Mai Huong Do

Computer Science PhD Candidate | Performance & Energy Analysis of ML Workloads on Linux

Toulouse, France (open to opportunities in Europe and Asia)
huong.dm4597@gmail.com | huongdm1896.github.io | linkedin.com/in/huongmaido97

Profile

Computer Science PhD candidate (expected graduation: March 2027) specializing in performance and energy analysis of federated learning workloads in distributed systems. Over two years of experience deploying ML workloads on Linux-based hardware, developing an automation framework for distributed execution, collecting CPU/DRAM/GPU power measurements and system telemetry, and analyzing experimental data, with a strong focus on reproducible results. Earlier industry experience in R&D hardware testing and failure diagnosis, presenting results to international customers and headquarters.

Experience

PhD Researcher, IRIT – University of Toulouse Apr 2024 – Present
ANR DELIGHT project Toulouse, France

- **Automation framework (FedE-ator, open source):** Developed a framework to automate the deployment, execution, and monitoring of machine learning and federated learning experiments across multi-node Linux clusters (Grid'5000 Testbed, up to 100 nodes), including CPU/GPU energy monitoring.
- **Performance and energy monitoring:** Implemented distributed telemetry collection using MPI, integrating CPU/DRAM energy measurements (RAPL), GPU power monitoring (NVML), external power meters, and system metrics from procfs.
- **Hardware control:** Integrated CPU frequency scaling (Linux cpufreq), GPU clock management, and power-limit controls into the experimental workflow, and implemented custom CPU frequency adjustment mechanisms for DVFS policies.
- **Workload benchmarking:** Evaluated CNN workloads (LeNet-5, MobileNetV2, ResNet18/50) using Flower and FedScale (two FL frameworks) across different CPU/GPU frequencies, analyzing training performance and energy consumption.
- **Performance optimization:** Designed and implemented three Dynamic Voltage and Frequency Scaling (DVFS) policies for federated learning, evaluating energy-performance trade-offs and reducing client idle time between training rounds (paper submitted).
- **Teaching:** Teaching assistant at University of Toulouse, tutorials and lab sessions on MPI and concurrent programming.

Master's Researcher / Research Assistant, ANDA Lab – Soongsil University Aug 2021 – Jan 2024
IITP / MSIT-funded research Seoul, South Korea

- **System modeling and problem formulation:** Modeled mobile edge computing (MEC) federation systems for Industrial IoT and augmented reality (AR) applications, formulating resource allocation and task offloading problems with energy consumption and latency as optimization objectives.
- **Optimization algorithm design:** Formulated resource allocation and task offloading as Markov Decision Processes (MDPs), designing actor-critic-based deep reinforcement learning approaches using DDPG to optimize energy-delay trade-offs.
- **Simulation and implementation:** Implemented simulation frameworks in Python, defining system states, action spaces, reward functions, and optimization logic to evaluate the proposed algorithms under different system configurations.
- **AR workload optimization:** Extended the optimization approach to AR applications, modeling video frame chunking and task dependencies across multi-stage processing graphs to optimize computation offloading and resource allocation.

Earlier Industry Experience

Radio Unit (RU) System Engineer, VACE Antenna Co., Ltd. Jun 2020 – Aug 2021
R&D RU Systems Ha Nam, Vietnam

- Contributed to the initial development of a Radio Unit (RU) project within a newly established R&D team, including setting up hardware test stations and validation workflows.
- Performed hardware testing and failure diagnosis on fully assembled Radio Units, tracing issues to individual subsystems using spectrum analyzers, signal generators, power meters, and oscilloscopes. Developed a Python tool to quantify void-area percentages in X-ray images for PCB defect screening and rework decisions.

- Presented test results and design-to-measurement discrepancies in weekly technical reviews with customers and headquarters, supporting decisions on product readiness for mass production.

Technical Skills

Performance analysis & telemetry: Workload benchmarking and characterization; performance bottleneck and anomaly investigation; CPU/DRAM energy measurement (Intel RAPL); GPU power monitoring (NVIDIA NVML); external power meters; performance and energy trade-off analysis.
Linux systems & hardware control: Linux system interfaces (procfs, sysfs); CPU frequency scaling and DVFS; GPU clock and power-limit management; system telemetry and resource monitoring.
Automation & data analysis: Python, Bash; distributed experiment automation; workload execution and telemetry collection; log parsing; data analysis and visualization (NumPy, Matplotlib); statistical comparison; Git.
ML/AI workloads: PyTorch, TensorFlow; CNN architectures (ResNet18/50, MobileNetV2, LeNet-5); CUDA GPUs; federated learning frameworks (Flower, FedScale).
Distributed computing & infrastructure: Linux; multi-node CPU/GPU clusters (Grid'5000); OpenMPI; batch scheduling; Nix, Miniconda, Python virtual environments.
Hardware engineering background: Bachelor's degree in Electronics and Telecommunications; previous hands-on experience in RF hardware testing, debugging, and failure analysis (industry experience, 2020–2021).

Education

PhD in Computer Science Apr 2024 – Mar 2027 (expected)
University of Toulouse, France
Thesis: Exploring the tradeoffs between energy and performance of federated learning algorithms in distributed systems.

MSc in Information Communication Convergence Technology Aug 2021 – Jan 2024
Soongsil University, South Korea
Thesis: Energy–delay optimization in mobile edge computing federation systems.

BEng in Electronics and Telecommunications Sep 2015 – Oct 2020
Hanoi University of Science and Technology, Viet Nam
Thesis: Design of a microstrip antenna for GNSS applications with low noise figure and high gain.

Selected Publications & Open-Source Contributions

- Do, H. M., Poquet, M., & Da Costa, G. (2026). "FedE-ator: A Reproducible Framework for Studying Energy Consumption in Federated Learning Systems." PECS Workshop, Euro-Par 2026. [FedE-ator]
- Do, H. M., Poquet, M., & Da Costa, G. (2026). "Towards Sustainable Federated Learning: A Survey on Energy and Experimental Practices." *Sustainable Computing: Informatics and Systems*, 101471. [Survey artifact]
- Full list of publications (two IEEE Access articles and conference papers) on Google Scholar; and open-source contributions on GitHub.

Additional Information

Languages: Vietnamese (native), English (working proficiency), French (elementary, self-study)
Award: Best Undergraduate Graduation Project, Telecommunications Council, HUST (2020)

References

References available upon request.