Jianwei Hao

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CURRENT POSITION

University of Georgia Athens, GA
Ph.D., School of Computing 2018-6/2024

EDUCATION

University of Georgia Athens, GA
Ph.D. in Computer Science
Advisor: Dr. In Kee Kim

University of Chinese Academy of Sciences Beijing, CN
Master of Business Administration 2012-2015
Advisor: Dr. Zhihong Li

Wuhan Polytechnic University Wuhan, CN
Bachelor of Communication Engineering 2004-2008

AWARDS AND HONORS

GS Travel Award 2023
University of Georgia
Outstanding Graduate Student 2021
University of Georgia
GS Travel Award 2021
University of Georgia

TEACHING EXPERIENCE

Teaching Assistant, University of Georgia 2019-2020
Courses: CSCI6795, Spring, 2024, Cloud Computing
CSCI1300, Spring, 2024, Introduction to Programming
CSCI2610, Fall, 2020, Discrete Math
CSCI1302, Fall, 2019, Software Development

MENTORING EXPERIENCE

Mentoring research of Undergraduate and graduate students
Research project design, IoT/edge device operation, fieldwork protocol training, and data analysis

Graduate Students

Name	University	Project	Role	Time
Jaya Curry	University of Georgia	A Wetland Soil Organic Matter Sensor	Design and implement IoT sensing platform	2023 - 2024
Kevin Nyquist	University of Georgia	A Wetland Soil Organic Matter Sensor	Design and implement IoT sensing platform	2023 - 2024
Emmanuel Oni	University of Georgia	Dynamic Energy Scheduling	Data analysis for energy scheduler	2022 - 2023
Radhika Bhavsar	University of Georgia	VM startup times benchmark	Data collection and analysis from GCP	2019

Undergraduate Students

Name	University	Project	Role	Time
Connor Caddell	University of Georgia	Dynamic Energy Scheduling	Benchmark edge device	2022
Arushi Dhillon	Emory University	A Wetland Soil Organic Matter Sensor	Collect and analyze image data	2020

RESEARCH EXPERIENCE

University of Georgia Athens, GA
Graduate Researcher; Advisor: In Kee Kim 2022-2023
Dynamic Energy Scheduling for Energy Harvesting Environmental Sensors

- Designed a DC power gain estimator that can accurately predict DC power gain by combining lightweight predictors carefully determined by their accuracy, overhead, and power consumption. This prediction mechanism enables

solar-powered EH sensors to perform stable operations without external support from online weather forecasting services.

- Designed a scheduling algorithm that shows effective utilization of harvested energy for sensors. This algorithm dynamically adjusts the intervals and frequency of sensing operations, ensuring high energy efficiency and preserving sensing data quality.
- Performed a thorough simulation study to evaluate EH environmental sensors' operations. Our simulation study uses real-world public datasets as inputs, and the trustworthiness of the simulation is enhanced by incorporating actual measurement data of predictors and sensors. Various performance aspects were evaluated, including power gain prediction, operation times, and sensing frequency compared to baselines.

University of Georgia Athens, GA
Graduate Researcher; Advisor: In Kee Kim 2020-2021
AI multi-tenancy on edge: Concurrent deep learning model executions and dynamic model placements on edge devices

- Insights into deep learning (DL) Multi-Tenancy: The research delves into the benefits and challenges of multi-tenancy for DL applications at the edge, addressing the coexistence and scheduling of different DL tasks
- Introduced two innovative approaches: Concurrent Model Executions (CME) and Dynamic Model Placements (DMP). CME allows running multiple DL models on edge AI accelerators simultaneously, while DMP enables concurrent deployment and execution of DL models on various edge resources
- Maximizing Resource Utilization: The study emphasizes resource optimization, providing a roadmap for fully leveraging edge devices' capabilities through a balance of CME and DMP
- Flexible DL Application Deployment: Understanding efficient DL task deployment on edge devices opens the door to a wide range of applications, transcending domain boundaries

University of Georgia Athens, GA
Graduate Researcher; Advisor: In Kee Kim 2019-2020
Empirical analysis of VM startup times in public IaaS clouds

- Designed and executed a thorough measurement approach for VM startup times on AWS and GCP
- Quantitatively measured VM startup time with diverse configurations
- Found that GCP uses a caching mechanism to reduce VMs' startup time
- Quantified the VM startup times improvement by comparing it with other researchers' results

WORK EXPERIENCE

Honeywell Atlanta, GA
Software Engineer 2022
Software tools developer

- Built up a cloud service cost dashboard website for CEOs to monitor the cloud resource (VM, Kubernetes, DB, Serverless) cost of the enterprise.
- Built the backend with Django. REST APIs are developed to communicate with the frontend.
- Caching was implemented to cache the query data and database. The database is updated periodically by scraping the cloud provider's API.

