

LINGZHI ZHAO

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Research Interests

My current research interest is leveraging reinforcement learning and dynamic programming algorithms in **multimedia system and networking** to improve users' quality of experience (QoE), with some applications of adaptive video streaming, live 360 video multicast.

Education

University of Illinois Urbana-Champaign

Aug. 2022 – present

Ph.D. in Computer Science

Advisor: Prof. Klara Nahrstedt

Shanghai Jiao Tong University

Sep. 2019 – Mar. 2022

M.S. in Information and Communication Engineering

Advisor: Prof. Ying Cui

Shanghai University

Sep. 2015 – Jul. 2019

B.S. in Communication Engineering

Selected Project Experiences

360LiveCast: Live 360 Video Multicast

Aug. 2022 – Jul. 2023

University of Illinois Urbana-Champaign

USA

- Proposed a viewport-aware multicast framework for live 360 video, which is built on top of traditional multicast and tailors for viewport distribution and management
 - * Introduced a novel representation of 360 video called viewport hull to facilitate live 360 video multicast
 - * Proposed adaptive viewport hull prefetching approach which enables seamless and fast viewport switching
 - * Proposed viewport hull group generation approach which reduces the server overload

Neural Adaptive Video Streaming

Sep. 2020 – Aug. 2022

Shanghai Jiao Tong University, Tencent

Shanghai, China

- Enhanced QoE of neural adaptive video streaming via lower-layer information exposure and online tuning
 - * Modeled the impacts of lower-layer information in adaptive video streaming, allowing a flexible tradeoff between QoE and costs for obtaining system information
 - * Proposed two continual learning-based online tuning methods in the online scenario with different QoE and training time tradeoffs

Adaptive 360 Video Streaming

Jul. 2019 – Aug. 2020

Shanghai Jiao Tong University

Shanghai, China

- Proposed an optimization-based cross-layer design for 360 video streaming to maximize video quality and reduce rebuffering time via bitrate adaptation at each GOP and transmission adaptation at each slot
- Proposed and implemented a robust adaptive bitrate algorithm to cope with viewport prediction errors

Industrial Experience

DPVR Co., Ltd

Apr. 2018 – May 2019

Software Engineer Intern @ Graphic Team, mentor: Ziyi Xu

Shanghai, China

- Designed and implemented a deep learning algorithm to predict users' calorie consumption by the traces of their headsets and controllers
- Developed a commercial application to display the dynamic and static calorie consumption for VR users

Publications

Conference

- **Lingzhi Zhao**, Ying Cui, Yuhang jia, Yunfei Zhang, and Klara Nahrstedt, “Enhancing Neural Adaptive Wireless Video Streaming via Lower-Layer Information Exposure,” submitted to *IEEE ICC*, 2024.
- **Lingzhi Zhao**, Qian Zhou, Bo Chen, and Klara Nahrstedt, “360LiveCast: Viewport-aware Multicast for Live 360 Video,” submitted to *IEEE INFOCOM*, 2024.
- **Lingzhi Zhao**, Ying Cui, Sheng Yang, Shlomo Shamai (Shitz), Yunbo Han, and Yunfei Zhang, “Rate Splitting for General Multicast,” *IEEE ICC*, 2022.
- **Lingzhi Zhao**, Ying Cui, Chengjun Guo, and Zhi Liu, “Optimal Streaming of 360 VR Videos with Perfect, Imperfect and Unknown FoV Viewing Probabilities,” *IEEE GLOBECOM*, 2020.[\[pdf\]](#)

Journal

- **Lingzhi Zhao**, Ying Cui, Yuhang jia, Yunfei Zhang, and Klara Nahrstedt, “Enhancing Neural Adaptive Wireless Video Streaming via Lower-Layer Information Exposure and Online Tuning,” *IEEE Trans. Multimedia*, under review.
- **Lingzhi Zhao**, Ying Cui, Zhi Liu, Yunfei Zhang, and Sheng Yang, “Adaptive Streaming of 360 Videos with Perfect, Imperfect, and Unknown FoV Viewing Probabilities in Wireless Networks,” *IEEE Trans. Image Process.*, 2021.[\[pdf\]](#)
- **Lingzhi Zhao**, Ying Cui, Sheng Yang, and Shlomo Shamai (Shitz), “An Optimization Framework for General Rate Splitting for General Multicast,” *IEEE Trans. Wireless Commun.*, 2022.
- Chengjun Guo, **Lingzhi Zhao**, Ying Cui, Zhi Liu and Derrick Wing Kwan, “Power-Efficient Wireless Streaming of Multi-Quality Tiled 360 VR Video in MIMO-OFDMA Systems,” *IEEE Trans. Wireless Commun.*, 2021.[\[pdf\]](#)

Technical Skills

Languages: Python, Matlab, C/C++ (ranked by proficiency)

Tools: ffmpeg, Kvazaar, DASH, L^AT_EX, VS Code, Git

Awards

SJTU Outstanding Scholarship

2020,2021

SHU Outstanding Scholarship

2016,2017,2018

Teaching and Services

TA, EE372 : **Computing and Communication Theory**

Sep. 2021 – Jan. 2022

TA, ICE7301H, ICE7302H : **Convex Optimization**

Sep. 2020 – Jan. 2021

Reviewer for IEEE Trans. Wireless Commun., IEEE Trans. Commun., ACM MobiHoc, IEEE PIMRC