Systems: Algorithm and Model Repository*.
- Contributed to 2 first-author patents.

Smart City & Smart Factory *July 2022 to June 2023*

- Responsible for designing, developing, and optimizing vision algorithms for urban and industrial scenarios.
- Independently developed and optimized a Python-based implementation of the traditional Vibe background detection and subtraction algorithm, improving algorithm efficiency from 10 fps to 300 fps.
- Participated in the creation of a petrochemical factory leakage dataset, designed detection algorithms and training strategies
- Independently developed leakage detection algorithms based on the YOLO series, achieving 98% accuracy on real-world test sets.

State Grid Shandong Electric Power Project *Sept. 2019 to Dec. 2020*

- Responsible for designing and implementing computer vision algorithmic solutions, as well as conducting research, and drafting research papers and patent applications.
- Independently developed a topological relationship detection algorithm based on object detection and contour tracing algorithms.
- Contributed to one patent (CN202010707515.0) and one EI-core paper published in the *Journal of Beijing University of Aeronautics and Astronautics*.

AWARDS

- Outstanding Graduate Student of Shandong University (Top 10%), 2021
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- FPGA Model Machine Design Competition (2nd Price), 2017
- National Encouragement Scholarship (Top 5%), 2017