Ericsson Beijing, China
Development Engineer 2008-2018
Development of air interface feature testing

- Scalability, reliability, and performance testing for Air Interface features on 3GPP standard systems 4G, 5G, and NBIoT.
- Managed network performance: parameter tuning, handover optimization, RRC/RAB KPIs, and frequency allocation to solve performance issues on 2G, 3G, and 4G.

PEER-REVIEWED PUBLICATIONS

[1] **J Hao**, E Oni, IK Kim, L Ramaswamy, "DynaES: Dynamic Energy Scheduling for Energy Harvesting Environmental Sensors," IEEE IPCCC, 2023

[2] **J Hao***, R Sharma*, MB Fleming, IK Kim, DR Mishra, SS Kim, LA Sutter, L Ramaswamy, "Toward Low-Cost and Sustainable IoT Systems for Soil Monitoring in Coastal Wetlands," IEEE CIC, 2023

[3] **J Hao***, P Subedi*, IK Kim, L Ramaswamy, "Reaching for the Sky: Maximizing Deep Learning Inference Throughput on Edge Devices with AI Multi-Tenancy," ACM TOIT, 2023

[4] **J Hao**, P Subedi, IK Kim, L Ramaswamy, "Characterizing Resource Heterogeneity in Edge Devices for Deep Learning Inferences," SNTA, 2021

[5] P Subedi, **J Hao**, IK Kim, L Ramaswamy, "AI multi-tenancy on edge: Concurrent deep learning model executions and dynamic model placements on edge devices," IEEE CLOUD, 2021

[6] **J Hao***, T Jiang*, W Wang, IK Kim "An empirical analysis of VM startup times in public IaaS clouds," IEEE CLOUD, 2021

*equal contribution

Non-PEER REVIEWED PUBLICATIONS

Hao, J.; Jiang, T.; Wang, W.; and Kim, I. K. 2021b. An Empirical Analysis of VM Startup Times in Public IaaS Clouds: An Extended Report. CoRR, abs/2107.03467.

INTERDISCIPLINARY PUBLICATIONS

[1] R. Sharma, **J. Hao**, M. Fleming, D. Mishra, I. K. Kim, S. Kim, L. Ramaswamy, L. Sutter. Low-Cost Sensors to Monitor Soil Organic Matter in Salt Marshes, GCE (Georgia Coastal Ecosystem) LTER Annual Meeting, January 2023.

[2] R. Sharma, **J. Hao**, D. Mishra, I. K. Kim, S. Kim, L. Ramaswamy, L. Sutter. Cyberinfrastructure to Monitor Soil Organic Matter in Salt Marshes of the Georgia Coast, NSF 2022 All Scientists' Meeting LTER (long term ecological research), Aug 2022. SitS PI Meeting'22

[3] R. Sharma, **J. Hao**, S. Kim, L. Ramaswamy, D. Mishra, I. K. Kim, L. Sutter. SitS AweSOMSense: Multi-modal Sensing and Analytics Framework for Modelling Belowground SOM in Salt Marsh Wetlands, Second Principal Investigators Workshop for Signals in the Soil (SitS), May 2022.

CONFERENCE PRESENTATIONS

[1] **J. Hao**. (2023) Toward Low-Cost and Sustainable IoT Systems for Soil Monitoring in Coastal Wetlands. IEEE CIC, Atlanta, GA

[2] **J. Hao**. (2023) DynaES: Dynamic Energy Scheduling for Energy Harvesting Environmental Sensors. IEEE IPCCC, Los Angeles, CA

[3] **J. Hao**. (2021) AI Multi-Tenancy on Edge: Concurrent Deep Learning Model Executions and Dynamic Model Placements on Edge Devices, IEEE CLOUD, Chicago, IL

[4] **J. Hao**. (2021) Characterizing Resource Heterogeneity in Edge Devices for Deep Learning Inferences, CSCI 6780 Distributed Computing Systems, Athens, GA

[5] **J. Hao**. (2021) AI Multi-Tenancy on Edge, CSCI 6795 Cloud Computing, Athens, GA