Lingzhi Zhao

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Research Interests

Adaptive Video Streaming, Immersive Video Communication, Multimedia Networking

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

Live 360 Video Multicast **Aug. 2022 – Jul. 2023**
University of Illinois Urbana-Champaign *USA*

- Proposed a viewport-aware multicast framework for live 360 video, 360LiveCast, which introduced new node capabilities to provide viewport-related service
  - 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 using lower-layer information, deriving a rigorous training method and adopting online tuning
  - Modeled the impacts of lower-layer information in adaptive video streaming problem, allowing a flexible tradeoff between QoE and costs for obtaining system information
  - Proposed an enhanced A3C method which jointly trains the policy and value networks and improves convergence speed and performance in the offline scenario
  - 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

- **Lingzhi Zhao**, Qian Zhou, Bo Chen, and Klara Nahrstedt, "360LiveCast: Viewport-aware Multicast for Live 360 Video," *IEEE INFOCOM*, 2024, under review.
- **Lingzhi Zhao**, Ying Cui, Zhi Liu, Yunfei Zhang, and Sheng Yang, "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]
- 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]
- **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.
- **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]
- **Lingzhi Zhao**, Ying Cui, Sheng Yang, Shlomo Shamai (Shitz), Yunbo Han, and Yunfei Zhang,"Rate Splitting for General Multicast," *IEEE ICC*, 2022.

Technical Skills

Languages: Python, Matlab, C/C++, HTML/XML (ranked by proficiency)
Tools: ffmpeg, Kvazzar, DASH, LaTeX, 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