Meng Wang

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Education

2018 - Present **University of Chicago**, Chicago, IL, USA
Ph.D. in Computer Sciences, GPA 3.97/4.00
Advisor: Prof. Haryadi S. Gunawi

2016 - 2017 **University of Chicago**, Chicago, IL, USA
M.S. in Computer Science, GPA 3.90/4.00

2012 - 2016 **Tsinghua University**, Beijing, China
B.E. in Industrial Engineering, GPA 88/100

Research Interests

Areas Operating and Storage Systems, Distributed and Cloud Systems, and Storage/Systems for Machine Learning.
Focuses Systems Dependability.

Work Experiences

Sep 2018 - Present **Research Assistant**, University of Chicago, Chicago, IL, USA
Working with Prof. Haryadi S. Gunawi in UCARE Group

Sep 2018 - Present **Teaching Assistant**, University of Chicago, Chicago, IL, USA
TA in Operating Systems, Intro to Computer Systems, Mobile Computing

Jun 2021 - Sep 2021 **Intern**, Seagate Technology LLC, Cupertino, CA, USA
Worked with Software Team

Jun 2020 - Sep 2020 **Intern**, Futurewei Technologies, Santa Clara, CA, USA
Worked with Software Team

Jun 2017 - Sep 2017 **Intern**, Google Inc, Mountain View, CA, USA
Worked in Adwords API Team

Dec 2015 - Jun 2016 **Undergraduate Research Asistant**, Tsinghua University, Beijing, China
Worked with Prof. Zhihai Zhang

Publications

Meng Wang, Cesar Stuardo, Daniar H. Kurniawan, Ray A. O. Sinurat and Haryadi S. Gunawi. **Layered Contention Mitigation for Cloud Storage**. In *The IEEE International Conference on Cloud Computing (CLOUD)*, 2022

Projects

Selected Research Projects

2018 - 2020 **Layered Contention Mitigation for Cloud Storage**

- My colleagues and I introduce an ecosystem of contention mitigation supports within the operating system, runtime and library layers. This ecosystem provides an end-to-end request abstraction that enables a uniform type of contention mitigation capabilities, namely request cancellation and delay prediction, that can be stackable together across multiple resource layers. Our evaluation shows that in our ecosystem, multi-resource storage applications are faster by 5-70% starting at 90P (the 90th percentile) compared to popular practices such as speculative execution and is only 3% slower on average compared to a best-case (no contention) scenario.
- As the project lead, my responsibilities included designing and implementing mitigation supports in the Linux OS layer against CPU contentions, helping with designs in other layers (memory layer against Garbage Collection contentions, library layer against lock contentions), integrating mitigation supports from all resource layers into MongoDB and Cassandra, evaluating performance using both microbenchmarks and macrobenchmarks.

Ongoing Research Projects

2020 - Present **HDD-optimized Storage for DNN Training** (In progress)

- My colleages and I analyzed on how input data pipeline affects deep learning training time. We proposed several optimization solutions to address the GPU underutilization due to IO delays. Our evlauation on Kubernetes clusters shows that our optimizations can improve deep learning training GPU utilization by up to 60%.
- As the project lead, my responsibilities included analysis of deep learning training data pipeline, design and development of the optimization solutions, and performance evaluation.

2022 - Present **Multi-level Erasure Coding in Hierarchical Clusters** (In progress)

- My colleages and I analyzed how Multi-level Erasure Coding (MLEC) performs in hierarchical clusters. We built a Markov Chain model to compute the durability of MLEC and other erasure approaches, and developed a simulator to evaluate the durability, availability, computation cost, and other metrics of MLEC and other erasure approaches.
- As the project lead, my responsibilities include designing and developing the simulator, verifying the math model, experimentation and general intellectual contributions to the overall design.

Selected Software Development Projects

2021 **Integrating Filecoin with CORTX Motr** *(Seagate Technology LLC)*

- Integrated Filecoin *(a storage-based Crypto)* with CORTX *(Seagate's open-souce distributed storage system)* via CORTX Motr *(CORTX's underlying block storage layer)*.

2018 **Evaluating different DNN quantization techniques**

- Studied different DNN quantization techniques including Binarized Neural networks, BMXNet, TFLite post-training quantization, TensorRT INT8/FP16.
- Evaluated accuracy loss and latency reduction of those quantization techniques.

2017 **Organizing team tasks in a better way** *(Google Inc.)*

- Developed an Java application to help Google API team better organize team tasks.
- The app collects task-related data from remote server, analyzes data and visualizes analysis results.

2017 **GetTable, an Restaurant Reservation Web App**

- Developed GetTable, a web-based application where users can search restaurants, make reservations and share reviews.
- Built backend server and database using Ruby on Rails.

2017 **Scalable Cloud Computing Web App Based on AWS**

- Deployed a Python web application for users to submit computing tasks.
- Implemented a load balancer with health check to auto scale the web servers running on Amazon EC2.
- Used MySQL for user authentication, DynamoDB for task metadata storage, Amazon S3 for inputs and outputs storage, and Amazon Glacier to archive data.

2017 **EZPlan, an iOS Calendar App**
- Developed an iOS Calendar app for users to schedule events and receive reminders.
- Integrated MapKit and OpenWeatherMap API to collect and display location and weather information.
- Integrated Google Maps and Google Places API for travel route recommendations.

Awards and Honors

2022 **University Unrestricted (UU) Fellowship**, University of Chicago

2015 **Third Prize in 33rd Tsinghua Challenge Cup Research Contest**, Tsinghua University

2013 **Tsinghua Outstanding Student Scholarship (top 5%)**, Tsinghua University

Courseworks

PL & Algo	C++ Programming, Advanced Programming, Data Structures and Algorithms
Systems	Intro to Computer Systems, Operating Systems, Networks
Mobile/Web Dev	iOS Development, Web Development, Advanced Web Development
Big Data	Databases, Cloud Computing, Big Data
ML	Machine Learning, Deep Learning Systems, Computer Architectures for Machine Learning

Technical Skills

Linux kernel	Hacking experience with `TCP stack, CPU scheduler`
Systems	Hacking experience with `MongoDB, Cassandra`
ML frameworks	`Keras, Tensorflow, Pytorch`
Programming	`C/C++, Java, Python, Ruby, Swift, Javascript, Bash, SQL`

Past Publications

Kanglin Liu, Meng Wang, Zhihai Zhang. **An Outer Approximation Algorithm for Capacitated Disassembly Scheduling Problem with Parts Commonality and Random Demand**. In *Large Scale Optimization in Supply Chains and Smart Manufacturing* (pp. 153-181). Springer, Cham, 2019

References

Haryadi S. Gunawi Associate Professor, Department of Computer Science, University of Chicago
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