Akshat Sureshbhai Desai

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Education

California State University, Fullerton — Fullerton, CA
Master of Science in Computer Science — *Aug. 2024 – May 2026*

Experience

Lead AI Developer (Lightwall Project) — Oct 2025 – Present
Worthwhile Adventures LLC (Collaboration) — *Fullerton, CA*

- Built a proximity-aware **LLM** NLP system that adapts personality and voice modes based on user distance.
- Designed a parser converting LLM outputs into validated **Arduino/C++** commands for synchronized lighting.
- Integrated speech & radar fusion and **RAG (ChromaDB)** grounding to reduce hallucinations in production flows.
- Implemented real-time input filtering with **sub-500 ms** gating and a **0.2 s** quiet window to cut false triggers.
- Optimized inference to achieve **2.8–4.1 s** transcript-to-speech latency across **capture→model→TTS**.

Graduate Research Assistant — Nov 2024 – Present
California State University, Fullerton — *Fullerton, CA*

- Led the **Verilog RAG Assistant** enabling simulation-in-the-loop verification of LLM-generated Verilog.
- Implemented an automated **self-correction loop** with 2 retries using **Icarus Verilog** to enforce clean builds.
- Built a textbook-grounded **RAG** pipeline with token-based PDF chunking and relevance grading in ChromaDB.
- Processed **1,231 MRI** scans on **HPC (SLURM)**, improving AD/MCI/CN accuracy from **69.11% to 85.45%**.
- Developed a **LightGBM** time-series forecasting pipeline with feature engineering, achieving $\mathbf{R^2 = 0.96}$.

Machine Learning Engineer — Dec 2023 – May 2024
Space Applications Centre (SAC–ISRO) — *Ahmedabad, India*

- Implemented autofocus using **Laplacian** sharpness scoring and focus-point search optimization.
- Benchmarked Global, Binary, Hill-Climbing, and **Fibonacci** optimizers, with Fibonacci converging fastest.
- Developed ROI-based auto-exposure using object tracking and skewness-driven exposure adjustment.

Projects

Histopathology Classification (Breast Cancer) | *PyTorch, ResNet-50* — Feb 2025 – May 2025

- Built a **ResNet-50** classifier for 8 breast cancer subtypes using multi-scale histopathology images.
- Achieved **99.86% AUC-ROC** and **98.61% specificity** on the BreaKHis dataset.

Image Caption Generator | *TensorFlow/Keras, VGG16, GRU, Dash* — Oct 2023 – Dec 2023

- Implemented a **VGG16 & GRU** image captioning pipeline using cached transfer-values for efficient training.
- Generated coherent captions on COCO images using **generator-based training and sequence decoding**.

YOLOv8 Waste Detection System | *YOLOv8, Computer Vision* — March 2023 – May 2023

- Designed an anchor-free **YOLOv8** object detector for **28 waste classes** on industrial conveyor data.
- Achieved **mAP@50 = 0.60** with **3–9 ms** real-time inference on the WaRP dataset.

Awards

1st Place — CSU Generative AI Hackathon (AWS) — Aug 2025

- Built a Flask & JS dashboard serving **XGBoost** staffing predictions via single-day and batch APIs.
- Integrated an **AWS Bedrock & LangChain** assistant for natural-language staffing insights.

Technical Skills

Languages: Python, C++, SQL
Machine Learning: Scikit-learn, XGBoost, LightGBM, Predictive Modeling, Feature Engineering
Deep Learning: PyTorch, TensorFlow/Keras, ResNet, YOLOv8, GRU, OpenCV, CUDA, Mixed-Precision Training
GenAI/NLP: LLMs, Prompt Engineering, RAG (ChromaDB), LangChain, Hugging Face, AWS Bedrock
Systems/MLOps: Linux, Docker, Git, Flask APIs, HPC (SLURM), ONNX Runtime, AWS, Google Cloud Run