

# ZIXIN LIU

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## EDUCATION

<b>Shandong University</b> M.Eng, Computer Technology • Advised by <a href="#">Dr. Xuemeng Song</a> and <a href="#">Prof. Liqiang Nie</a> • GPA 3.35/4	<b>Qingdao, China</b> <i>Sept. 2019 to June 2022</i>
<b>Xi'an University of Posts and Telecommunications</b> B.S, Computer Science and Technology • GPA 3.28/4	<b>Xi'an, China</b> <i>Sept. 2014 to June 2018</i>

## RESEARCH INTERESTS

Multi-modal Learning, Computer Vision, Knowledge Distillation

## TECHNICAL SKILLS

- **Computational:** Python, C++, C, CUDA, Verilog,  $\text{\LaTeX}$
- **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

Advised by [Prof. Liqiang Nie](#), Institute of Computer Vision  
**Shenzhen, China**  
*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

Advised by [Prof. Liqiang Nie](#), Intelligent Media Research Center  
**Qingdao, China**  
*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

Advised by [Dr. Xuemeng Song](#), Intelligent Media Research Center  
**Qingdao, China**  
*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

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### 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

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### 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

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- Outstanding Graduate Student of Shandong University, 2020
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- FPGA Model Machine Design Competition (2nd Price), 2016
- National Encouragement Scholarship (Top 5%), 2015