Shashank Arava

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EDUCATION

University of Maryland, College Park   **Spring 2026**
- **B.S. in Computer Science:** Data Science, Database Design, Programming Mobile Systems, Machine Learning
- **B.S. in Mathematics:** Applied/Theoretical Statistics, Numerical Analysis, Euclidean/Non-Euclidean Geometries

PROFESSIONAL EXPERIENCE

Biostatistics Intern - Harmony Biosciences, Remote   May 2025 - August 2025
- Built a clinical trial simulation engine with GUI using Python, enabling biostatisticians to model parallel, crossover, and adaptive trial designs with configurable parameters, and visualize power curves and sample size trade-offs
- Implemented Monte Carlo algorithms to evaluate statistical power, Type I error, and precision across thousands of trial scenarios, supporting data-driven protocol design decisions

Technical Analyst - Akira Technologies, Washington D.C.   August 2024 - May 2025
- Engineered RESTful API endpoints for a full-stack web application to automate a federal agency's public-comment review workflow, reducing associated labor costs and manual review time by >80% for agency staff
- Developed cloud-backed features using AWS S3/RDS, supporting scalable document storage and retrieval
- Enhanced AI integration by developing an AWS Bedrock-powered chatbot for natural-language queries on cleaned and labeled data, reducing manual document lookup and enhancing user experience

PROJECTS

Signal Heist: Real-Time Asymmetric Tactical Hacking Game
- Architected event-driven multiplayer game backend with Spring Boot, WebSocket, and Redis pub/sub handling real-time sessions, deterministic simulation with priority-queued events, and full replay/state recovery
- Built horizontally scalable microservices with Redis-backed matchmaking, session caching, and PostgreSQL persistence; implemented server-side validation and anti-cheat enforcing action legality across distributed clients
- Containerized platform with Docker and designed integration tests simulating hundreds of concurrent matches; optimized for low-latency state synchronization and reconnection handling

Real-Time Code Vulnerability Detection System
- Developed an end-to-end ML pipeline to detect 7 critical security vulnerabilities (SQL injection, command injection, hardcoded secrets) in Python, achieving 85% F1-score and <100ms inference latency
- Fine-tuned CodeBERT transformer model on 2,000+ labeled code samples from GitHub, NIST SARD, and synthetic generation, reducing false positive rate by 40% compared to rule-based tools (Bandit, Semgrep)
- Built and deployed a full-stack application with FastAPI backend and React frontend featuring real-time code analysis, severity ratings, and remediation suggestions; containerized with Docker for cloud deployment
- Designed a scalable data pipeline integrating GitHub API, CVE databases, and synthetic data generation to address class imbalance, improving minority-class recall from 62% to 78%

Projective Geometry in Computer Vision
- Implemented an interactive demonstration of projective (image) transformations in Python, including homogeneous coordinates and perspective projection algorithms used in modern rendering pipelines
- Developed real-time homography estimation using DLT algorithm and RANSAC, enabling perspective correction and multi-image stitching with sub-pixel accuracy

WORK EXPERIENCE

Teaching Assistant & Peer Mentor, College Park, MD   May 2023 - Present
- Mentor current and prospective CMNS students with academic planning and creating graduation roadmaps
- Back administrative operations by fielding inquiries on advising, registration and graduation applications
- Revised weekly lesson plans, facilitated in-class activities, and organized presentations and workshops

SKILLS

Languages: C, C++, CSS, Go, HTML, Java, Javascript, MySQL, OCaml, PHP, PostgreSQL, Python, Rust, Shell, Typescript
Frameworks: Angular, Bootstrap, Express.js, FastAPI, Flask, Node.js, React.js, PyTorch
Tools: AWS, Docker, Git, Firebase, Jira, Linux, Maven, MongoDB, Redis, Unix
Libraries: Matplotlib, NumPy, OpenCV, Pandas, PyTest, Scikit-learn, SciPy