

# Wen Hu

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Lab of Multimedia and Networking, Tsinghua University

## Education

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**Department of Computer Science, Tsinghua University, Beijing, China**

*Ph.D. Candidate, Advisor: Prof. Lifeng Sun.*

2012–2017

**School of Computer Engineering, Nanyang Technological University, Singapore**

*Visiting student, Advisor: Prof. Yonggang Wen.*

2015–2016

**School of Computer Science and Technology, Xidian University, Xi'an, China**

*Bachelor, GPA: 94.7/100, Rank: 4/478.*

2008–2012

## Projects

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**Video Prefetching**, research project.

2015–2016

- Algorithm: Online determine how many and which content items should be prefetched with the reinforcement learning algorithm to strike a balance between the increased prefetching/storage cost incurred by incorrect prediction and the reduced content download delay because of successful prediction (C/C++).
- Results: 70% cost saving with a high precision and hit ratio (80%).

**Overlay Path Construction**, research project.

2014–2015

- Algorithm: Select WebRTC-powered browsers by taking the failure randomness and clients' diversity into account to relay the failed web requests (C/C++ & Javascript).
- Results: 60% successful download ratio improvement in the case of regional CDN server outage.

**Wi-Fi AP Organization**, research project.

2014–2015

- Algorithm: Partition APs into Voronoi-like cells to balance the trade-off between the increased replication costs and the improved QoE, and replicate content ahead of users' requests to offload peak traffic (C/C++ & Python).
- Results: 27% server load reduction and 40% quality of experience improvement.

**RTT Prediction**, research project.

2013–2014

- Algorithm: Predict RTT with a hybrid learning- and model-based prediction approach: for larger geographical distance, predict RTT by training a decision tree; for shorter distance, predict RTT by composing the network path (C/C++).
- Results: 90% of the predictions error are less than 10 ms.

**TCP Optimization**, research project.

2013–2014

- Algorithm: Increase the initial CWND window size to reduce the delivery time and utilize virtual multi-connections to improve the network utilization (C/C++).
- Results: 5% improvement under the Tencent telecommunication environment.

## Research Interests

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### Data-driven Multimedia Content Delivery

- Edge-assisted content delivery.
- Overlay path construction.
- CDN server selection.

## Publications

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- [1]**Wen Hu**, Zhi Wang, and Lifeng Sun. Towards network-failure-tolerant web content delivery: A path-aware peer-assisted approach. In *IEEE Global Communications Conference (GLOBECOM)*, 2016.
- [2]**Wen Hu**, Zhi Wang, and Lifeng Sun. Characterizing tcp performance for chunk delivery in dash. In *Pacific-Rim Conference on Multimedia (PCM)*, 2016.
- [3]**Wen Hu**, Zhi Wang, and Lifeng Sun. Guyot: a hybrid learning- and model-based rtt predictive approach. In *IEEE International Conference on Communications (ICC)*, 2015.
- [4]**Wen Hu**, Zhi Wang, and Lifeng Sun. Path-aware peer-assisted web content delivery against network failures. In *IEEE/ACM International Symposium on Quality and Service (IWQoS)*, 2015.
- [5]**Wen Hu**, Zhi Wang, Ming Ma, and Lifeng Sun. Edge video cdn: A wi-fi content hotspot solution. In *Journal of Computer Science and Technology (JCST)*, (accept with minor revision).
- [6]**Wen Hu**, Yichao Jin, Yonggang Wen, Zhi Wang, and Lifeng Sun. Towards wi-fi ap-assisted content prefetching for on-demand tv series: A learning-based approach. (submitted to *IEEE Transactions on Circuits and Systems for Video Technology (TCSVT)*).
- [7]**Wen Hu**, Zhi Wang, and Lifeng Sun. Towards reliable web content delivery against network failures: A path-aware peer-assisted approach. (submitted to *IEEE Transactions on Network and Service Management (TNSM)*).

## Patents

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- Zhi Wang, **Wen Hu**, and Lifeng Sun. A Layered RTT Prediction Method, ZL201510293578.5, 2016.
- Zhi Wang, **Wen Hu**, and Lifeng Sun. A Wi-Fi AP based Content Delivery Method, 201510897619.1, 2016.

## Selected Honors

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- First Class Guanghua Scholarship, Tsinghua University, 2015.
- Outstanding Graduate Award, Xidian University, 2012 (top 1%).
- National Scholarship, Xidian University, 2009, 2011 (top 1%).
- Third Prize in the National Undergraduate Electronic Design Contest, 2011.
- Third Prize in the National English Competition for College Students, 2011.
- First Prize in the Programming Contest, Xidian University, 2010 (top 5%).

## Languages and Skills

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- C/C++, Shell script, Python, Matlab.
- Linux, Visual Studio, Latex, Vim.