SAHIL AJAY ADIVAREKAR

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EDUCATION

The Pennsylvania State University, University Park **Aug 2023 - May 2025**
MS in Computer Science and Engineering GPA - 3.5 / 4.0
University of Mumbai **2019 - May 2023**
Bachelor of Engineering in Computer Engineering GPA - 3.6 / 4.0

TECHNICAL SKILLS

Programming Languages: Python [4+ years], Java [2+ years], SQL [2+ years], C [1 year], JavaScript [1 year]
Technologies: Hugging-Face, PyTorch, TensorFlow, LangChain, Scikit-learn, Streamlit, Django, Flask
Expertise: Machine Learning, Deep Learning, Recommendation Systems, Generative AI, Reinforcement Learning
Software: Git, GitHub, Ubuntu, Android, MySQL, PostgreSQL, PyCharm, VS Code

EXPERIENCE

AI/ML Engineer at Smeal Business School **Aug 2024 - Present**
- Performed quantitative analysis on 2M+ Zulu trade records to uncover trader behavior and decision patterns.
- Utilized MiniLM with prompt engineering to generate contextual insights and automate trader profiling
- Enhanced interpretability and reduced manual analysis time by 40% through AI-driven summarization and pattern recognition.

Teaching Assistant at Penn State University **Sep 2023 - Present**
- Assisted students in relational databases, data structures, algorithms, theory of computation, and Python fundamentals.
- Automated the grading system and thus reducing evaluation time by 40% while improving grading consistency.

ML Research Engineer at TSEC **Sep 2022 - July 2023**
- Conducted ML research and co-authored 3 papers on time-series prediction, data augmentation and image classification.
- Performed exploratory data analysis on 10 years of Mumbai weather data, applying Random Forest to predict rainfall and trends with 92% accuracy; research featured in IEEE Xplore and significantly boosted predictive performance.
- Designed a novel data augmentation technique combining image merging and transformation, leading to superior model performance over traditional methods; research accepted in Agriculture Journal.
- Built and fine-tuned CNN architectures on a 54,305-image plant disease dataset using regularization techniques; identified the most efficient model for disease detection; research published by Springer.

AI/ML Engineer at VK Developer **Feb 2022 - Aug 2022**
- Engineered a machine learning model to recommend optimal material grades for construction projects by analyzing historical usage patterns, resulting in a 15% improvement in overall cost efficiency.
- Processed and analyzed 50,000+ rows of raw material data, including grade types, unit costs, and structural applications.
- Trained and evaluated classification models such as XGBoost and Random Forest, incorporating SHAP value-based interpretability, and achieved 92% test accuracy in predicting grade selections based on durability and cost-performance.

PROJECTS

MiniViT-GPT: Context Aware Story Generation Model **Nov 2024 - Present**
- Engineered a transformer-based image-to-text system using ViT and GPT-2 to generate context-aware captions and narrative descriptions, achieving 30% BLEU-1 and stable BLEU-4 performance with symbolic reasoning to refine narrative coherence
- Trained a captioning model on 8,000+ images and 40,000+ captions from the Flickr8K dataset, integrating ViT for visual semantics and MiniLM for contextual embeddings to enhance image-to-text understanding
- Executed multi-modal prefix tuning by injecting image and context features as soft embeddings into GPT-2, boosting caption fluency and semantic alignment, contributing to a 25% improvement in overall model

AI Powered Research Summarizer **Oct 2024 - Nov 2024**
- Built an AI-powered summarization tool that automates literature reviews by extracting and summarizing key insights from research papers, enabling users to compare up to 5 papers simultaneously, improving research workflow efficiency by 40%
- Worked on a Retrieval-Augmented Generation (RAG) pipeline using FAISS-based vector retrieval, allowing efficient indexing of papers and enhancing contextual relevance in generated summaries by integrating LangChain with GPT-4.
- Designed a Streamlit web app enabling researchers to upload up to 5 papers, query content, and receive structured summaries with references, reducing manual review time by 50%

NeuroScoop: News Article Engine **Aug 2024 - Sep 2024**
- Designed a recommendation engine for over 200,000 news articles using author, co-author, and headline metadata
- Utilized BERT (MiniLM) embeddings and ChromaDB for efficient semantic search, improving accuracy by 30%
- Developed a user-friendly Streamlit-based interactive UI to deliver real-time, personalized article recommendations

Autonomous Stock Trading Agent using Reinforcement Learning **Apr 2024 - May 2024**
- Devised a stock trading agent by leveraging Proximal Policy Optimization (PPO) to configure real-time trading decisions (buy, sell, hold) based on historical stock market data and 21% improvement over baseline models
- Customized an environment using OpenAI Gymnasium, where the agent interacts with stock price time-series data, learning optimal strategies through trial-and-error reinforcement learning and generating a profit of 60% for over a span of 4 years

RESEARCH PUBLICATION

Plant Disease Detection Leveraging Latent Space based Mixing Methods for Image Data Augmentation

Suryawanshi V. A, Sarode T. K, Adivarekar S. A. “Plant Disease Detection Leveraging Latent Space based Mixing Methods for Image Data Augmentation”. Curr Agri Res 2024; 12(3). Available from: https://bit.ly/4fSb1xS

Implementation of Exploratory Data Analysis on Weather Data

S. Adivarekar, S. Nanwani, N. Mandal and T. Sarode, "Implementation of Exploratory Data Analysis on Weather Data," 2023 International Conference on Communication System, Computing and IT Applications (CSCITA), Mumbai, India, 2023, pp. 21 25, doi: 10.1109/CSCITA55725.2023.10104864.