Aniket Patil

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Summary

Machine Learning Engineer with expertise in deep learning, computer vision, and production AI deployment. Built a RAG pipeline with sub-2s latency and 94% faithfulness, and developed a semi-supervised cardiac segmentation model at Indian Institute of Technology Ropar that outperformed fully supervised approaches using only 20% labeled data. Published 2 Springer papers and earned Kaggle Master recognition.

Education

Vishwakarma Institute of Information Technology, Pune — **Jun 2021 – Jun 2025**
B.Tech in Artificial Intelligence and Data Science | GPA: 8.88/10.0 — *Pune, India*

Experience

Research Intern | Indian Institute of Technology, Ropar — **Jun 2024 – Feb 2025**
Dynamic Uncertainty Correction for Semi-Supervised Medical Image Segmentation

- Architected an **uncertainty-guided semi-supervised segmentation framework** for cardiac MRI using MC Dropout (mean-variance) to dynamically correct pseudo-labels under limited annotation budgets, advancing clinical AI deployability.
- Achieved **>50% boundary error reduction** using only 20% labeled data on the ACDC dataset (HD95: 10.62 → 4.85; ASD: 3.04 → 1.49), surpassing fully-supervised baselines.
- Engineered an **end-to-end PyTorch pipeline** (preprocessing → training → evaluation → visualization) with Git version control, reducing model development cycles by **40%**.
- Delivered a **1.8M-parameter model** that outperformed established semi-supervised baselines, demonstrating high parameter efficiency suitable for edge and clinical deployment.

Research Intern | Vishwakarma Institute of Information Technology, Pune — **May 2023 – Aug 2023**
Lightweight SegNet-Based Framework for Dermoscopic Lesion Segmentation

- Designed a **modified SegNet encoder-decoder CNN** for automated skin lesion segmentation on dermoscopic images using computer vision techniques, reducing learnable parameters while preserving fine-grained spatial detail.
- Outperformed baseline models by **+7.38 pp Jaccard and +5.30 pp Dice** on the ISIC 2017 dataset (2,000 train / 600 test images), demonstrating robust generalization.
- Optimized architecture depth for **efficient real-world inference**, suitable for resource-constrained clinical and edge environments; findings contributed to two peer-reviewed publications.

Projects

Production Retrieval-Augmented Generation Pipeline with Evaluation | GitHub — **Nov 2024 – Mar 2025**

- Engineered a production-grade RAG pipeline with hybrid retrieval **(FAISS + BM25)** and weighted score fusion, indexing 7,712 ArXiv documents with sub-2s query latency using SentenceTransformers and **GPT-4.1-mini**.
- Achieved **94% faithfulness, 4.2/5.0 relevancy, and 78% context precision** through multi-stage prompt engineering with strict context grounding and citation enforcement.
- Improved retrieval precision by **26% (62% → 78%)** over pure vector search via a 70/30 semantic-keyword hybrid strategy, reducing hallucinations to under 6% at $0.0007 per query.

Realtime Monocular Depth Mapping | GitHub — **Sep 2023 – Jan 2024**

- Designed a **U-Net encoder-decoder CNN** for dense depth map generation from single RGB images; achieved real-time inference at **35.5 FPS (6× speed, 14× fewer parameters)** vs. baseline using OpenCV for preprocessing.
- Integrated composite loss (L1 + SSIM + gradient) for enhanced edge preservation, achieving **MSE 0.04588 and SSIM 0.7779** on NYU Depth V2, outperforming standard approaches.

Portfolio Optimization Using Market Correlations | GitHub — **Oct 2022 – Feb 2023**

- Developed and benchmarked ARIMA, LSTM, and Prophet time-series models on NYSE, NASDAQ, and S&P 500 data; identified LSTM as top performer via MSE/RMSE with rolling cross-validation.
- Conducted sectoral correlation analysis using Pandas and Matplotlib to derive data-driven investment insights for portfolio optimization.

Publications

- **Enhancing Skin Lesion Diagnosis with Data Augmentation Techniques: A Review** | Paper
  ***Aniket Y. Patil**, Anjula Mehto, Saif Nalband | Multimedia Tools and Applications, Springer, 2024*
- **Skin Cancer Image Augmentation Techniques Using AI: A Survey** | Paper
  ***Aniket Y. Patil**, Yashwant S. Ingle, Nuzhat Faiz Shaikh and Parikshit Mahalle | Springer, 2023*

Skills

ML / DL Frameworks:	PyTorch, TensorFlow, Keras, Scikit-learn, OpenCV, LangChain, Hugging Face
GenAI & LLMs:	LangChain, RAG, SentenceTransformers, OpenAI, Prompt engineering
Data & Analytics:	NumPy, Pandas, SQL, Matplotlib, Tableau, PowerBI
Languages:	Python, R, LaTeX
MLOps & Deployment:	Git/GitHub, Linux, Google Colab, Jupyter, Docker, FastAPI

Achievements

- **Kaggle Master** — Profile: Notebooks awarded bronze medals; recognized for high-quality exploratory data analysis and algorithm tutorials across multiple public datasets.