Kamalesh Kumar

413-472-6246 kamalvidya.2002@gmail.com kkk2002 kkamaleshkumar kkamaleshkumar.github.io

Education

University of Massachusetts Amherst **Sep. 2024 – May 2026**
Master of Science in Computer Science (GPA 4.00/4.00) *Amherst, MA*

Indian Institute of Technology (IIT) Madras **Jul. 2020 – May 2024**
B.Tech in Civil Engineering, Minor in Artificial Intelligence & Machine Learning *Chennai, India*

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

Publications

- **K. Kumar**, J.-A. Delamer, and J. Hughes, "Breaking free from hand-crafted rewards: A genetic programming framework for end-goal-driven reinforcement learning," *(in review at AAMAS 2026)*
- **K. Kumar**, P. P. Kendre, R. D. Manilal, and R. Muthuganapathy, "Sketchcleangan: A generative network to enhance and correct query sketches for improving 3d cad model retrieval systems," *Computers & Graphics*, vol. 123, 2024
- P. P. Kendre, **K. Kumar**, S. S. K. Jayasree, S. Rajan, A. Jayan, and R. Muthuganapathy, "Sketchcadgan: A generative approach for completing partially drawn query sketches of engineering shapes to enhance retrieval system performance," *Computers & Graphics*, vol. 115, 2023

Experience

KLA Corporation **May 2025 – Aug. 2025**
Machine Learning Intern *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.

Mitacs Globalink **May 2024 – Aug. 2024**
Research Intern (Reinforcement Learning) *Antigonish, Canada*
- Worked on genetic programming (GP) to discover novel reward functions in RL using the DEAP framework.
- Parallelized training of the PPO algorithm across the population of reward functions in the Compute Canada cluster.
- Showed the ability of GP in discovering better performing reward functions in MuJoCo and other Gym environments.

Paris AI Research Institute **May 2023 – Aug. 2023**
Research Intern (Reinforcement Learning) *Paris, France*
- Awarded the Charpak Scholarship by the French Embassy in India to research on adversarial & robust RL.
- Investigated state, action, and kernel perturbing adversaries, and established theoretical equivalences between them.
- Proved connections between optimal transport distance, optimal couplings, and adversarial risk in RL

Nuartin Labs **Jun. 2022 – Aug. 2022**
Machine Learning Intern *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 – present**
- Investigating non-stationary environments in reset-free, continual RL settings requiring lifelong agent adaptation.
- Seeking 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 58K CAD sketches. Published at Computer & Graphics'24.

Technical Skills

Languages: Python, C++, MATLAB, LaTeX, C, SQL
Libraries: PyTorch, TensorFlow, JAX, Transformers (Huggingface), Stable-baselines, Gym, OpenCV
Technologies/Frameworks: ROS, Ray, Linux, Git, Spark, Flink, Hadoop, Docker, Azure