Gyanendra Shukla

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EDUCATION

Maulana Azad National Institute of Technology (MANIT), Bhopal, India   **2019 – 2023**
Bachelor of Technology (B.Tech), Computer Science and Engineering
- CGPA: 9.16/10.0
- Class Rank: Top 3% of the graduating class.

RESEARCH EXPERIENCE

Explainable Plant Disease Classification using a Teacher-Student Vision Transformer Architecture
Undergraduate Major Project
- Proposed a novel classification and visualization architecture integrating Convolutional Neural Networks (CNNs) with a Vision Transformer (ViT) for enhanced feature extraction in plant disease detection.
- Pioneered the application of a U-Net inspired Teacher-Student distillation framework to ViTs, a novel approach for generating high-fidelity explainability maps.
- Investigated the use of convolutional layers as patch embeddings for ViT-based autoencoders, demonstrating a unique approach to feature representation.

Keywords: Explainable AI (XAI), Vision Transformer (ViT), Knowledge Distillation, Teacher-Student Architecture

Low-Cost Distributed Sensor Network for Smart Agriculture   *Undergraduate Minor Project*
- Designed and prototyped a low-cost, modular sensor node using the ATmega328P microcontroller for monitoring key agricultural metrics (e.g., soil moisture, temperature).
- Developed a centralized monitoring and alerting platform based on a distributed producer-consumer architecture, enabling real-time data aggregation and analysis from deployed farm sensors.

Keywords: Smart Agriculture, Internet of Things (IoT), Sensor Networks, Embedded Systems

Comparative Analysis of Explainable AI (XAI) for Prostate Cancer Detection
- Conducted a comprehensive survey and comparative analysis of state-of-the-art XAI techniques (e.g., LIME, SHAP, Grad-CAM, LRP) for medical imaging.
- Evaluated the efficacy and interpretability of various explainability methods on a DenseNet-121 model trained for prostate cancer detection from histopathology images.

Keywords: Explainable AI (XAI), Medical Imaging, Deep Learning, Interpretability

WORK EXPERIENCE

Wells Fargo   **Bengaluru, IN**
Software Engineer   *July 2024 – Present*
- Engineered a scalable, centralized data distribution system, abstracting underlying transport mechanisms (e.g., Kafka, REST, NDM) to provide a unified data delivery interface for enterprise applications.
- Designed and implemented migration utilities that facilitated a seamless transition of petabyte-scale data from legacy HDFS to modern object storage (S3), enabling cloud adoption and reducing storage costs.
- Developed interactive data lineage and visualization tools, enhancing process transparency and reducing debugging time for complex data flows.
- Authored automation scripts for CI/CD pipelines, reducing manual deployment intervention by 90% and accelerating project delivery cycles.
- Led the 'Markets Mic' initiative, a knowledge-sharing forum where specialists presented on diverse topics to office-wide audiences.

Program Associate   *July 2023 – July 2024*
- Spearheaded the transformation of a legacy file-based delivery system to a modern, configuration-driven API, improving system reliability, scalability, and maintainability.
- Developed Python tools for automated generation and validation of pipeline configurations, eliminating manual errors and saving significant developer time.
- Built high-performance, resilient data pipelines within a scalable, event-driven microservices architecture.

Program Intern   *May 2022 – July 2022*

- Designed and implemented a prototype for a high-speed trade order matching engine.
- Engineered the application to be highly configurable (e.g., symbols, capacity), ensuring horizontal scalability and ease of adaptation.
- Developed an accompanying UI and API for real-time market data visualization and interaction.
- Leveraged lock-free data structures and Apache Kafka for high-throughput, low-latency event processing.

Azad Nano-Sat Team   **On-Board Data Handling (OBDH) Subsystem**

- Contributed to the On-Board Data Handling (OBDH) team for the AZAD nanosatellite project.
- Focused on the integration of the real-time operating system (RTOS) with various satellite subsystems, ensuring robust data communication and command execution.

PUBLICATIONS

- Shukla, G. (2024). *A Scalable and Abstracted Distributed Data Delivery System.* Wells Fargo Internal Whitepaper.

SELECTED PROJECTS

Monkey Language Interpreter (Live Demo)
Go, JavaScript, WebAssembly

- Developed a tree-walking interpreter for the Monkey programming language in Go, supporting variables, control flow, first-class functions, closures, and a hygienic macro system.
- Cross-compiled the Go interpreter to WebAssembly (WASM), enabling serverless, in-browser execution without any backend dependencies.

C Language Compiler
Rust

- Implemented a compiler for a subset of the C language in Rust, capable of parsing source code, performing semantic analysis, and generating executable binary files.

Chaotic Double Pendulum Simulation (Live Demo)
Rust, WebAssembly, JavaScript

- Developed a high-performance physics simulation visualizing the chaotic motion of customizable double pendulums.
- Deployed as a web application using WebAssembly for near-native performance in the browser.

Raft Consensus Algorithm Visualization
Go, JavaScript

- Implemented the Raft consensus algorithm from the ground up in Go.
- Built an interactive web-based visualization to demonstrate leader election, log replication, and fault tolerance concepts.

Reinforcement Learning Snake Agent
Python, PyTorch

- Trained autonomous agents to play the game of Snake using Q-learning and Deep Q-Network (DQN) algorithms, demonstrating principles of reinforcement learning.

TECHNICAL SKILLS

Programming Languages: Python, Java, Go, Rust, C/C++, JavaScript
Libraries & Frameworks: PyTorch, NumPy, Pandas, Scikit-learn, Apache Kafka, gRPC
Tools & Technologies: Git, Docker, Kubernetes, SQL, NoSQL, Linux, CI/CD, Microservices

HONORS & AWARDS

- **Manager Spotlight Award**, Wells Fargo (2024, 2025)
- **Team Spotlight Award**, Wells Fargo (2025)
- **Winner**, MLH (Major League Hacking) Hackathon (2022)
- **Winner**, Version Beta Hackathon, MANIT Bhopal (2021)
- **99.39 Percentile**, IIT-JEE (Main) - Scored among the top ~0.6% of over 1.2 million candidates.

Leadership & Extracurricular Activities

- **Co-Founder & Vice President**, ACM MANIT Student Chapter (2022 – 2023)
- **Founder & Chapter Lead**, OWASP MANIT Student Chapter (2022 – 2023)
- **Class Representative**, Department of CSE, Batch of 2023 (2020 – 2023)
- **Academic Volunteer**, Aaroha (NGO for underprivileged children) (2019 – 2023)
- **Writer & Anchor**, Roobaroo (University Cultural Club) (2020 – 2023)