Prisha Priyadarshini

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EDUCATION

Rutgers University - New Brunswick (Transfer from The College of New Jersey, 2023-2025)
Bachelor of Science: Computer Science & Mathematics Minor
GPA: 3.5/4.0 Expected May 2027
Relevant Coursework: Discrete Structures I-II, Data Structures, Artificial Intelligence, Linear Optimization, Calculus I-III, Deep Learning, Numerical Computing & Analysis, Elementary Differential Equations, Design & Analysis of Algorithms

TECHNICAL SKILLS & CERTIFICATIONS

- **Core ML & AI:** PyTorch, Transformers, Hugging Face, FAISS, LightGBM, XGBoost, Multilayer Perceptron, OpenCV, CNNs, Temporal Fusion Transformers (TFT), U-Net++, RAG
- **Programming Languages:** Python, C, C++, Java, JavaScript, MATLAB
- **Data & Scientific Computing:** NumPy, Pandas, GeoPandas, Matplotlib, Seaborn
- **Backend Frameworks:** Flask, FastAPI, REST APIs, Streamlit
- **Frontend Frameworks:** React, Next.js, Tailwind CSS, HTML/CSS, TypeScript, GraphQL
- **Databases**: PostgreSQL, SQLite
- **Research Concepts:** OpenAI APIs, Multi-Agent LLM Systems, Multimodal Chain-of-Thought (MMCoT), Generative AI
- **Cloud, Systems & MLOps:** Git, GitHub, AWS, Azure, Docker, CI/CD, Bitbucket, Jira, RunPod, Anaconda, Vercel
- **Certifications:** AWS Certified Machine Learning — Specialty, AWS Certified Cloud Practitioner

RELEVANT EXPERIENCE

Incoming Machine Learning Intern | *Regeneron* | Troy, NY Start May 2026
- Incoming Summer 2026

ML Research Extern (Team Lead)- Interpretable ML via Rutgers MBS Exchange | *DIMACS* | New Brunswick, NJ Jan 2026 - Present
- Spearheading empirical research on whether real-world binary tabular datasets admit small, accurate, and interpretable ML models with a focus on model multiplicity and Rashomon sets.
- Implementing and benchmarking SOTA interpretable decision tree algorithms (SPLIT, LicketyRESPLIT) against XGBoost using metrics beyond accuracy.
- Running large-scale experiments in Python/Linux using Rutgers' Amarel HPC cluster, and communicating findings through weekly research updates and a final presentation.

AI Associate Developer | *Insurity* | Remote Oct 2025-Jan 2026
- Project 1: Peril Prediction Project
  - Engineered large-scale geospatial preprocessing pipelines (6M+ rows) integrating climate variables with peril events through time alignment, spatial filtering, and feature engineering using Python, Pandas, and GeoPandas.
  - Built and evaluated LightGBM-based multi-class peril classifiers; applied SMOTE class balancing , increasing accuracy and F1 score by ~10%.
  - Experimented with a Temporal Fusion Transformer (TFT) model, modeling seasonal dependencies via cyclical week encoding and trained GPU-accelerated PyTorch models in a managed Anaconda environment on NVIDIA RTX hardware.
- Project 2: Computer Vision Project
  - Developed a geospatial change-detection system for before/after satellite imagery using OpenCV, CNN and Transformer architectures including U-Net++ for high-resolution segmentation.

AI Researcher | *Algoverse* | Remote June 2025-Present
- Project 1: DynaStride: Dynamic Stride Windowing with MMCoT for Instructional Multi-Scene Captioning.
  - Contributed to a hierarchical scene-captioning pipeline integrating dynamic stride window selection, multimodal chain-of-thought (MMCoT) reasoning, Qwen2.5, Qwen3, MiniLM, and subcaption aggregation for temporally coherent caption generation.
  - Designed and implemented evaluation frameworks for BLEU-4, METEOR, CIDEr, BERTScore, SBERT similarity, and temporal analysis metrics; conducting ablation studies on frame sampling and aggregation strategies to validate pipeline effectiveness.
  - Ran large-scale YouCook2 experiments on 30 RTX A6000 GPUs and achieved 17% higher CIDEr than GPT-4o and 14% over VLLaMA-3.
  - Accepted for an oral presentation at NeurIPS 2025 (7HVU) and accepted to AAAI 2026 (AI4EDU).
- Project 2: Multi-agent LLM Deliberation on subjective questions
  - Designing a multi-agent LLM system to analyze how consensus emerges on subjective global opinion questions, leveraging the GlobalOpinionsQA and OpinionsQA dataset.
  - Building a reproducible experimental pipeline with structured agent outputs of multi-round deliberation using GPT-4.1, GPT-4.1-nano, GPT-4.1-mini, DeepSeek R1, grok 3, and Llama-3.3-70B-Instruct and creating visualizations of results with pie charts, bar charts, and line plots via Matplotlib.

