

MALAV PATEL

Chicago, IL | malavpatel2022@u.northwestern.edu | (630) 359-1224

EDUCATION

Georgia Institute of Technology (Aug 2022 – Present); Atlanta, GA

MSc student Computer Science

PhD student Aerospace Engineering

Northwestern University (Sept 2018 – June 2022); Evanston, IL

Graduation Date: 06/15/2022

Bachelor of Science Mechanical Engineering with Aerospace Concentration

Bachelor of Arts Physics

Bachelor of Arts Integrated Science

Coursework: Linear Algebra, Statistics, Optimization, Deep Learning

Github: <https://github.com/Malav-P>

Undergraduate GPA: 3.99/4.0

SKILLS

Computer Skills/Programming Languages

- Python, C, C++, MATLAB, Julia
- Parallel Computing – CUDA
- Image Analysis – OpenCV
- Deep Learning – PyTorch

SELECTED PROJECTS, AWARDS AND ACHIEVEMENTS

Convolutional Neural Network | (December 2021-June 2022)

- From scratch, designed a library in C++ for the implementation of a convolutional neural network. Implemented trained model on MNIST dataset to 97.58% accuracy. Accelerated computations with BLAS routines
- Accelerated training 3x via GPU programming using CUDA.
- Interfaced built library with OpenCV to predict digits shown on a live video feed.

GPT2 (December 2023 – Present)

- Built OpenAI GPT2 from scratch in C++ as personal project. Optimized memory management via in-place memory transformations, KV-caching, inference optimizations. Strong understanding of Transformer model architecture.

Presidential Fellowship | (August 2022 – Present)

- Awarded \$5500 every academic year for being top 10% of incoming class.

Summer Undergraduate Research Grant | (June 2020 – Sept 2020) & (June 2021 – Sept 2021)

- 2-time recipient of Northwestern SURG worth \$3500 for research in soft matter systems.

EXPERIENCE

Space Systems Optimization Group (August 2022 -Present) - Graduate Research Assistant

- Utilizing/developing novel optimization schemes for satellite constellation design in cislunar space.
- Operations research (optimization)

Driscoll Physics Lab | (December 2019 – June 2021) - Undergraduate Researcher

- Modeled in SolidWorks and manufactured a device for stretching polystyrene particle embedded thin films
- Analyzed particle trajectories in a fluid using image processing package, trackpy, in python.

Chamberlain Group Internship | (June 2021 – September 2021)

- Used Tensorflow package to analyze data taken on production line gearboxes to determine production faults. Measurement of torque and power input into gearboxes over time used as input layer to deep learning network. Created model 88 percent accurate.

PUBLICATIONS

Cislunar Satellite Constellation Design via Integer Linear Programming - <https://doi.org/10.48550/arXiv.2311.10252>

Concurrent Optimization of Satellite Phasing and Tasking for Cislunar Space Situational Awareness