

Aaryan Kurade

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Summary

ML Engineer specializing in the end-to-end development and deployment of computer vision systems. Proven ability to architect robust AI/ML pipelines, containerize models for scalable inference via APIs, and integrate ethical considerations and explainability into the core of a project. Passionate about building responsible and transparent AI solutions.

PROFESSIONAL EXPERIENCE

Utopia Optovision Pvt. Ltd. | *ML Engineer Intern*

Jan 2024 - Jan 2025

- **Engineered** and deployed an automated text extraction system using **YOLO** and **PaddleOCR**, demonstrating a strong practical understanding of AI/ML concepts and rapid prototyping techniques with Python.
- **Applied** advanced computer vision approaches by leveraging **OCR** and **object detection**, resulting in a **15% improvement in model accuracy** for a key product feature.
- **Streamlined** data processing workflows by enhancing technical documentation and automation scripts, **reducing manual effort by an estimated 20%** and improving team efficiency.

Projects

Deepfake Detection

May 2025 - Jun 2025

- **Engineered** an end-to-end deepfake detection pipeline using PyTorch, processing video data with OpenCV to extract over 3,800 face frames and achieving **91.2% accuracy** and a **0.978 ROC-AUC score** on a balanced test set.
- **Architected** and deployed a scalable **REST API** using **FastAPI** and **Docker**, making the detection model accessible for real-time inference and serving it via a **public-facing URL on Render**.
- **Integrated explainable AI (XAI)** techniques by implementing **Grad-CAM** to generate visual heatmaps, increasing model transparency by highlighting the facial regions influencing its predictions.
- **Authored** a comprehensive ethics and bias report that analyzed model performance, including false positive/negative rates (10.1% / 7.4%), and outlined strategies for responsible deployment to mitigate societal risks like misinformation.

Video Anomaly Detection System

Jun 2025 - Jul 2025

- **Engineered** a production-grade, deep-learning anomaly detection system using a PyTorch-based Convolutional Autoencoder, achieving **92.5% precision** and **0.74 AUC** on the **UCSD Ped2 surveillance dataset**.
- **Architected** a scalable **REST API** using **FastAPI** and containerized the application with **Docker**, enabling real-time analysis of video streams with processing speeds of ~0.2 seconds per clip on GPU.
- **Implemented** an end-to-end **MLOps** pipeline featuring adaptive thresholding for dynamic environments and automated cloud deployment to **Render.com** via a **build.sh** script and **render.yaml** configuration.
- **Developed** a comprehensive solution with enterprise-ready features, including batch processing, preset security levels, and interactive API documentation, making it suitable for integration into real-world security systems.

AI-Driven Early Detection of Cardiovascular Diseases using Heart Sounds

Jan 2025 - Apr 2025

- **Developed** an AI-driven diagnostic system for early CVD detection, leveraging **VGG-AttnNet**, **Conformer**, and **AST models** for heart sound classification.
- **Implemented** robust audio preprocessing and feature extraction pipelines, achieving [e.g., **87% AUC**] diagnostic accuracy in classifying heart sounds while maintaining real-time performance.
- **Validated** system effectiveness through trials, demonstrating potential to improve cardiovascular care through explainable insights.
- **Deployed** the trained model on Google Cloud for remote inference.

Technical Skills

- **Programming Languages & Libraries:** Python, MySQL
- **Frameworks & Libraries:** TensorFlow, PyTorch, NumPy, Pandas, Scikit-learn, Matplotlib
- **Specializations:** Computer Vision, Natural Language Processing (NLP)
- **Tools & Platforms:** LLMs, VLM, OCR, Docker, Roboflow, CVAT, Jupyter, Git, GCP, FastAPI, Object Detection, OpenCV, Fine-tuning, Segmentation, SLAM, Reinforcement Learning, 3D Vision, Explainable AI (XAI), Generative AI, MLOps, Streamlit
- **Language Proficiency:** English Proficiency

Education

MIT World Peace University (MIT-WPU)

Jun 2021 - Jun 2025

Btech, Electronics and Communication Engineering - AI/ML (GPA: 7)

Pune, India