Kapil Wanaskar

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Work Experience

First American Title, *Senior ML Engineer* Apr 2025 – Present | Remote, CA, USA
- Engineered MultiAgent [WebSearch + Verification] workflow automating 250,000+ daily repetitive tasks, eliminating $1.25M in manual processing costs ($5 per task) while achieving 98% accuracy rate [**Patent** Pending]
- Optimizing model costs by 78% through knowledge distillation: Fine-tuned Qwen2.5-VL-7B to replace Gemini-2.5-Pro-API, deployed via Ollama achieving 2.3x faster inference speeds in production MultiAgent workflow

Amazon Web Services (AWS), *Applied ML Engineer* May 2024 – Mar 2025 | Cupertino, CA, USA
- Implemented GRPO, an advanced Reinforcement Learning (RL) fine-tuning strategy, to optimize Llama3.1; improved training efficiency by 40% over PPO while preserving accuracy across 100K+ samples
- Optimized large-scale distributed model training across 100+ Trainium accelerators with int4 quantization, implementing efficient data parallelism that reduced inter-node communication overhead by 35% and memory usage by 60%

Intuitive Surgical, *Software Engineer - ML* May 2023 – May 2024 | Sunnyvale, CA, USA
- Built FastAPI + VectorDB-based inference pipeline to detect out-of-distribution robotic surgery logs; achieved 98% precision, enabling early-stage anomaly flagging by the clinical safety team
- Supervised fine-tuned (SFT) LLM via PEFT (LoRA) on few-shot human-labeled feedback
- Post-trained embedding encoders and re-indexed FAISS via Online Reinforcement Learning (RL) for similarity updates, improving security by 13%
- HyperParameter tuned 130,000+ variations of unsupervised models on 150+ GB data using SageMaker + MLflow; achieved 92% precision and 99.9% accurate training inputs

Vectorr.in, *Software Engineer* Mar 2018 – Jul 2022 | Mumbai, India
- Engineered unsupervised customer segmentation system 10k+ (daily) visits stored in Snowflake database, surging customer satisfaction from 3.1 to 4.8.
- Integrated Apache Kafka and Superset to segment real-time audience data for digital marketing while training Unsupervised models on AWS EC2, amplifying ROI by 23%.

Research Publications

A Framework for Switchable LLM Alignment via CITA – Contrastive Instruction-Tuned Alignment 2026
- Achieved 86.7% instruction-alignment efficiency on Llama-3.1-8B with 25% higher reward margins (7.5 vs 6.0) **outperforming DPO** by 30.6pp, **GRPO** by 50.6pp, and **PPO** by 66.3pp across multi-dimensional evaluation
- Created ECLIPTICA benchmark with 3,000 prompt across 10 instruction types and 5 benchmarks
- Developed CITA algorithm with unified training pipeline (SFT→DPO→CITA) combining contrastive preference optimization and mandatory KL anchor, validated through Optuna-based hyperparameter search across 13 trials

A Comprehensive Dataset for Human vs. GenAI Image Detection 2026
- Created MS COCOAI dataset with 96,000 semantically-aligned real/synthetic pairs from 5 Text2Image/ diffusion models
- Established dual-task benchmark achieving 80.1% binary detection and 44.9% model attribution
- Designed frequency-domain ResNet-50 robustness framework, detecting with 80.1% accuracy across 4 perturbations

Multimodal Benchmarking and Recommendation of Text-to-Image Generation Models, *IEEE CISOSE 2025* 2025
- Received the "BDS **Best** Student **Paper**" **award**
- Evaluated 12+ (text-to-image) models (Stable Diffusion, CogView, FLUX, etc.) with ground truth from DeepFashion Multimodal dataset for alignment
- Designed Weighted Score metric combining CLIP-Score, LPIPS, FID, MRR& Recall@3 via min–max normalization
- Integrated metadata features and CLIP embeddings to align generated with ground truth image and prompt context
- Metadata-augmented models (Flux, InContext LoRA) showed ~19% higher Weighted Score & ~15 point FID reduction

Prompt Recommendations for AI art, *IEEE AIKE, California, USA* 2023
- Extracted features of 5000 images via text embeddings and ensemble models
- Proposed Graph-based evaluation of 3 recommendation Algorithms and Community Detection Algorithms, via analyzing absence of ratings or preference scores

Education

MS in Artificial Intelligence, Computer Engineering, CA, USA
San José State University

Master of Computer Integrated Manufacturing and Bachelor of Engineering, *Indian Institute of Technology (IIT) Bombay* Mumbai, India