Ram Sharan Chaulagain

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Education

PhD & MSc in Computer Science Aug 2018 - May 2025
Florida State University, Tallahassee, FL *Advisor: Dr. Xin Yuan*

Bachelor's in Computer Engineering Jun 2012 - Jan 2017
Tribhuvan University, Nepal

Experiences

Research Assistant Aug, 2018 – Present
Florida State University, Tallahassee, FL

- Analyzed communication characteristics of HPC (Lammps, Nekbone, Milc) and Deep Learning (Cosmoflow) applications. Developed SDN-based adaptive routing schemes tailored to these communication patterns for the Dragonfly interconnect fabric, which avoids congested paths yielding higher throughput.
- Enhanced UGAL routing scheme improving the accuracy of the latency estimation for UGAL with local information showcasing proactive mitigation of the potential network congestion with imbalanced network traffic.
- Implemented collective communications, routing, topologies, and other network parameters to study HPC interconnect performance on the Booksim, CODES, and SST (interconnect simulators).

Research Intern May 2020 – Aug 2020
Argonne National Lab, Chicago, IL

- Designed a deep-learning-based routing algorithm matching existing theoretical routing (UGAL-G) with 6% improvement over the existing state-of-the-art UGAL-L routing algorithm for adversarial traffic pattern and published a research poster in Super Computing Conference 2020.

Research Intern May 2019 – Aug 2019
Argonne National Lab, Chicago, IL

- Developed a counter-based method using local router information for early detection of global link congestion before backpressure and researched congestion mitigation in Dragonfly topology using the CODES simulator.
- Contributed to a CODES interconnect simulator, enhancing the dragonfly-link-stat instrumentation file to log terminal-received packet latency.

Selected Publications

- **Chaulagain RS**, Mondol T, Bhowmik S, Yuan X. *"Exploiting Software-Defined Networking Technology for Improving UGAL Routing in Dragonfly Networks"* The 25th IEEE/ACM International Symposium on Cluster, Cloud and Internet Computing (CCGRID 2025)). 2025 (Accepted)
- **Chaulagain RS**, Yuan X. *"Enhanced UGAL Routing Schemes for Dragonfly Networks."* ACM International Conference on Supercomputing. 2024 May.
- **Chaulagain RS**, Liza FT, Chunduri S, Yuan X, Lang M. *"Achieving the Performance of Global Adaptive Routing using Local Information on Dragonfly through Deep Learning."* ACM/IEEE SC tech poster. 2020 Nov.

Programming Skills

Programming Languages: Python, C / C++

Parallel Programming Frameworks: POSIX Threads, OpenMP, MPI, CUDA, NCCL

Infrastructure Tools: Git, MySQL, Docker, Terraform

Others: PyTorch, TensorFlow, AWS, Linux scripting, MPI, OpenMP, Microcontroller programming, LaTeX, Netica

Selected Projects

- Developed and optimized a deep neural network from scratch in C/C++ for handwritten digit recognition, achieving high accuracy on the MNIST dataset; implemented loop optimizations, x86 vector extensions (SSE/AVX), OpenMP, MPI, and CUDA to significantly enhance execution time.
- Built and deployed a deep learning-based stock prediction application with LSTM model on AWS servers using Terraform.

Training and Tutorials

Tutorial: Efficient Distributed GPU Programming for Exascale, an SC/ISC Tutorial **(SC'24)**

Tutorial: Introduction to AI-driven Science on Supercomputers: A Student Training Series

Coursera Certifications: Fundamentals of Reinforcement learning