Harsh Mankodiya

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Education

Arizona State University **August 2023 - May 2025**
Master of Science, Computer Science: GPA 3.70 *Tempe, USA*
Courses: *NLP, Statistical Learning, Artificial Intelligence, Data Mining*

Institute of Technology, Nirma University **August 2019 - May 2023**
Bachelor of Technology, Computer Science Engineering *Ahmedabad, India*
Courses: *Machine Learning, Deep Learning, Data Structures, Linear Algebra, Calculus, Probability and Statistics*

Professional Experience

Nomic AI **July 2025 - Present**
Machine Learning Engineer *NYC, USA*
- Training Transformer-based document parsing models on complex, high-density datasets and building scalable pipelines for evaluation, benchmarking, and deployment, driving agentic document AI capabilities and multimodal understanding.

Cellino Biotech **May 2024 - August 2024**
Machine Learning Intern *Cambridge, USA*
- Developed a proof of concept for a central embedding model for patch selection, anomaly detection, cell segmentation and cell classification.
- Fine-tuned **DinoV2** using **Vision Transformer** based heads for downstream 2D-segmentation tasks, achieving average F1-Score of **82%**. Utilized **Weights & Biases** for experiment tracking, artifact logging and hyperparameter sweep.
- Streamlined dataset preparation for ML pipelines by integrating **Google Cloud APIs** with **PyTorch Dataset** utilities to convert **Zarr arrays** to **Tensors** and implemented **local caching** to boost data loading throughput.
- Decomposed embeddings using **t-SNE** and **PCA**, leveraged **GMM clustering** for zero-shot cell artifact detection. Optimized with **JAX** for on-device GPU inference, achieving a **10x** speedup.
- Containerized the inference pipeline with **Docker**, enabling real-time data processing and developed automated testing using **PyTest** and **BASH**.

Lens Lab, Arizona State University **August 2023 - May 2024**
Research Assistant *Tempe, USA*
- Integrated eXplainable AI techniques with RL agents in **Gymnasium** environments to enhance decision explainability.
- Trained **Proximal Policy Optimization (PPO)** using **StableBaselines3** with **VAE**-based feature extraction for image stream processing.
- Leveraged **Multi-Modal CLIP** models for **zero-shot segmentation** and concept sampling for policy rollouts.
- Published findings at **NeurIPS 2024 SATA Workshop**, focusing on explainability in robotic decision-making.

Bosch **January 2023 - May 2023**
Research Intern *Bangalore, India*
- Designed a **GradCAM-based Knowledge Distillation** pipeline to train **SegNet** and **U-Net** models for image segmentation, achieving **IoU** scores exceeding 85% on multiple datasets using **NVIDIA DGX A100** systems.

Samyak Infotech Pvt Ltd **May 2022 - July 2022**
Machine Learning Intern *Ahmedabad, India*
- Fine-tuned **BERT**-based **LayoutLM**, for structured information extraction from scanned business invoices, achieving an **F1-score of 81%**.
- Summarized long invoices by using **T5 Transformer** and obtained a strong **BERTScore** of **0.95**
- Performed **KMeans clustering** on layout-aware embeddings to organize invoices into structurally similar groups reducing manual annotation effort by **10%**.

Relevant Projects

Continual Knowledge Expansion for Book Retrieval Systems | *Python, FAISS, HuggingFace* **Dec 2024**
- Developed a pipeline to continuously ingest and embed new book content, enabling a **RAG** system to stay updated.
- Utilized **DPR** and **FAISS** to extract new knowledge chunks from book sections, improving retrieval precision.
- Implemented a **Curriculum Learning**-based pretraining strategy, reducing perplexity of **Pythia-2.8B** and **LLaMA2-7B** by **20%** compared to vanilla pretraining.

Technical Skills

Languages - Python, C++, Shell, Docker, Git
ML Frameworks - PyTorch, HuggingFace, Jax, TensorFlow, scikit-learn, XGBoost, Stable-Baseline3, Gym, LangChain, LangGraph, Ollama
Python Libraries - NumPy, SciPy, Pandas, OpenCV, Pillow, Zarr, Dask, Seaborn, Matplotlib, Plotly, W&B, MLFlow, PySpark
ML Techniques - LLMs, RAG, Knowledge Distillation, Reinforcement Learning, SSL, CLIP, Image Captioning, Image Classification, Image Segmentation, VAE, GANs, Style Transfer