Nikhil Barhate

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Education

University of Colorado Boulder — Boulder, CO
Master of Science in Computer Science — *Aug 2022 – May 2024*

University of Mumbai — Mumbai, India
Bachelor of Technology in Electronics Engineering — *Sep 2017 – Jun 2021*

Experience

AMD — Longmont, CO
Machine Learning Intern — *May 2023 – Aug 2023*

- Designed and Implemented Machine Learning models to predict the most efficient CPU-GPU matrix partitioning for Sparse Matrix-Vector Multiplication (SpMV) on AMD MI250X AI accelerator
- The final method improved performance by 24% on a subset of test matrices on the rocSPARSE benchmark.
- Created and taught ML curriculum and tutorials on a Xilinx FPGA AI accelerator for a week-long bootcamp.
- Tech Stack: Python, C++, scikit-learn, PyTorch, StableBaselines3, ROCm, SLURM

Mila - Quebec AI Institute — Remote
Research Visitor — *Sep 2021 – May 2022*

- Advised by Anirudh Goyal and Professor Yoshua Bengio
- Research in memory retrieval and trajectory modeling for retrieval augmented reinforcement learning
- Implemented cross attention mechanisms to retrieve trajectory embeddings and incorporate retrieved information into an online reinforcement learning agent which resulted in improved training efficiency
- Tech Stack: Python, PyTorch, Singularity, SLURM

Indian Institute of Science — Remote
Research Intern — *Dec 2020 – Jun 2021*

- Advised by Jogendra Nath Kundu and Professor R. Venkatesh Babu
- Research in unsupervised domain adaptation for semantic segmentation in computer vision
- Developed methods to incorporate edge detection and domain confusion in Deeplab-v2 architecture to induce domain invariant features and explored Adversarial Domain Search methods for style transfer
- Tech Stack: Python, PyTorch, NumPy, OpenCV, Nvidia Docker, SLURM

Projects

Decision Transformer

- Implemented an offline Reinforcement Learning algorithm (Decision Transformer) from scratch and reproduced results on MuJoCo control environments using the D4RL dataset
- GitHub Link: github.com/nikhilbarhate99/min-decision-transformer

Hierarchical Actor Critic

- Implemented a Hierarchical goal-based Reinforcement Learning algorithm (Hierarchical Actor-Critic) in PyTorch and reproduced results on the Mountain Car and Pendulum OpenAI gym environment
- GitHub Link: github.com/nikhilbarhate99/Hierarchical-Actor-Critic-HAC-PyTorch

Proximal Policy Optimization

- Implemented clipped objective Proximal Policy Optimization reinforcement learning algorithm using PyTorch and reproduced results in OpenAI gym Roboschool environment
- GitHub Link: github.com/nikhilbarhate99/PPO-PyTorch

Technical Skills

Languages: Python, C++
Frameworks: PyTorch, NumPy, Keras, OpenCV, MPI, gRPC
Development Tools: Linux, Git, Docker, SLURM, Google Cloud Platform