Ankan Dutta

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EDUCATION

MCA, Vellore Institute of Technology, Bhopal 06/2024 – Ongoing
9.05

BCA, Bennett University, Greater Noida 09/2021 – 06/2024
9.92

ACADEMIC PROJECTS

Deepfake Image Classification on Videos, AI/ML 04/2025 – 06/2025

- **Situation**: With the growing threat of deepfake videos undermining digital media trust, accurate detection mechanisms were essential for real-world applications like journalism, law enforcement, and social platforms.
- **Task**: Build a robust deepfake classification model leveraging state-of-the-art deep learning and metric learning techniques to distinguish real vs. fake face videos.
- **Action**: Designed a complete pipeline in Python that included video frame extraction, face detection using FaceNet, and dataset generation from Celeb-DF (~70,000 frames). Trained and evaluated multiple models (Xception+Fine Tuned Triplet Loss, EfficientNet, 3D-CNN, CNN+LSTM) with triplet loss-based embedding learning. Enhanced performance using ensemble methods (bagging with max-vote).
- **Result**: Achieved 96% classification accuracy using CNNs and improved to 98% with ensemble voting. Ensured reproducibility and code quality through modular design and PEP-8 compliance. Successfully validated models on benchmark datasets (FaceForensics++) using metrics like AUC-ROC and visualization tools (Grad-CAM).
- **Technology:** NumPy, Pandas, Scikit-Learn, URLIB, TensorFlow, Keras, PyTorch, OpenCV

Data Analyzer and Visualizer, AI/ML 03/2025 – 06/2025

- **Situation**: Identified a gap in tools available for non-technical users to intuitively analyze and visualize structured data without writing code.
- **Task**: Design and develop a web-based chatbot that supports secure CSV uploads and enables users to query, analyze, and visualize datasets interactively via natural language.
- **Action**: Built a full-stack Flask application with user authentication (SQLite, password hashing) and secure session handling. – Implemented CSV ingestion (up to 100MB), with backend processing using Pandas to extract column insights, detect nulls, generate statistical summaries, and produce visualizations. – Integrated Matplotlib and Seaborn to deliver histograms, heatmaps, boxplots, pairplots, and top-value plots in real-time. – Designed a rule-based NLP system to interpret queries and dynamically return visual or tabular responses.
- **Result**: Delivered an interactive chatbot capable of processing up to 1000 rows in under 20 seconds, handling datasets up to 100MB in size. The system significantly reduces analysis time for non-coders and supports over a dozen analytical operations.
- **Technology**: NumPy, Pandas, NLTK, HTML, CSS , JavaScript, Flask

PALMP(Palm Payment System), AI/ML 05/2025 – 07/2025

- **Situation:** The project was initiated to create a proof-of-concept for a futuristic, secure, and touchless biometric payment system to demonstrate its viability in a real-world application.
- **Task:** To develop an industry-level Minimum Viable Product (MVP) for a palm-based payment ecosystem, complete with separate, fully functional interfaces for both end-users and merchants.
- **Action:**Architected a full-stack Flask application, developing the backend logic and RESTful routes to power the entire payment ecosystem. I engineered distinct user and merchant modules for registration, authentication, and dashboard management. For biometric security, I integrated Google's MediaPipe Hands with the frontend to create a real-time AI palm detection and capture system. I implemented core payment functionalities, including wallet management and transaction processing, and designed the SQLite3 database schema to support all application features.
- **Result:** Successfully launched a complete MVP of the "Palm Wallet," delivering a secure, AI-powered user registration process that validates palm prints via a webcam. The final product enables a seamless payment workflow between users and merchants, featuring real-time balance updates and comprehensive transaction histories for both account types.
- **Technology:** Flask (Python), SQLite3, HTML5, CSS3, JavaScript, MediaPipe Hands.

SKILLS

Languages & Tools
Python, Java , C++, SQL, AWS

Libraries
NumPy, Pandas, Scikit-learn, TensorFlow, PyTorch, Keras, NLTK, OpenCV, XGBoost, Matplotlib, Seaborn, SQL (MySQL), MongoDB, Hugging Face, JSwing, Applet,JDBC,Servlet

Machine Learning & Data Analysis
Feature Engineering, Model Tuning & Optimization, Time Series Forecasting, Supervised/Unsupervised Learning, Clustering (Hierarchical Clustering,K-means, etc), Ensemble Methods (Random Forest, Gradient Boosting), Dimensionality Reduction (PCA), Deep Learning, NLP, LLM (OpenAI)

Development, Deployment & Infrastructure:
CI/CD (via GitHub), lightweight hosting with Flask/Dash, static site deployment using Netlify

CERTIFICATION

Machine Learning Engineering for Production (MLOps), Coursera

AWS Academy Graduate - AWS Academy Machine Learning Foundations, AWS(Amazaon Web Service)

Java, HackerRank

Python, HackerRank