Atharva Pansare

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EDUCATION

Master of Science in Computer Science **May 2025**
North Carolina State University, Raleigh NC **GPA: 4.0**
Coursework: Data Structures and Algorithms, Neural Networks, Advanced Deep Learning, Data Analysis, Foundations of Data Science and Statistics, Object-Oriented Design and Development, Software Engineering, Database Management Systems

Bachelor of Technology in Computer Science and Engineering, **Jul 2023**
Dr. Vishwanath Karad MIT World Peace University, Pune, India **CGPA: 9.78**

TECHNICAL SKILLS

Programming Languages: Python, JavaScript, TypeScript, C++, C, Java, R, HTML, CUDA (in progress)
Frameworks: TensorFlow, Keras, Pytorch, Flask, React, Node.js Scikit-learn, NumPy, Pandas, FastAPI, Ruby On Rails
Tools: Docker, Apache Kafka, Git, GitHub, AWS S3, AWS EC2, Postman, Ollama
Database Management Systems: MySQL, PostgreSQL, MongoDB, SQLite, SQL

PROFESSIONAL EXPERIENCE

Research Assistant **Dec 2024-Present**
North Carolina State University – Dr. Debjani Sihi

- Developed and optimized process-based models of soil respiration and methane flux using differential equations implemented in **Python** and statistical analysis in **R**
- Estimated parameters and evaluated model performance through numerical integration, sensitivity analysis, and calibration against observational data
- Ran large-scale simulations on HPC in a **Linux** environment, managing remote workflows and data processing via **SSH**

Machine Learning Engineer Intern **Jul 2022-Jan 2023**
KPOINT Technologies Pvt. Ltd.

- Designed and implemented an **end-to-end ML pipeline**, including preprocessing, model training, and real-time inference; built a **REST API** with **CherryPy** and containerized the system using **Docker** for seamless deployment
- Developed a real-time Thumbnail Recommendation System for the KPOINT Video Platform, using **TensorFlow** and **Transfer Learning** in **Python**, which had an accuracy of over 95%
- Scraped and pre-processed thousands of thumbnails from the company website, converting them to grayscale for consistent model training and increased the dataset size by 25% by using various **data augmentation** techniques
- Stored the scraped thumbnails and dataset in **AWS S3** for easy access and scalability during model training

PROJECTS

Large Language Models, RAG, Full Stack Web Development – Hack_NCState (2nd Place Winner)

- Developed a fraud detection web app using **Retrieval-Augmented Generation** with a locally hosted **Ollama LLM (Llama2-7B)** to analyze phone numbers, emails, and messages for suspicious activity in real time
- Built a **React** frontend with a **Dockerized FastAPI** backend to handle embedding, retrieval, and LLM inference
- Indexed 1,200+ manually labelled messages in **MongoDB Atlas** by storing **BERT embeddings** and using its **vector-search** feature to retrieve the top-k similar fraud examples
- Collaborated in a team of 3 to design a fraud detection dataset and deploy the application within 24 hours.

Object Detection using Deep Learning – NC PSI Hackathon (Winner)

- Developed an object detection model using **YOLOv8** to classify 47 plant types from synthetic and real-world images.
- Generated a synthetic dataset with augmented plant cutouts; optimized preprocessing techniques to enhance model accuracy.
- Utilized **AWS SageMaker** for model training and deployment; collaborated in a **team of 4** over a 3-day competition.

Image Segmentation using Deep Learning, Computer Vision

- Implemented UNet and Res-UNet neural network archiectures from scratch using **TensorFlow** and **Keras** for brain tumor detection from MRI scans using image segmentation and pixel-based classification
- Achieved a training Dice Co-efficient of 83% and validation Dice Co-efficient of 72% for the Res-UNet model

Full Stack Web Development using Node.js, React with Apache Kafka Integration

- Developed a real-time chat application with **WebSocket** based communication and **Kafka** for message persistence
- Built a WebSocket server using **Node.js** that interacts with a **MySQL** database to store and retrieve chat messages
- **Dockerized** a Kafka consumer to broadcast messages to connected clients for local development and testing

RESEARCH PUBLICATIONS

First Author, Drone Detection using YOLO and SSD: A Comparative Study (IEEEXplore link)
First Author, Personality Prediction with Natural Language Processing using Questionnaire Responses (IEEEXplore link)
Author, Remote Landslide Detection Using Semantic Segmentation (IEEEXplore link)