# Haosong Peng

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## EDUCATION

**Beijing Insitiute of Technology** **Beijing, China**

*Master of Science in Engineering* *Sep. 2022 – Jun. 2025 (Expected)*

- **Research Interests**: Video Analytics System, Multimedia, Edge Computing | **Supervisor**: Yufeng Zhan
- Member of Institute of Intelligent Information Processing and Control, School of Automation (Yuanqing Xia Group)

**Beijing University of Chemical Technology** **Beijing, China**

*Bachelor of Science in Engineering* *Sep. 2018 – Jun. 2022*

- **GPA**: 4.07/4.33 (Rank 1/153)
- **Core Modules**: Linear Systems Theory, Deep Learning, Image Acquisition and Processing, Numerical Analysis

## RESEARCH EXPERIENCE

**Edge-Assisted Real Time Video Analytics Services Based on Vision Foundation Model** **Beijing, China**

*General Program under the National Natural Science Foundation of China* *Oct. 2024 – Present*

- Developed a prototype running high-resolution video analytics workloads using NVIDIA Jetson and Alibaba Serverless function.
- Proposed a dedicated acceleration mechanism based on Vision Transformer for video object detection task.
- Studied the optimization of analytics accuracy, bandwidth, and latency in edge offloading or edge-cloud collaborative scenarios.

**Research on Key Incentive Mechanisms for Sustainable Training in Federated Learning** **Beijing, China**

*Youth Program under the National Natural Science Foundation of China* *Sep. 2022 – Dec. 2024*

- Designed an sequential computation offloading mechanism between edge computing service providers and client in multi-access edge computing scenarios to prevent collusion.
- Decided visiting order and prices for service providers to maximize the revenue using deep reinforcement learning to decide.

**Automatic Forming and Processing Control System** **Sichuan, China**

*Technical Development Project by the Southwest Institute of Automation* *Sep. 2023 – Oct. 2024*

- Addressed issues in a specific forming process, such as lag in cutting temperature acquisition, insufficient closed-loop control for machining safety, and challenges in controlling dimensional accuracy and consistency.
- Employed a deep neural network to predict cutting temperature and machining quality in real-time.

**Cloud-Edge Collaborative Software Design** **Beijing, China**

*Technical Development Project the China Unicom Research Institute* *Sep. 2021 – Dec. 2022*

- Modeled cloud workflows as directed acyclic graphs, applied graph neural networks for feature extraction, and utilized deep reinforcement learning along with Monte Carlo Tree Search algorithms to determine the scheduling order of subtasks.
- The proposed method reduces task completion time and enhance the throughput of the service system.

## PUBLICATIONS & PREPRINTS

** = Equal Contributions*

- **Haosong Peng**, Yufeng Zhan, Dihua Zhai, Xiaopu Zhang and Yuanqing Xia. "Egret: Reinforcement Mechanism for Sequential Computation Offloading in Edge Computing." **IEEE Transactions on Services Computing (SCI Q1, IF=5.2) .**
- **Haosong Peng**, Yufeng Zhan, Peng Li and Yuanqing Xia. "Tangram: High-resolution Video Analytics on Serverless Platform with SLO-aware Batching." **2024 IEEE International Conference on Distribution Computing System (CORE A) .**
- **Haosong Peng**, Chuge Wu, Yufeng Zhan and Yuanqing Xia. "Lore: a learning-based approach for workflow scheduling in clouds." **RACS '22: Proceedings of the Conference on Research in Adaptive and Convergent Systems (EI).**
- Yi Chang, **Haosong Peng**, Yufeng Zhan and Yuanqing Xia. "Octopus: An End-to-end Multi-DAG Scheduling Method Based on Deep Reinforcement Learning." **2024 IEEE Chinese Control Conference (EI).**
- Zhiwei Wu, **Haosong Peng**, Biao Hu and Xiaodong Feng. "Trajectory Tracking of a Novel Underactuated AUV via Nonsingular Integral Terminal Sliding Mode Control." **IEEE Access 2021 (SCI Q2, IF=3.3).**
- **Haosong Peng***, Wei Feng*, Hao Li, Yufeng Zhan, Qihua Zhou and Yuanqing Xia. "Arena: A Patch-of-Interest ViT Inference Acceleration System for Edge-Assisted Video Analytics." **arXiv preprint arXiv:2404.09245, 2024.**

- Hao Li*, Yuanyuan Gao*, **Haosong Peng***, Chenming Wu, Weicai Ye, Yufeng Zhan, Chen Zhao, Dingwen Zhang, Jingdong Wang, Junwei Han. "DGTR: Distributed Gaussian Turbo-Reconstruction for Sparse-View Vast Scenes". **Preprint.**
- **Haosong Peng***, Tianyu Qi*, Yufeng Zhan, Hao Li, Yalun Dai and Yuanqing Xia. "Radiant: Large-scale 3D Gaussian Rendering based on Hierarchical Framework." **Preprint.**
- Wei Feng, Zicong Hong, **Haosong Peng**,Yufeng Zhan, Peng Li and Yuanqing Xia. EYES: Efficient Vision Transformer Serving at the Edge via Token Parallelism. **Preprint.**

## PATENTS

- A Cloud-Edge Collaborative Method, Device, and Product for Object Detection, (Filed, First Inventor after Supervisor)
- An Edge Computing Acceleration Method, Device, Medium, and Product for Video Analytics (First Inventor after Supervisor)
- An LRA Scheduling Method, Device, and Medium Based on Graph Neural Networks (Filed, Third Inventor after Supervisor)

## SKILLS & INTERESTS

**Technical:** Python & Pytorch, C, R, Matlab & Simulink, Latex, Linux & Bash, Docker, OpenCV, MS Office;

**Languages:** English (CET-6 538), Mandarin (Native)

**Interests:** Badminton, Photography, Traveling

## INTERSHIP

**Digital Industry Research Assistant Intern** **Chongqing, China**

*China Academy of Information and Communications Technology (CAICT)* *Jun. 2022 – Jul. 2022*

- **Project**: Data Support for the 2022 China International Smart Industry Expo
- **Main Responsibilities**: Developed an efficient automation script using Python and Selenium to automatically search and scrape information from online platforms based on existing company names, significantly improving the efficiency and accuracy of information collection.

## AWARDS & HONORS

- 2023 Innovation Practice Star – China Graduate Innovation Practice Series Competition *Apr. 2024*
- First Prize in Huawei Cup National Graduate Mathematical Modeling Competition *Dec. 2023*
- First-Class Academic Scholarship – Beijing Institute of Technology *Oct. 2023*
- Beijing Outstanding Graduate *Jun. 2022*
- BUCT Outstanding Graduation Thesis Award *Jun. 2022*
- Li Wenyang and Yang Yan Social Support Scholarship (Top 0.1%) *Nov. 2021*
- National Scholarship (Top 0.2%) x2 *Oct. 2020, Oct. 2019*
- Outstanding Student × 2, Model Student × 2, and Excellent League Cadre *Sep. 2019 - May. 2022*