Om Mishra

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Professional Summary

Aspiring Machine Learning Engineer proficient in Python, Deep Learning, and Transformer architectures, focused on building end-to-end AI systems. Experienced in developing and deploying ML applications using PyTorch, Scikit-learn, and Hugging Face, with a strong emphasis on model evaluation, explainability, and real-world impact.Strong foundation in Data Structures, Algorithms, and software engineering best practices.

Projects

Transformer Translation System | ***PyTorch, NLP, Attention Mechansim*** GitHub | App

- Built and trained a complete **Encoder-Decoder Transformer** architecture from scratch for English-to-French neural machine translation on **2.3M sentence** pairs using **PyTorch**.
- Implemented SentencePiece tokenization, positional encoding, multi-head attention, masking, encoder-decoder cross-attention, beam search decoding, and autoregressive inference.
- Achieved a highly competitive **34.82 BLEU score** on **24k sentence** validation set and developed a **Streamlit-based** translation app with cross-attention **heatmap visualizations**.
- Improved training stability using Noam Learning Rate Scheduling, gradient clipping, custom validation pipelines, and numerical stability debugging during large-scale Transformer training.

PulmoScan AI: High-Sensitivity Pneumonia Screening Tool | ***PyTorch, Streamlit, OpenCV*** GitHub | App

- Engineered a medical diagnostic system to detect pneumonia from chest X-rays, explicitly prioritizing **Recall (Sensitivity)** to minimize false negatives in clinical screening.
- Fine-tuned and benchmarked **DenseNet121** against ResNet50, achieving **99.7% Recall** (vs. 97.0%) and reducing missed pneumonia cases from 11 to 1.
- Implemented **Explainable AI (Grad-CAM)** with bicubic interpolation to visualize lung opacities and ensure transparent predictions with a full-stack streamlit app with caching and reducing inference latency by **˜80%**.

Ramartha : Semantic & Narrative Analysis of Shri Ramcharitmanas | ***NLP, Streamlit*** GitHub | App

- Built an end-to-end NLP system for semantic analysis of a low-resource classical text using **Word2Vec and FastText** embeddings.
- Designed a **Unicode-native preprocessing pipeline** and with **verse-level embeddings** for semantic retrieval and **narrative-aware analysis.**
- Deployed an interactive Streamlit application for real-time exploration of semantic relationships and concept similarity.

Urban Mobility Optimization: Bike Demand Prediction | ***Python, Scikit-learn, SHAP*** GitHub | App

- Built an ML forecasting system achieving $\mathbf{R^2 = 0.935}$ for hourly bike demand prediction and proactive inventory optimization.
- Evaluated 7 regression models and selected a tuned **LightGBM regressor** with strong generalization performance.
- Applied cyclic feature engineering, log-transformation, and SHAP interpretability for actionable demand insights

Telecom Customer Churn Prediction | ***Python, Pandas, Scikit-learn, Streamlit*** GitHub | App

- Developed a churn prediction pipeline on 7k+ customer records using EDA, feature engineering, and classification modeling.
- Trained and compared 8 ML models, selecting **Logistic Regression** achieving **˜80.9% Recall** and **ROC-AUC = 0.75**.
- Deployed a Streamlit app for churn scoring, batch predictions, and retention-focused decision support.

Technical Skills

Languages: Python, SQL
Machine Learning & Deep Learning: PyTorch, Scikit-learn, CNNs, Transfer Learning
Data Analysis & Visualization: NumPy, Pandas, Matplotlib, Seaborn, Plotly
Computer Vision & XAI: OpenCV, Grad-CAM, SHAP
Deployment & Tools: Streamlit, FastAPI , Git, GitHub, HuggingFace Hub, VS Code

Certifications & Achievements

- **Oracle AI Foundations Associate** – Certified in Artificial Intelligence fundamentals, Machine Learning concepts, and responsible AI by Oracle.
- **NASA Space Apps Challenge – Galactic Problem Solver** – Recognized for contributing innovative solutions during NASA's global hackathon challenge.

Education

Smt. C.H.M. College Ulhasnagar, Maharashtra
Bachelor of Science in Information Technology *2024 – Present(Expected: 2027)*