Qinghua Ding

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Education

- **Tsinghua University** — Beijing,China
  Bachelor of Science in Computer Science; GPA: 85/100 — *Jun 2019 (expected)*
- **The Chinese University of Hong Kong** — Shatin,HK
  Visiting student in IE Dept, hosted by Prof. Jianwei Huang. — *Jan - May 2017*
- **Singapore University of Technology and Design** — Singapore
  Visiting student in ESD Pillar, hosted by Prof. Lingjie Duan. — *Aug - Nov 2017*

Research Interests

- Non-convex Optimization, Machine/Deep Learning.

Experience

These are selected research projects concerned about machine, deep and reinforcement learning. My previous research in computer network is skipped, and please refer to my former publications for details.

- **ITCS Lab, THU** — Jian Li
  The Theory of Non-convex Optimization — *Mar 2018 - present*
  - **TBD**: Traditional optimization scheme in training neural network is usually based on SGD or its variants, however, the convergence rate as well as the variance need to be well controlled. Many research has concentrated in this area recently. We're also considering about algorithms with better theoretical guarantees for the non-convex optimization.
- **NLP Lab, THU** — Minlie Huang
  Hierarchical Reinforcement Learning in Text Summarization — *Nov 2017 - Jan 2018*
  - **SumHRL**: The SumHRL uses a hierarchical reinforcement learning (HRL) method for text simplification problems. The network we proposed features a "Word2Vec-LSTM-RL" structure. We used classical reinforcement learning method for sentence selection and deep reinforcement learning for sentence summarization. SumHRL is comparable to the state-of-art method on ROUGE scores over NYT Dataset.
- **CMCL Lab, CMU** — Srinivasan Seshan
  Mechanism Design in Content Delivery Network — *Jun - Sept 2017*
  - **VDX**: The VDX is a double auction platform which is operated by the third party (e.g., Conviva) who coordinates between the content delivery operators and the content providers. It breaks the network bottleneck by aggregating the content requests and auctioning the delivery tasks. In this way, it releases the power of multi-CDN for content delivery and greatly improves the video streaming performance.
- **NetMan Lab, THU** — Dan Pei
  Reinforcement Learning in Network Systems — *May - Nov 2017*
  - **iTCP**: Our iTCP uses a reinforcement learning based method for TCP initial window selection. It first uses clustering algorithm for grouping clients based on the features of their requests. Then iTCP uses sliding window UCB to balance the exploitation and exploration for selecting the window size in each user group. Our method improved the network performance (rtt+latency) by 10% in online tests at Baidu's datacenters.

DL Projects

- **Understanding Human Activity via Pose Estimation**, Course Project at the CUHK.
- **Using Transfer Learning in Predicting Felidae Size**, implemented using VGG16, github@DevonQH.

(Former) Publications

The following works are done when I was interested in optimization and control in networks, mechanism design and computer-aided building construction.

- Competitive Analysis of Data Sponsoring and Edge Caching for Mobile Video Streaming,
  Haitian Pang, Lin Gao, **Qinghua Ding**, Jiangchuan Liu, Lifeng Sun, *NOSSDAV* 2018.
- Location Dependent Pricing in Edge Caching Market with Non-uniform Popularity,
  Qinghua Ding, Haitian Pang, Lifeng Sun, *ICC* 2018.
- Image-and-Skeleton-Based Parameterized Approach to Real-Time Identification of Construction Workers Unsafe Behaviors,
  Hongling Guo, Yantao Yu, **Qinghua Ding**, Martin Skitmore, *Journal of Construction Engineering and Management*, 2018, **IF: 1.735**.
- When Data Sponsoring Meets Edge Caching: A Game-Theoretic Analysis,
  Haitian Pang, Lin Gao, **Qinghua Ding**, Lifeng Sun, *Globecom* 2017.
- SAM: Cache space allocation in collaborative edge-caching network,
  Qinghua Ding, Haitian Pang, Lifeng Sun, *ICC* 2017.
- First Mile in Crowdsourced Live Streaming: A Content Harvest Network Approach,
  Haitian Pang, Zhi Wang, Chen Yan, **Qinghua Ding**, Lifeng Sun, Thematics Workshop, *Multimedia* 2017.
- An experimental study of real-time identification of construction workers' unsafe behaviors,
  Hongling Guo, Yantao Yu, **Qinghua Ding**, Martin Skitmore, *Automation in Construction*, 2017, **IF: 2.919**.

Misc

The following works are those that I joined in system implementation or algorithm design. I was acknowledged in some of these descent works.

- Reducing Web Latency through Dynamically Setting TCP Initial Window with Reinforcement Learning,
  Xiaohui Nie, Youjian Zhao, Guo Chen, Kaixin Sui, Dan Pei, *IWQoS* 2018.
- Redesigning CDN-Broker Interactions for Improved Content Delivery.
  Matthew K. Mukerjee, Ilker Nadi Bozkurt, Devdeep Ray, Bruce Maggs, Srinivasan Seshan, Hui Zhang, *CoNext* 2017, **Best Paper Award**.

Skills

- **Knowledge** Non-Convex Optimization, Computational Learning Theory, Reinforcement/Machine/Deep Learning, Game Theory and Mathematical Economics.
- **Languages** Python, C, C++, Tensorflow (CNN, RNN, DQN)
- **Toefl** 30/30 (Reading), 28/30 (Listening), 20/30 (Speaking), 28/30 (Writing)
- **GRE** 170/170 (Quantitative), 150/170 (Verbal), 3.0 (Writing)

Lectures Taken & Books Read

- **ELEG5491 Introduction to Deep Learning**: Instructor - Xiaogang Wang, **Graduate Course** at the CUHK.
- **ENGG5104 Image Processing and Computer Vision**: Instructor - Jiaya Jia, **Graduate Course** at the CUHK.
- **Introductory Lessons on Convex Optimization**: Very nicely written book by Yurri Nesterov.
- **Convex Analysis and Monotone Operator Theory in Hilbert Space**: Quite mathematical book of Heinz H. Bauscheke and Patrick L. Combettes.

Honors

- **National Endeavorship**: Tsinghua University, 2017.
- **Hengda Inspirational Scholarship**: Tsinghua University, 2017
- **Silver Medal for Social Practice**: Team leader, Computer Science and Technology Department, 2016.