Pranshu Panda

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EDUCATION

B.S. Computer Science, University of Minnesota – Twin Cities **Expected May 2026**
GPA: 3.711 | Dean's List: Fall 2022, Fall 2024, Spring 2025, Fall 2025
Relevant Coursework: AI for Decision Making, Machine Learning Fundamentals, Natural Language Processing, Computational Robotics, Analysis of Numerical Algorithms, Operating Systems, Software Development, UI, Algorithms and Data Structures

SKILLS

Languages: Python, C, Java, OCaml, x86 Assembly, HTML/CSS, shell
AI/ML Concepts: Probabilistic Modelling, Uncertainty Quantification, Supervised/Unsupervised Learning, Transformers, LLMs
Libraries/Frameworks/Tools: PyTorch, GPyTorch, BoTorch, Scikit-learn, Pandas, Numpy, Matplotlib, Git, Threading

WORK EXPERIENCE

Undergraduate Teaching Assistant, University of Minnesota | Minneapolis, MN **Sept 2025 - Present**
- Leading weekly instructional lab sessions, office hours and grading assignments through a git workflow for 600+ students in conjunction with course staff for **CSCI2041 and CSCI2033: Computational Linear Algebra.**

Undergraduate Researcher, University of Minnesota | Minneapolis, MN **March 2025 - Present**
- Conducting research under Prof. Aryan Deshwal on probabilistic machine learning for experimental design and optimization over discrete spaces to accelerate scientific discovery, applied to molecule and protein design.
- Engineered **GPU-accelerated Bayesian Optimization pipelines** in **PyTorch** and **BoTorch**, implementing **mutation** and **population**-based **search algorithms** from scratch to improve exploration efficiency.
- Scaled estimation models and evaluations to **60-dimensional design spaces**, reducing runtime and improving convergence in large, discrete optimization problems.

Research Intern, Indian Institute of Technology Delhi (CSE) | Delhi, India **June 2024 - Sept 2024; Dec 2025 - Present**
- Designing and implementing a **PyTorch**-based Bayesian Optimization pipeline to tune cache management policy hyperparameters, improving system throughput via data-driven configuration search in a black-box setting.
- Developed a **Python** based visualization tool for multiprocessor-cache memory transactions, integrating queues, packet flow paths, and request service times from simulation traces to help debug and analyze CPU-memory traffic.

Software Engineering Intern, Stryker Corporation | Delhi, India **June 2023 - Aug 2023**
- Fine-tuned a **YOLOv7 object detection model** on a custom dataset for surgical equipment detection, achieving **>0.88 confidence** in operating-room environments for the Endoscopy R&D team.
- Refactored **UI resolution and cross-device responsiveness** for the OCULAN Surgical Light service tool; extended an audio dictionary application with clinical terminology.
- Worked with the Sustainability Solutions team on software and tooling supporting **reprocessing of single-use medical devices.**

RESEARCH AND PROJECTS

Fine-Tuning of Transformers with LoRA: A Comparative Study | Group Work **Nov 2025 - Dec 2025**
- Benchmarked Low-Rank Adaptation (LoRA) against full-model and head-only fine-tuning on SST-2 and IMDB; demonstrated that LoRA achieves superior accuracy on SST-2 (94.27% vs 93.81%) and parity on IMDB (~95.5%), validating PEFT as a robust alternative to computationally expensive full fine-tuning.

Shortest Paths for Trivially Partitioned Graphs | Group Work **Sept 2024 - Dec 2024**
- Optimized and analyzed Dijkstra's Algorithm and A* Search in **Python** using a hierarchical graph partitioning strategy, achieved up to a **52.7%** runtime reduction on large trivially partitioned graphs.

WINGS - University of Minnesota Rocket Team | Group Work **Sept 2023 - Dec 2024**
- Developed the third-generation custom ground station **WINGS** in conjunction with the Avionics software sub team, utilizing **Typescript, React and Uno CSS** to receive, process, visualize and store live data from a rocket.
- Rigorously tested the live telemetry through a serial port interface functionality by developing a custom telemetry simulator that sends and receives data with application programming interface calls to the Rust backend.

Audio Dictionary for the Visually Impaired | Individual Work **May 2023 - Aug 2023**
- Built a **Python**-based, voice-operated dictionary that scrapes definitions, converts them to MP3 audio, and uses a MySQL backend to cache repeated queries and store search history for faster retrieval.