Algorithms Researcher | *The College of New Jersey* | Ewing, NJ Jan 2025-May2025

- Investigated classical and modern RNA secondary structure prediction algorithms (Nussinov, Zuker, LinearFold), focusing on dynamic programming optimizations and free energy minimization techniques.
- Implemented sparse dynamic programming strategies to reduce computational complexity in large-sequence folding tasks, improving scalability and pruning redundant substructure evaluations.
- Deployed large-scale experiments on a SLURM-managed HPC cluster using the ViennaRNA package; automated batch processing pipelines to benchmark folding accuracy, energy scores, and runtime across thousands of RNA sequences.

TECHNICAL PROJECTS

- **GenreBlender (Python, PyTorch, Multilayer Perceptron, Generative AI, Streamlit)**
  - Engineered a Generative AI system combining Meta's MusicGen and a 4-layer PyTorch Multilayer Perceptron (92% validation accuracy) to create and quantitatively evaluate controllable music genre blends via a weighted probability framework in a Streamlit app.
- **PocketRAG (Python, Flask, FAISS, Gemini-2.5-Flash, AWS EC2, Docker, Gunicorn, RAG, NLP)**
  - Engineered a production RAG pipeline with document chunking, FAISS vector retrieval, and Gemini-2.5-Flash inference; containerized and deployed on AWS EC2 (Docker + Gunicorn) achieving sub-second latency.
- **Telematics UBI- Usage-Based Insurance Prototype (Python, XGBoost, AWS, FastAPI, GraphQL, Docker, React, HTML)**
  - Built and deployed a calibrated XGBoost telematics risk model within a full-stack AWS architecture (FastAPI, AppSync, DynamoDB, React, GraphQL) supporting real-time premium prediction dashboards.
- **Personal Portfolio (React, TypeScript, Next.js, Tailwind, CI/CD, Vercel)**
  - Designed and deployed a responsive portfolio (Next.js, TypeScript, React, Tailwind) showcasing AI research and experiences with GitHub-based CI/CD via Vercel and performance optimization using the Next.js App Router architecture.

PROFESSIONAL DEVELOPMENT & EXTRACURRICULARS

Mathematics Grader | *Rutgers University - New Brunswick* | New Brunswick, NJ Dec 2025 - Present

- Grading homework and exams for Multivariable Calculus across 3 sections
- Evaluating mathematical reasoning, correctness, and clarity with consistency and accuracy

Peer Tutor | *The College of New Jersey* | Ewing, NJ September 2024-May 2025

- Provided one-on-one tutoring for Linear Algebra, Data Structures, Analysis of Algorithms, and Statistical Inference and Probability.
- Assisted students in understanding complex concepts, solving problems, and preparing for exams.

Recruitment Chair | *Kappa Theta Pi - Zeta Chapter (The College of New Jersey)* | Ewing, NJ Dec 2024-May 2025

- Coordinated the rush process for the spring 2025 semester to attract top talent to Kappa Theta Pi.
- Collaborated with the VP of Membership to welcome 10 new members into the fraternity.

CS Department Volunteer | *The College of New Jersey* | Ewing, NJ Sept 2024-May 2025

- Served as a representative for the department at key admissions events, including Lion's Day Open House and Accepted Students day.
- Engaged with prospective and admitted students by answering questions, offering campus tours, and sharing insights into the CS program and collaborated with faculty to set up event spaces.

Student Athlete | *The College of New Jersey* | Ewing, NJ Aug 2023-May 2024

- Competed as a member of TCNJ's NCAA Division III Women's Tennis Team, balancing 20+ hours/week of practice, training, and competition with a full academic course load.
- Earned All-NJAC Singles and Doubles recognition (2024) for athletic and competitive excellence.

PUBLICATIONS

Pham, E., Priyadarshini, P., Maliackel, A., Bandi, K., Meo, C., Zhu, K.

DynaStride: Dynamic Stride Windowing with MMCoT for Instructional Multi-Scene Captioning

Accepted to **NeurIPS 2025 (Holistic Video Understanding Workshop**) and **AAAI 2026 (AI4EDU Workshop).**