

KAMALESH KUMAR

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Education

University of Massachusetts Amherst

Master of Science in Computer Science (GPA 4.00/4.00)

Sep. 2024 – May 2026

Amherst, MA

Indian Institute of Technology (IIT) Madras

B.Tech in Civil Engineering, Minor in Artificial Intelligence & Machine Learning

Jul. 2020 – May 2024

Chennai, India

Relevant Coursework: Advanced Machine Learning, Algorithmic Game Theory & Fairness, Robotics, Systems for Data Science, Reinforcement Learning (RL), Multi-Armed Bandits, Computational Cognition, Non-Linear Optimization.

Publications

- Breaking Free from Hand-Crafted Rewards: A Genetic Programming Framework for End-Goal-Driven Reinforcement Learning (*under review at AAMAS'26*)
- SketchCleanGAN: A generative network for improving 3D CAD model retrieval systems (*Computer & Graphics'24*) [DOI]
- SketchCADGAN: A generative approach for query sketch completion of 3D CAD models. (*Computer & Graphics'23*) [DOI]

Experience

Machine Learning Intern

KLA Corporation

May 2025 – Aug. 2025

Milpitas, CA

- Leveraged continual learning advances to tackle catastrophic forgetting in deep learning based wafer inspection models.
- Performed initial experiments that lead to a ~71% drop in the defect count and a ~52% improvement in precision.
- Collaborated with cross-functional teams to leverage recent research in gradient-replay, adapter & LoRA fine-tuning.

Research Intern (RL)

Mitacs Globalink

May 2024 – Aug. 2024

Antigonish, Canada

- Worked on genetic programming (GP) to discover novel reward functions in RL using the DEAP framework.
- Parallelized PPO training across reward populations using Ray + PyTorch, and scaled training to multiple cores.
- Showed the ability of GP in discovering better performing reward functions in MuJoCo and other Gym environments.

Research Intern (RL)

Paris AI Research Institute

May 2023 – Aug. 2023

Paris, France

- Investigated state, action, & kernel perturbing adversaries in RL, and showed theoretical equivalences between them.
- Proved connections between optimal transport distance, optimal couplings, and adversarial risk in RL

Machine Learning Intern

IceCream Labs

Jun. 2022– Aug. 2022

Bangalore, India

- Built pipeline for efficient watermark removal for downstream consumers alongside the founding member.
- Developed an end-to-end pipeline consisting of calibrated localization, image super-resolution, and object segmentation.

Projects

Continual Reinforcement Learning with Average Reward Criterion | UMass Amherst

Feb. 2025 – May 2025

- Investigated non-stationary environments in reset-free, continual RL settings requiring lifelong agent adaptation.
- Showed theoretical connections with average-reward POMDPs for modeling partial observability in infinite-horizon tasks.

Autonomous Object Following Robot using ROS and DeepSORT | UMass Amherst

Feb. 2025 – May 2025

- Built a ROS-based object-following robot using YOLO-v3 and DeepSORT for real-time tracking and re-identification.
- Designed a Dockerized ROS Noetic environment on Triton enabling CUDA-accelerated inference, and real-time control.

Real-Time Fake News Detection in Articles Using Apache Flink | UMass Amherst

Sep. 2024 – Dec. 2024

- Developed a real-time streaming pipeline with Apache Flink and ONNX-optimized DistilBERT for fake news detection.
- Optimized system performance for throughput, latency, fault tolerance, and resource efficiency in a scalable deployment.

Improving Sketch Queries for Robust Retrieval of 3D CAD Models | IIT Madras

Aug. 2022 – Dec. 2023

- Designed a two-stage cascaded GAN architecture to facilitate sketch completion of incomplete query sketches.
- Proposed a novel three-branch factorization based on conditional Wasserstein Generative Adversarial Network (GAN) to clean defective sketches and thus improvised a dataset of 58000 CAD sketches.

Technical Skills

Languages: Python, C++, MATLAB, L^AT_EX, C, SQL

Libraries: PyTorch, TensorFlow, JAX, Huggingface Transformers, Stable-baselines, Gym, OpenCV

Technologies/Frameworks: ROS, Ray, Linux, Git, Spark, Flink, Hadoop, Docker, Azure