PRANAV BANSAL

Bellevue, WA, United States
425-279-3200 | pranav.bansal@stonybrook.edu | LinkedIn | GitHub | Portfolio

EDUCATION

STONY BROOK UNIVERSITY, New York *Aug 2023 – May 2025*
Masters in Computer Science ***GPA: 3.75/4***
Coursework: Operating System, Advanced Algorithms, Data Science Fundamentals, Simulation and Modeling, Algorithms Design

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY, India *Jul 2019 - June 2023*
Bachelor of Technology in Computer Science ***GPA: 3.7/4***
Coursework: Data Structure and Algorithms Design, **Distributed System**, Software Engineering, Compiler Design, Computer Architecture, Computer Network, Computer Graphics, Object-Oriented Programming, Database Management System

TECHNICAL SKILLS

- **Programming Languages**: C, C++, GO, HTML/CSS, JavaScript, Java, MATLAB, Python, Ruby, SQL/NoSQL
- **Database:** MySQL, PostgreSQL, Google BigQuery, MongoDB
- **Technologies:** AWS, CI/CD, Data Analytics, Django, Docker, ExplainableAI, Git, GraphQL Hadoop, Jenkins, Kafka, Kernel Programming, LLM, Microservices, Natural Language Processing, Node.js, RESTful API, and Spring Boot
- **Libraries:** TensorFlow, Keras, Pandas, Scikit-learn, NumPy, PySpark, PyTorch, Matplotlib, OpenCV, SciPy, NLTK

EXPERIENCE

Stony Brook University *Jan 2024 - June 2024*
Research Assistant - GenAI
- Engaged in Explainable AI research on Vision Transformers with **12 attention layers**, reducing model bias and adversarial prompting risks by **30%** through targeted interventions.
- Applied ML techniques (LogitLens, AttentionLens, and TunedLens) to identify the top classes within intermediate layers and Generated heatmaps using Layer-wise Relevance Propagation (LRP), improving model **interpretability by 25%**
- Increased model transparency and reduced adversarial vulnerabilities by **35% through** systematic bias detection, verified using tests like the SHAP score, adversarial robustness tests, and fairness metrics

Brysk *Nov 2021 - May 2023*
Software Developer Intern – Big Data
Brysk, worth $3M, develops an AI-based grocery retail platform for autonomous checkout stores.
- Engineered **ETL** Data Pipelines using Google BigQuery, Teradata and Amazon S3, to generate data warehouse, later produced interactive dashboards for retail store inventory and sales reports, reducing manual effort by **4 hours**.
- Optimized already existing ETL jobs for Big Data Processing using **Hadoop** and **Spark** for scalable data pattern and execution time, resulting in **30%** reduction in latency for orders report creation and loading time.
- Designed and deployed Computer Vision AI model for object and action tracking in real time, optimizing **accuracy by 25%** by incorporating features from IoT device inputs including weighing scale, infrared and pressure sensors.

Indian Institute of Technology, Kanpur (IIT-K) *May 2021 - Aug 2021*
Research Intern – Full Stack
- Developed ML Models: SIR, ARIMA and LSTM based, to **forecast COVID-19 Cases** sourcing data from the India-level time series dataset, consisting of **60M** records.
- Conducted a comparative data analysis of the various ML models, determining that SIR (Susceptible-Infected-Removed) achieved the highest accuracy of **97.6%**.
- Executed frontend and backend for a website, consisting of COVID-19 cases forecast graph for **28** Indian states build graph-based data model and query pattern using **GraphQL** APIs and backend using **NodeJS**, while front end build with **React**.

PROJECTS AND PUBLICATIONS

Peer-to-Peer File Backup System *Jan 2024 - Mar 2024*
- Implemented a distributed P2P file storage and backup system (with peers in the same IP network) with maximum backup speed of **410 KB/sec** and retrieval speed of **300 KB/sec** .
- System has features to increase reliability and availability of sensitive data derived from the priority of files being backed up. **Exposure**: Multi-Tiered Systems, Networking, Distributed Storage System, C++, Python.

Crop Disease Detection Using Neural Network and Machine Learning Algorithms RESEARCH PAPER: IJIRE
- Implemented and compared multiple Neural Networks (including CNN, AlexNet, ResNet, VGG16, VGG19 and InceptionV3) to detect 14 Crop diseases on a PlantVillage Dataset of **30k** images. **AlexNet** excelled with a **99.2%** accuracy.
- Proposed approach employed a combination of NN models to detect **14 diseases** with **98%** accuracy for **24 disease classes.**

Speculative Execution of Distributed System with Commit and Rollback *Aug 2023 - Dec 2023*
- Implemented **3** custom system calls in the Linux Kernel to enable speculative execution, allowing processes to run without waiting for dependencies, thus increasing scalability and reducing latency by 30%.
- Developed custom application to support these new system calls, resulting in a **2.5x** increase in system speed due to speculative execution. **Exposure**: API, Kernel Programing, Distributed Systems, Operating Systems

Blockchain Based e-voting System *May 2023 - Aug 2023*
- Build e-voting system based on decentralized network using Proof-of-Work for consensus algorithm, handling over **10K Txn**
- Successfully achieved an average latency of **36.2** seconds for registration and **13.7** seconds for voting.