ADITYA RAO

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EDUCATION

University of Southern California (USC), USA   Aug 2022 - May 2024
Master of Science in Electrical Engineering (Machine Learning and Data Science), GPA: 3.73/4.0
- ***Relevant Coursework:*** *Machine Learning I: Supervised Methods, Introduction to Deep Learning, Algorithms in C++, Probability for Computer Engineers, Linear Algebra for Engineering, Database Systems, 3D Vision.*

Veermata Jijabai Technological Institute (VJTI), India   Jul 2018 - Jun 2022
Bachelor of Technology in Electronics Engineering, GPA: 8.86/10
- ***Relevant Coursework:*** *Data Structures and Algorithms, C++, Python, Image and Video Processing, Data Science, Neural Networks and Fuzzy Systems, Natural Language Processing, Microcomputer System Design, Digital Signal Processing.*

SKILLS & OTHER

Programming Languages: Python, R, C++, SQL, Javascript, Swift, HTML, CSS
DevOps and Database Management: Docker, Kubernetes, Git, MongoDB, PostgreSQL
Cloud and Operations: GCP, AWS, Azure, MLOps, Tableau
Machine Learning and Web Frameworks: PyTorch, PyTorch Lightning, Tensorflow, Keras, JAX, scikit-learn, Django, Flask, Numpy, Pandas, LLM, HuggingFace, LangChain, OpenCV

PROFESSIONAL EXPERIENCE

ACME Lab   Jun 2023 - Dec 2023
Machine Learning Research Assistant (Python, MATLAB, PyTorch)
- Developed LSTM model in PyTorch for HAR, improving accuracy with bidirectional layers and regularization techniques.
- Employed Python, Numpy, and Pandas for data normalization and reduction in complex HAR datasets.
- Streamlined model training processes with PyTorch Lightning, boosting performance and scalability of temporal analysis.

VJTI   Aug 2021 - Apr 2022
Deep Learning Engineer Intern (Python, Kivy, PyTorch, Neural Networks)
- Implemented Deep Q-Learning with PyTorch to improve autonomous vehicle decision-making capabilities by 15% via MDPs.
- Led a team of 4 engineers to refine Q-Learning with experience replay techniques, boosting policy development by 20%.
- Utilized PyTorch for neural networks for core AI functionalities and Kivy for dynamic UI visualizations in vehicle projects.
- Applied Docker for environment management, ensuring consistent deployment of neural network models.

Indian Institute of Technology   Jun 2021 - Jul 2021
Machine Learning Intern (Python, scikit-learn, Numpy, Pandas)
- Gained 85% accuracy in stock prediction using NLP (CountVectorizer and TF-IDF) with scikit-learn, Random Forest, and SVM.
- Reduced RMSE to 4.735 in equity market forecasting using Python, Numpy, and Pandas alongside LSTM models.
- Implemented feature extraction methods using CountVectorizer and TF-IDF in Python for better financial news analysis.
- Built and tested various ML models with Python and scikit-learn for market trends analysis to support investments decisions.

PROJECTS

Chatbot Development with LangChain and LLMs | *Python, LangChain, LLMs, vector stores, embeddings.*
- Developed a chatbot using LangChain and LLMs, implementing Retrieval Augmented Generation (RAG) to retrieve contextual documents from external datasets, encompassing document loading, splitting, vector stores, retrieval techniques, question answering, and chat functionalities.

Structure From Motion | *Python, NumPy, OpenCV, Matplotlib, 3D Reconstruction*
- Engineered a Structure from Motion (SFM) algorithm using Python, NumPy, OpenCV, and Matplotlib to accurately reconstruct 3D scenes from 2D images, achieving critical advancements in feature detection and camera pose estimation.

Geometry Processing | *Python, Matplotlib, Numpy, JavaScript, ThreeJS, HTML*
- Implemented advanced 3D mesh processing techniques, including Loop Subdivision for mesh upscaling and Quadric Error Metrics for mesh simplification, utilizing adjacency data structures like half-edge matrices for efficient mesh traversal and computation, enhancing model detail and optimization in a computational geometry project from scratch.

Credit Card Default | *Python, Matplotlib, NumPy, Machine Learning, Scikit-learn, Seaborn*
- Developed a credit card default prediction model in Python with Scikit-learn, reaching a test accuracy of 76.4% and 86% cross-validation accuracy; refined model performance with PCA, LDA, and SMOTE to address class imbalance.

Anime Face Generator | *Python, Deep Learning, GAN, PyTorch, Streamlit, Matplotlib*
- Created a DCGAN model for anime face generation in PyTorch, deployed via Streamlit, achieving dynamic user interaction with real-time loss curve visualizations and accuracy assessments between generated and actual images.

Reddit Data Pipeline Engineering | *Reddit API, Docker Containerization, Apache Airflow & Celery ETL, AWS Integration*
- Elevated a Reddit data extraction and ETL pipeline with Docker, Airflow, and AWS, improving data storage, management, and reporting efficiency by 40%, utilizing Amazon S3, Glue, and an optimized Redshift cluster for data handling.