Chuan Jiang

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Education

Purdue University **Aug 2016 – Present**
Ph.D. in Computer Engineering, ECE *West Lafayette, IN*

Shanghai Jiaotong University **Aug 2012 – June 2016**
Bachelor of Science in Engineering, ACM Honored Class *Shanghai, China*

Work Experience

Facebook **June 2019 – Aug 2019**
Software Development Engineer Intern (Mentor: Dr. Ying Zhang) *Menlo Park, CA*

- Developed a set of tools to statistically analyze a system for diagnosing network incidents.
- Tuned the system's parameters using statistical information and improved the accuracy of network incident diagnosis.
- Implemented a tool using machine learning techniques to identify false incident alarms.

Facebook **June 2018 – Aug 2018**
Software Development Engineer Intern (Mentor: Dr. Dexter Cao) *Menlo Park, CA*

- Designed and implemented a new dispatching pipeline in the network monitoring system to realize push-based collection for monitoring tasks.
- Implemented locality preference in the dispatching pipeline to reduce latency for processing tasks.
- Implemented access control in the backend to avoid overloading.

Microsoft Research Asia **Aug 2015 – Feb 2016**
Research Intern (Mentor: Dr. Qiang Huo) *Beijing, China*

- Proposed and implemented an algorithm to perform stroke analysis for texts in images.
- Used stroke analysis to identify text baselines in images to improve the precision of text recognition.

Research Experience

FloMore: Designing routing to minimize flow loss at desired percentiles. **Feb 2020 – Present**
Advisor: Prof. Sanjay Rao and Prof. Mohit Tawarmalani *Purdue, West Lafayette, IN*

- Reduced flow loss at desired percentiles by exploiting that different flows could meet their bandwidth requirements over different sets of failure states.
- Proposed and implemented a decomposition algorithm to reduce solving time from hours to tens of seconds for large networks.
- Implemented and evaluated multiple TE schemes including Teavar, SMore and SWAN on a multi-node CloudLab testbed emulating a cloud WAN using a distributed version of Mininet and Open vSwitch
- Experimented on 20 real topologies to show significant improvement over the state-of-the-art including Teavar, SMORE and SWAN.

PCF: Resilient Routing with Worst-case Guarantees **Dec 2018 - Aug 2020**
Advisor: Prof. Sanjay Rao and Prof. Mohit Tawarmalani *Purdue, West Lafayette, IN*

- Proposed a set of novel resilient routing schemes to enhance the flexibility of network response while ensuring that the performance under failure can be tractably modeled using formal optimization method.
- Provided theoretical results on benefits over Microsoft's FFC (state-of-the-art), and feasibility of implementation.
- Implemented solvers of various routing schemes including FFC and PCF's variants.
- Showed by experiments that PCF can sustain higher throughput than FFC by a factor of 1.11X to 1.5X on average across 21 topologies.

Lancet: Designing network for pruned failure sets **Feb 2018 – July 2019**
Advisor: Prof. Sanjay Rao and Prof. Mohit Tawarmalani *Purdue, West Lafayette, IN*

- Codeveloped a divide-and-conquer algorithm to efficiently identify failure scenarios that the network can handle, in order to meet probability requirements rather than worst-case requirements.
- Designed a protection routing and proved the correctness of a distributed implementation for it.
- Extended the scheme to support multiple traffic classes.

Nutshell: Proxy-Assisted Browsing in Cellular Networks **Dec 2016 – Oct 2017**
Advisor: Prof. Sanjay Rao *Purdue, West Lafayette, IN*

- Evaluated proxy-based redundant execution for low latency mobile pages.
- Reduced work load at proxies and analyzed the throughput and latency results.

Publications

1. **Chuan Jiang**, Sanjay Rao, and Mohit Tawarmalani. "FloMore: Meeting bandwidth requirements of flows", ArXiv, abs/2108.03221, 2021. (Substantially revised paper under anonymous submission)
2. **Chuan Jiang**, Sanjay Rao, and Mohit Tawarmalani. "PCF: Provably Resilient Flexible Routing", pp. 139-153, **ACM SIGCOMM**, 2020. (Acceptance rate: 53/250 = 21.2%)
3. Yiyang Chang, **Chuan Jiang**, Ashish Chandra, Sanjay Rao, Mohit Tawarmalani. "Lancet: Better network resilience by designing for pruned failure sets", pp.1-26, **ACM SIGMETRICS**, 2020. (Acceptance rate: 55/279 = 19.7%)
4. Yanjun Wang, **Chuan Jiang**, Xiaokang Qiu, Sanjay G. Rao. "Learning Network Design Objectives Using A Program Synthesis Approach", pp. 69-76, **HotNets**, 2019. (Acceptance rate: 20/98 = 20.4%)
5. Ashiwan Sivakumar, **Chuan Jiang**, Yun Seong Nam, Shankaranarayanan P N, Vijay Gopalakrishnan, Sanjay Rao, Subhabrata Sen, Mithuna Thottethodi, Vijaykumar T.N. "NutShell: Scalable Whittled Proxy Execution for Low-Latency Web over Cellular Networks", pp. 448–461, **ACM MOBICOM**, 2017. (Acceptance rate: 35/186 = 18.8%)

Languages & Technical Skills

Computer Languages: C/C++, Python, Java
Database: MySQL
Tools: Gurobi, Matlab, Scikit-learn
SDN: Mininet, Open vSwitch

Honors and Awards

Anthony T. C. Gaw Fellowship, Purdue University **2021**
Undergraduate Excellence Scholarship of Shanghai Jiaotong University **2014**