Qianlin Liang

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EDUCATION

University of Massachusetts, Amherst, MA, USA

Ph.D in Computer Science Aug. 2018 – Present

- Research Direction: Distributed Systems for Artificial Intelligence, Edge Computing and Energy Informatics

M.S. in Computer Science Aug. 2018 – Dec. 2020

- Cumulative GPA: 3.94/4.00

The Pennsylvania State University, University Park, PA, USA

B.S.(Hons.) in Computer Science Aug. 2012 – May 2016

- Minor in Mathematics
- Thesis: A Study of Price and Capacity Trade-Offs of Replicating Computation on the Public Cloud
- Cumulative GPA: 3.91/4.00

ACADEMIC EXPERIENCE

University of Massachusetts, Amherst

Research Assistant in the Laboratory for Advanced Software Systems Aug. 2018 – Present

- Developed runtime system for energy-efficient execution of DNN-based IoT applications on shared edge accelerators
- Designed and implemented cluster resource management algorithms to intelligently manage multiple applications on edge accelerators while respecting their runtime SLOs
- Analyzed the architecture benefits and limitations of specialized edge accelerators when compare to traditional edge and cloud-based systems
- Explored distributed processing capabilities, such as split processing for deep learning models, of edge and cloud
- Designed and implemented carbon-efficient system for elastic ML training workloads

The Pennsylvania State University, University Park

Undergraduate Research Assistant in Computer Systems Lab May 2015 – May 2016

- Analyzed Amazon EC2 Spot market history price and developed statistic model to predict EC2 Spot market price
- Implemented controller to launch, terminate and run jobs on EC2 instances programactically
- Designed and implemented algorithm for EC2 users to lessen their cost while maintaining high reliability

INDUSTRY EXPERIENCE

Adobe Research

Research Scientist Intern May 2022 – Aug. 2022

- Designed and implemented an analytic system using a novel GNN-based approach to estimate DNN inference latency across various GPU resource allocations
- Evaluated the system and expressed results and findings in the form of a research paper

Shanghai Rajax Information Technology Co., Ltd

Data Scientist Aug. 2016 – May 2018

- Performed feature engineering to create features which improved forecast accuracy of various predictive models.
- Designed supply and demand pricing model to improve service quality during peak time
- Developed algorithms to cluster operating area and improve operating efficacy and efficiency

PUBLICATIONS

[1] **Qianlin Liang**, Walid Hanafy, Noman Bashir, David Irwin, Prashant Shenoy. Energy Time Fairness: Balancing Fair Allocation of Energy and Time for GPU Workloads, *under review at ACM/IEEE Symposium on Edge Computing (SEC)* 2023.

[2] Walid Hanafy, **Qianlin Liang**, Noman Bashir, David Irwin, Prashant Shenoy. CarbonScaler: Leveraging Cloud Workload Elasticity for Optimizing Carbon-Efficiency, *under review at ACM Special Interest Group on Measurement and Evaluation (SIGMETRICS), 2024.*

[3] **Qianlin Liang**, Walid A. Hanafy, Noman Bashir, Ahmed Ali-Eldin, David Irwin, Prashant Shenoy. Dělen: Enabling Flexible and Adaptive Model-serving for Multi-tenant Edge AI. In *Proceedings of IEEE/ACM Eighth International Conference on Internet-of-Things Design and Implementation (IoTDI), San Antonio May 2023*.

[4] Abel Souza, Noman Bashir, Jorge Murillo, Walid Hanafy, **Qianlin Liang**, David Irwin, Prashant Shenoy. Ecovisor: A Virtual Energy System for Carbon-Efficient Applications. In *Proceedings of the ACM Architectural Support for Programming Languages and Operating Systems (ASPLOS), Vancouver, Canada, March 2023.*

[5] **Qianlin Liang**, Walid A. Hanafy, Ahmed Ali-Eldin, Prashant Shenoy. Model-driven Cluster Resource Management for AI Workloads in Edge Clouds. In *ACM Transactions on Adaptive andAutonomous Systems (TAAS) Jan 2023.*

[6] **Qianlin Liang**, Prashant Shenoy, David Irwin. AI on the Edge: Rethinking AI-based IoT Applications Using Specialized Edge Architectures. In *Proceedings of IEEE International Symposium on Workload Characterization, October 2020.*

[7] Cheng Wang, Bhuvan Urgaonkar, Aayush Gupta, **Qianlin Liang**, and George Kesidis. Exploiting Spot and Burstable Instances for Improving the Cost-efficacy of In-Memory Caches on the Public Cloud. In *Proceedings of the European Conference on Computer Systems (EUROSYS 2017), Belgrade, Serbia, April 2017.*

[8] Cheng Wang, **Qianlin Liang**, and Bhuvan Urgaonkar. An Empirical Analysis of Amazon EC2 Spot Instance Features Affecting Cost-effective Resource Procurement. In *ACM/SPEC International Conference on Performance Engineering (ICPE 2017), L'Aquila, Italy, April 2017.*

[9] **Qianlin Liang**, Cheng Wang, and Bhuvan Urgaonkar. Spot Characterization: What are the Right Features to Model?. In *Proceedings of the First International Workshop on System Analytics and Characterization (SAC 2016), co-located with ACM SIGMETRICS 2016, Antibes Juan-les-pines, France, June 2016.*

TEACHING EXPERIENCE

University of Massachusetts Amherst – Teaching Assistant

- Reasoning Under Uncertainty (COMPSCI 240) — Spring 2020
- Introduction to Informatics (INFO 101) — Fall 2018

AWARDS

- The Evan Pugh Scholar Award, The Pennsylvania State University — 2015
  For undergraduate juniors and seniors who are in the upper 0.5 percent of their respective classes.
- The President Sparks Award, The Pennsylvania State University — 2014
  For earning a 4.00(A) cumulative grade point average based on at least 36 graded credits.
- The President's Freshman Award, The Pennsylvania State University — 2013
  For earning a 4.00(A) cumulative grade point average based on at least 12 graded credits.

SKILLS

- Programming: Python, C/C++, Java, JavaScript, HTML5, Matlab, Bash, LaTeX
- Data Science Framework: Tensorflow, Pytorch, Numpy, Pandas, Scipy, Sklearn
- Operating Systems: UNIX/Linux, OS X, Windows
- Cloud Computing: Docker, Kubernetes, AWS