Varun Panuganti

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portfolio: https://varunp3000.github.io

EDUCATION

University of Washington — Seattle, WA

B.S. ACMS: Data Science & Statistics; B.S. Informatics — *Sep 2023 – Jun 2027*

GPA: 3.77 | **Coursework:** CSE 416 (ML), CSE 373 (DS&A), Data Structures, Statistical & Scientific Computing, Data Science Foundations

EXPERIENCE

LLM Uncertainty Quantification (UQ) — Oct 2024 – Present
University of Washington — *Seattle, WA*

- Developing processes to integrate a chain of LLMs for data annotation, allowing users to input a set of prompts, select LLMs, and configure confidence thresholds and token limits.
- Developing an intuitive React web interface for file uploads using JavaScript, HTML, and CSS, enabling CSV file analysis.
- Implementing backend processes in Node.js (Express) and Python to manage API calls, LLM workflows, and confidence scoring.

Computer Science Instructor — Jul 2024 – Apr 2025
ICODE — *Sammamish, WA*

- Guided students in designing self-driving robots using VEX and sensors, culminating in a robot that consistently navigated a maze.
- Mentored K-12 students in game development with Python (Pygame) and Unreal Engine, helping them build a 90%-complete racing game with AI opponents and physics simulation.
- Instructed Java fundamentals (OOP, recursion, algorithms, and data structures), leading students to develop a Spring-based application for data processing and visualization.

COURSE PROJECTS

CSE 416 — CIFAR-10 Image Classification — PyTorch, CNNs, GPU — 2025

- Implemented CNNs (conv→ReLU→pool→dropout) with data augmentation and efficient DataLoaders.
- Trained on GPU with early stopping and LR scheduling; tracked train/val curves and performed error analysis on misclassifications.

CSE 416 — House Prices (Tabular ML) — scikit-learn, pandas — 2025

- Prepared data (imputation, encoding, scaling) and splits; established linear baselines and regularized models (Ridge/LASSO).
- Ran hyperparameter sweeps with validation curves; monitored RMSE to ensure generalization and prevent leakage.
- Interpreted coefficients and feature effects; summarized error sources and key failure modes with plots/tables.

STAT 534 — Bayesian Linear Models (Numerics) — C/C++, LAPACK/LAPACKE, GSL — 2025

- Computed closed-form log marginal likelihood for $[1 \mid A]$ via stable solves and log-determinants (all on the log scale).
- Validated against an R baseline on `erdata.txt` (n=158, p=51); reproduced check cases precisely.

STAT 534 — Logistic Regression Model Search (MC3) — R, AIC/BIC, MCMC — 2025

- Built forward/backward subset selection with robust `glm` wrappers (convergence/NA handling) on a 60-feature dataset.
- Implemented MC3 over add/remove-one neighbors with neighbor-count–corrected MH; compared best models across 10 chains.
- Filtered candidates with rcdd linearity tests to avoid separation/unreliable AIC; documented stability vs. greedy baselines.

CSE 373 — Shortest Paths Finder — Java, Graphs (Dijkstra/A*) — 2024

- Designed adjacency-list graphs and a binary-heap priority queue; implemented Dijkstra's and A* with admissible heuristics.
- Handled large graphs via careful PQ updates (reinsert for decrease-key) and parent-pointer reconstruction.
- Wrote JUnit edge-case tests; benchmarked densities and validated $O((V+E)\log V)$ runtime and memory behavior.

TECHNICAL SKILLS

Languages: Python, C/C++, Java, R, SQL, JavaScript/TypeScript, HTML/CSS
ML/AI: PyTorch, scikit-learn, pandas, NumPy, SciPy, Matplotlib, Jupyter
Stats/Numerics: BLAS, LAPACK/LAPACKE, GSL; optimization, log-sum-exp, numerical stability
Data/Systems: Git/GitHub, MPI; testing (JUnit/`pytest`), Linux CLI
Web: React, Node.js/Express, Flask