Aditya Rajan

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Education

University of Illinois at Urbana-Champaign August 2023 – May 2026
Bachelor of Science in Statistics & Computer Science, Minor in Mathematics *GPA: 3.93/4.00 (Dean's List Fall '24)*

Experience

Machine Learning Research Intern June 2025 – Present
IDiA Lab *University of Wisconsin-Madison*

- Developed ischemic stroke lesion segmentation algorithms using novel ML architectures like Swin transformers.
- Implemented preprocessing strategies for different MRI modalities (T1-weighted, FLAIR, DWI, etc.).
- Explored domain-agnostic MRI data augmentation approaches using physics-based generative ML models.

Undergraduate Researcher (Computational Genomics) January 2025 – Present
Alam Lab *University of Illinois at Urbana-Champaign*

- Conducted S. pneumoniae & S. aureus genome data analysis from High-Throughput Sequencing technologies.
- Designed large-scale data pipelines for prophage detection in 2000+ annotated genome samples.
- Developed novel transformer-based ML solutions to examine antimicrobial resistance and virulence in pathogenic bacteria.

Machine Learning Intern May 2024 – June 2024
Madhya Pradesh State Electronics Development Corporation *Bhopal, MP, India*

- Analyzed family registration data to integrate registration processes with the state government's Single Citizen Database (Samagra ID) for 24+ million registered citizens.
- Implemented video-based KYC for the ongoing Samagra e-KYC project using machine learning in Python.
- Automated state and national ID linking for state citizens, improving data processing efficiency.

Projects

CRISPR-Cas9 Off-Target Prediction | *Python – Scikit-learn, Pandas, NumPy etc.* January 2025 – Present

- Engineered a data analysis pipeline to process 340,000+ gRNA sequences, optimizing feature extraction for GC content, edit distance, etc.
- Achieved *98% accuracy and 0.96+ ROC-AUC scores* by developing predictive ML models (Logistic Regression, XGBoost, Transformer).
- Implemented sequence-to-numeric transformations (one-hot encoding) natively to retain critical sequence information.

Network Port Scanning CLI Tool | *Rust – Clap, Tokio* May 2024 – July 2024

- Developed a high-performance, nmap-like CLI tool to scan network ports (TCP, HTTP, etc.), enhancing diagnostic efficiency.
- Leveraged multithreading & asynchronous coding, achieving 30% faster scan times compared to traditional methods.
- Integrated robust logging and error-handling mechanisms, ensuring seamless UX and improved fault tolerance.

A* Search Algorithm Visualiser | *Python – Math, Pygame* August 2023 – September 2023

- Developed an interactive visualization tool for A* Search Pathfinding Algorithm in Python.
- Implemented A* Graph Traversal to find the Single-Source Shortest Path in a user-generated maze-like graph, with sub-second search times on average.
- Recorded mouse events & built responsive UI elements with the Pygame library.

Technical Skills

Languages: Java, Python, C/C++, PostgreSQL, Rust, R
Frameworks/Tools: Git, Docker, VSCode, Android Studio
Libraries: Tensorflow, scikit-learn, PyTorch, pandas, NumPy, Matplotlib