Shubham Gupta

gupta.shubham@nyu.edu | +19176032850
https://www.linkedin.com/in/shubhamgupto/ | https://iamshubhamgupto.github.io

Machine Learning Engineer: Masters in Computer Engineering graduate from New York University and Climate Modelling Research Assistant. Extracurricular Computer Vision and DevOps lead. Three internships with experience in open-source contributions and working with PyTorch, TensorRT, Python, Docker, and Git.

Experience

M^{2}LInES, New York University — New York City, US
Climate Modeling Research Assistant | *Advisor: Dr. Laure Zanna* — *February 2023 – May 2024*

- Improving **ocean emulation** training pipeline on **NERSC Perlmutter** and **NYU HPC** for better GPU usage, faster I/O and efficient use of resources. Implementing efficient **seq2seq** architectures to compete with transformers.
- Optimized GPU performance by **30**% using Nsight systems to improve GPU usage and Distributed Data Parallel workers.
- Maintain code and data owned by M2LInES organization. Optimized code run time and website deployment. Created content for machine learning with Lorenz-96 climate model. **[Website]**

NYU RoboMaster: Ultraviolet — New York City, US
Computer Vision and DevOps Lead | *Mentor: Chris DiMauro* — *September 2022 – June 2024*

- Spearheaded **large scale HPC** experimentation for tuning quantized object detection models, including YOLOv8, YOLOv9, and RT-DETR. Successfully integrated with Kalman filters for motion prediction and **trajectory forecasting**.
- Established two-way data connections using UART, Ethernet protocol between devices including, Nvidia Jetson and Arduino.
- Compiled high-performance **ROS2 machine learning inference containers** for ARM64 Nvidia GPUs. Created infrastructure to deploy controls, communication, camera and inference microservices using **docker compose**.

Aruba, a Hewlett Packard Enterprise company — Bangalore, India
Software Development Intern — *January 2022 – July 2022*

- Developed **SpringBoot APIs** using ElasticSearch and Postgres data for IoT Operations, edge to cloud story.
- Designed and deployed monitoring dashboard for **150k** customer device statistics using ElasticSearch, Grafana and Python.

Indian Space Research Organization — Bangalore, India
Research Intern | *Advisor: Dr. Hebbar R* — *August 2019 – April 2020*

- **Published work** at the international conference of Computer Vision and Machine Intelligence (CVMI 2022).
- Demonstrated an automated **Sentinel-2** data pipeline with SnaPy and GDAL for water body detection, **eliminating** manual annotation. Tested on **DeeplabV3+** and a custom architecture for **near real time** water segmentation.

Technical Skills

Languages: Python3, Triton, C++, Java, SQL, Shell, Lucene, LaTeX
Libraries: PyTorch, Pytorch3D, Onnx, TensorRT, OpenCV, Scikit-learn, Numpy, Pandas, Numba, PyRealSense2, Flask, FFmpeg
Frameworks: ROS2 Humble, SpringBoot, Elasticsearch, Jekyll, Hugo, Jenkins, Kubernetes, CUDA, Nsight
Applications: HPC, AWS, GCP, Docker, Grafana, QGIS, Github, Jira, Confluence, Firebase, Postman, Lightroom, Blender
Certifications: Associate Cloud Engineer, Architecting with Google Compute Engine, 30 Days of Google Cloud

Education

New York University — New York City, US
Master of Science in Computer Engineering — 3.8/4.00

PES University — Bangalore, India
Bachelor of Technology in Computer Science and Engineering — 8.39/10.0

Publications

Dheeshjith, S., Subel, A., **Gupta, S.**, Adcroft, A., Fernandez-Granda, C., Busecke, J., & Zanna, L. (2024). Transfer Learning for Emulating Ocean Climate Variability across CO_2 forcing. arXiv preprint arXiv:2405.18585. **[preprint]** **[ICML Oral 2024]**

Lee, K., **Gupta, S.**, Kim, S., Makwana, B., Chen, C., & Feng, C. (2023). SO-NeRF: Active View Planning for NeRF using Surrogate Objectives. arXiv preprint arXiv:2312.03266. **[preprint]** **[code]**

Gupta, S., Uma, D., & Hebbar, R. (2023). Analysis and application of multispectral data for water segmentation using machine learning. In Computer Vision and Machine Intelligence: Proceedings of CVMI 2022 (pp. 709-718). Singapore: Springer Nature Singapore. **[preprint]** **[code]** **[publication]** **[slides]**

Projects

Cavemen: A prehistoric approach for Mapless Navigation | **[Website]** | *Python3, SIFT, FAISS, VBoW, Redis* — 2023

- Visual Place Recognition and navigation using only monocular input and classic visual features. **Top submission** for coursework Robot Perception ROB-GY 6203 Fall 2023. **[LinkedIn]**

LYCB: Leave Your Clothes Behind | **[Website]** | *HPC, Segment-Anything, COLMAP, Pytorch3D* — 2023

- Proof-of-Concept to capture real world clothes on hand held devices and create assets to be used in Blender or virtual try-ons.

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