Vineeth Gutta

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Research Interests

Interested in Machine Learning and High Performance Computing (HPC) with a focus on portability, scalbility, and performance of Deep Learning (DL) applications running on HPC systems

Technical Skills

Languages: Python, Java, React JS, Node JS, C++, Bash, SQL
Software and Tools: Git, Docker, PyTorch, TensorFlow, Scikit-Learn, Numpy, Pandas, ONNX, ONNX Runtime, REST, Eclipse, relational databases, NoSQL
High Performance Computing (HPC) software: Slurm, Singularity, Horovod, PyTorch Distributed Data Parallel, RAPIDS AI, DeepSpeed, AMD ROCm, GPU Profiling

Education

Doctor of Philosophy (PhD) in Computer Science (2019 – Present)
University of Delaware – Newark, DE
Advisor: Dr. Sunita Chandrasekaran
Cumulative GPA: 3.95
Expected: Fall 2024

Bachelor of Science in Computer Science (2015 – 2019)
University of Delaware – Newark, DE
Cumulative GPA: 3.43

Research Experience

Research assistant: Computational Research and Programming Lab

- Worked on a software to improve DL workloads to expand compatibility between DL frameworks and hardware architectures for improving training and inference performance using ONNX and ONNX Runtime.

Collaboration with National Cancer Institute (NCI)/ NIH/ DOE: (June 2021 – Present)

- Improving portability of applications like AMPL and CANDLE which leverage DL to automate key drug discovery steps and address cancer surveillance respectively
- Generalizing the capabilities of cancer drug discovery DL models by training on tumor-normal tissue datasets
- Developed a library for assessing the predictive efficacy of cancer drug response models across Convolutional Neural Networks (CNNs) and Gradient Boosted Tree models, particularly beneficial for tabular dataset problems.

PIConGPU Center for Accelerated Application Readiness (CAAR) (June 2023 – Present)

- Ported plasma-physics DL models to the Frontier exascale system at Oak Ridge National Lab (ORNL)
- Improved scalability and optimization of ML models on AMD MI250X GPUs with the ROCm software stack
- Optimized application by Profiling distributed training workloads using Omnitrace

PhD Intern- Pacific Northwest National Laboratory's Scalable Analytics and Decision Optimization group (June 2022 – August 2022)

- Created a proxy application for scalable Graph Neural Networks (GNNs)
- Created a workflow for sparse, distributed and scalable graphs in distributed memory using Louvain method

Teaching Experience

Graduate teaching assistant (Aug 2019 – May 2021)

- Intro to Data Mining: Guest lecture twice during the semester in addition to grading assignments for a course with undergraduate and graduate students
- Intro to Software Engineering: helped transition the course to remote format and implemented agile methodologies, such as code reviews, into the curriculum. Taught labs and lead a team of undergraduate and graduate Tas

Instructor (June 2020 – Aug 2020)

- Taught, CISC181, a course on object-oriented programming concepts to undergraduate students
- Developed a modified curriculum for fully remote course for summer semester

Publications

Journal publications

Gutta V, Ganakammal SR, Jones S, Beyers M, Chandrasekaran S (2024) UNNT: A novel Utility for comparing Neural Net and Tree-based models. PLOS Computational Biology 20(4): e1011504. https://doi.org/10.1371/journal.pcbi.1011504

Technical Reports

Oliver Perks, Chongxin, Jayson Falkner, Ricardo Jesus, Prakash Verma, Yueming Hao, Dolan Zhao, Iman Hosseini, John C. Linford, Rivershade, **Vineeth Gutta**, … Sean Fish. (2021). 2021 A-HUG Hackathon: Cloud Hackathon for Arm-based HPC (1.0). Zenodo. https://doi.org/10.5281/zenodo.5115938

Vineeth Gutta (2021). HiT: A framework for increasing portability of deep learning applications in HPC. GitHub. https://github.com/vgutta/vgutta/blob/main/Prelims.pdf

Invited Talks

2024 DARWIN Computing Symposium (University of Delaware)

DARWIN-driven Innovation: A Showcase of HPC research at Computational Research and Programming Lab

Service to Profession

Sub reviewer for IEEE Cluster 2021 (1 paper)
Sub review for Supercomputing 2024 (1 paper)

Honors / Awards:

Computer and Information Sciences Distinguished Graduate Student Award (2021)

Professional Memberships / Affiliations

ACM member since 2015