Ajay Devidas Wanekar

M.Tech Energy Science and Technology

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SUMMARY

M.Tech student at IIT Hyderabad with 2+ years of experience in Artificial Intelligence and Machine Learning. Experienced in Computer Vision, Vision-Language Models, LLMs, RAG, and Agentic AI, with practical experience in multimodal AI, detection and tracking, and intelligent interfaces.

Degree	University/Institute	Year	CGPA/ Marks(%)
M.Tech Energy Science and Technology	IIT Hyderabad	2027	6.8
B.E. Electrical Engineering	Savitribai Phule Pune University	2022	7.28
XII (Maharashtra State Board)	Vasantrao Naik Jr. College of Science and Arts, Cidco, Ch. Sambhajinagar, Maharashtra	2017	67.38%
X (Maharashtra State Board)	Maharashtra Public School, DTP, Ch. Sambhajinagar	2014	83.00%

WORK EXPERIENCE

Project Associate | *LFOVIA Lab, IIT Hyderabad* **Sep 2024 – Jul 2025**

Evaluated and fine-tuned Vision-Language Models (VLMs), including Florence-2 Base/Large, Llama 3.2 Vision, and Qwen2-VL, for multimodal text-image understanding, and benchmarked task-specific models including RetinaFace, DeepFace, and Siamese architectures for targeted detection, face analysis, and visual tracking/re-identification.

Junior Research Assistant | *TIHAN, IIT Hyderabad:* **Nov 2023 – Jul 2024**

Worked on multimodal maritime perception by developing and curating near-infrared and sonar datasets, implementing sensor-specific preprocessing, annotation, data-quality optimization, and model-training pipelines for robust object detection in complex maritime environments, resulting in an IEEE conference publication.

Research Intern | *WINET Lab, IIT Hyderabad:* **Jul 2023 – Nov 2023**

Developed foundational sonar-based underwater object-detection datasets by implementing annotation, Python-based preprocessing, data augmentation, and markup pipelines to improve data quality and model robustness, with the work published at the IEEE International Conference on Sustainable Technology and Engineering (i-COSTE 2023).

PROJECTS

Multi-Channel Conversational AI Platform:

- Built a multi-tenant conversational AI platform unifying voice, chat, and email with real-time STT/TTS pipelines and multilingual support for low-latency customer-care interactions.
- Developed a hybrid RAG pipeline (semantic + keyword retrieval) with LLM-based intent classification, improving answer relevance by 18% for customer data interactions.

Multimodal Vision-Language Model Evaluation for Computer Vision Tasks:

- Evaluated Vision-Language Models (VLMs) for multimodal (text-image) understanding across computer vision tasks, including object detection, segmentation, age and gender classification, crowd analysis, and action/activity recognition, as alternatives to conventional task-specific detectors.
- Curated and annotated RGB and depth-mapping datasets, building structured preprocessing, labeling, and quality-validation pipelines that standardized inputs and improved model training consistency and reliability.
- Benchmarked and fine-tuned models using Python-based pipelines, evaluating detection performance (precision/recall, IoU) and optimizing data-processing workflows for improved scalability and computational efficiency.

M.TECH THESIS

Hybrid Machine Learning Modeling for Multi-Objective Optimization of a Non-Oxidative Methane Coupling DBD Reactor

- Developed and benchmarked Linear Regression, Random Forest, XGBoost, and Gaussian Process Regression models to predict DBD reactor performance from operating conditions, reducing dependence on costly experimental trials.
- Engineered features from a 24-sample experimental dataset using one-hot encoding and evaluated model generalization through Leave-One-Out Cross-Validation (LOOCV).
- Achieved cross-validated R^2 values up to 0.996 using Gaussian Process Regression across six reactor-performance outputs, including CH_4 conversion, H_2 selectivity, and C_2–C_4 hydrocarbon selectivities.
- Performed feature-importance analysis and assessed model limitations related to extrapolation and confounded variables, identifying Bayesian Optimization as a potential strategy for experiment-guided process optimization.

TECHNICAL SKILLS

Programming & Frameworks: Python, SQL, PyTorch, CUDA, Pandas, NumPy, Scikit-learn, TensorFlow

AI & ML: Computer Vision (CV), Vision-Language Models, Large Language Models (LLMs), LLM Fine-Tuning, ANN, CNN, YOLO, DeepFace, RetinaFace, Multimodal Data Processing (Text, Image) Transformer Architectures

CONFERENCE PUBLICATIONS

[1] Wanekar A. D., Mannam N. P. B., Rajalakshmi P. “Novel Approach to Underwater Object Detection Using Sonar Sensors for Autonomous Underwater Vehicles (AUVs).” IEEE i-COSTE 2023, pp. 1–5.

[2] Wanekar A. D., Mannam N. P. B., Rajalakshmi P. “Object Detection and Classification for Autonomous Surface Vehicles (ASVs) Through Near-Infrared Imaging.” IEEE i-COSTE 2023, pp. 1–6.

HACKATHONS & ACHIEVEMENTS

- Top 10 All India - Winner, Meta x Pragati AI Hackathon.
- AI and X Hackathon, IIT Hyderabad - 2nd Place Winner