JUNCHENG GU

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RESEARCH INTERESTS

I am broadly interested in computer systems and networking, especially in operating systems, virtualization, and resource management. I used to work on memory disaggregation over low-latency networks for rack-scale computing. My recent focus is system support for deep learning applications.

EDUCATION

Ph.D. candidate in Computer Science and Engineering   Sep 2015 - Aug 2021 (Expected)
University of Michigan, Ann Arbor, MI, USA
Advisors: Prof. Kang G. Shin, and Prof. Mosharaf Chowdhury

M.S. in Electrical and Computer Engineering   Aug 2013 - May 2015
University of Florida, Gainesville, FL, USA

B.S. in Electronic Information Science and Technology   Sep 2009 - Jun 2013
Central South University, Changsha, Hunan, China

PUBLICATIONS

CONFERENCE

[C1] Haizhong Zheng, Ziqi Zhang, **Juncheng Gu**, Honglak Lee, Atul Prakash. Efficient Adversarial Training with Transferable Adversarial Examples. In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR'20)*, June 2020

[C2] **Juncheng Gu**, Mosharaf Chowdhury, Kang G. Shin, Yibo Zhu, Myeongjae Jeon, Junjie Qian, Hongqiang Liu, Chuanxiong Guo. Tiresias: A GPU Cluster Manager for Distributed Deep Learning. In *Proceedings of* 16*th USENIX Symposium on Networked Systems Design and Implementation (NSDI'19)*, February 2019

[C3] **Juncheng Gu**, Youngmoon Lee, Yiwen Zhang, Mosharaf Chowdhury, Kang G. Shin. Efficient Memory Disaggregation with Infiniswap. In *Proceedings of* 14*th USENIX Symposium on Networked Systems Design and Implementation (NSDI'17)*, March 2017

[C4] Chao Li, Longjun Liu, Yang Hu, **Juncheng Gu**, Mingcong Song, Xiaoyao Liang, Jingling Yuan, Tao Li. Towards Sustainable In-Situ Server Systems in the Big Data Era. In *Proceedings of ACM/IEEE* 42*nd Annual International Symposium on Computer Architecture (ISCA'15)*, June 2015

[C5] Longjun Liu, Chao Li, Hongbin Sun, Yang Hu, **Juncheng Gu**, Tao Li, Jingmin Xing, Nanning Zheng. HEB: Deploying and Managing Hybrid Energy Buffers for Improving Datacenter Efficiency and Economy. In *Proceedings of ACM/IEEE* 42*nd Annual International Symposium on Computer Architecture (ISCA'15)*, June 2015

[C6] Longjun Liu, Chao Li, Hongbin Sun, Yang Hu, **Juncheng Gu**, Tao Li. BAAT: Towards Dynamically Managing Battery Aging in Green Datacenters. In *Proceedings of* 45*th Annual IEEE/IFIP International Conference on Dependable Systems and Networks (DSN'15)*, June 2015

WORKSHOP

[W1] Yiwen Zhang, **Juncheng Gu**, Youngmoon Lee, Mosharaf Chowdhury, Kang G. Shin. Performance Isolation Anomalies in RDMA. In *Proceedings of the Workshop on Kernel-Bypass Networks (KBNets'17)*, August 2017

JOURNAL

[J1] **Juncheng Gu**, Youngmoon Lee, Yiwen Zhang, Mosharaf Chowdhury, Kang G. Shin. Decentralized Memory Disaggregation Over Low-Latency Networks. In *USENIX ;login:*, 42(4), Winter 2017

[J2] Chao Li, Yang Hu, **Juncheng Gu**, Jingling Yuan, Tao Li. Oasis: Scaling Out Datacenter Sustainably and Economically. In *IEEE Transactions on Parallel and Distributed Systems*, 28(7), July 2017

Academic Experience

Research Assistant, University of Michigan   Sep 2015 - Present

Explore resource management techniques for clusters by applying fast networks and novel algorithms.

- ***Information-agnostic GPU cluster manager for distributed deep learning (DDL) training*** [C2]

    1. Efficient information-agnostic scheduler with two-dimensional optimization and priority discretization.
    2. Smart job placement based on DL model structure captured by the RDMA network profiler.

- ***Efficient and de-centralized memory disaggregation System through RDMA networks*** [C3] [W1] [J1]

    1. Efficient and fault-tolerant remote memory paging through low-latency and kernel-bypass (RDMA) networks.
    2. De-centralized remote memory placement and eviction mechanism by leveraging the power of many choices.

Research Assistant, University of Florida   Aug 2013 - May 2015

- ***Exploring Energy Storage Device and Renewable Power Technologies in Green Datacenters*** (*Master Thesis*)

    1. Self-adaptive renewable-power and workload management algorithms for in-situ datacenters. [C4] [J2]
    2. Green and sustainable cloud computing using hybrid energy storage devices. [C5, C6]

Work Experience

Research Intern, Microsoft Research, Redmond, WA   May - Aug 2017

Mentored by Dr. Yibo Zhu, Dr. Hongqiang (Harry) Liu, and Dr. Chuanxiong Guo, in Mobility and Networking Research Group. Worked on profiling and optimizing (RDMA) network for distributed deep learning training [C2].

Honors and Awards

Graduate School

Departmental Fellowship (University of Michigan), 2015
Certificate of Outstanding Academic Achievement (University of Florida), 2014
Student Travel Grant: *ISCA*'15, *NSDI*'{17,19}, *SOSP*'17

College

Graduate with distinction among all college students in Hunan Province, 2013
Second Prize in Intel Embedded System Design Invitational Contest (ESDC), 2012
National College Student Scholarship of China, 2011
First-level Scholarship of Central South University, 2010, 2012

Programming Skills

C/C++, Python, Shell script, Java, MATLAB