

Cagan Bakirci

Los Angeles, CA | caganbakirci.github.io | github.com/caganbakirci | linkedin.com/in/caganbakirci

SUMMARY

Robotics AI researcher and machine learning engineer with graduate research in robot learning, safe reinforcement learning, and specification-guided learning, backed by nearly four years of production software and ML engineering.

RESEARCH EXPERIENCE

Graduate Researcher — LIRA Lab (Robot Learning & Safe RL) Sep 2025 – Present

Advisor: Prof. Erdem Biyik University of Southern California, Los Angeles, CA

- Developing safety-aware reinforcement learning methods that learn catastrophe regions from blocker intervention feedback to reduce unsafe exploration in robotic manipulation while preserving task performance
- Built end-to-end evaluation infrastructure including custom simulation tasks, oracle trainers, ablation harnesses, Weights & Biases dashboards, and 3D hazard-region visualizations
- Built a WidowX real-robot imitation-learning pipeline, including expert-demonstration collection, behavior-cloning training, and an inference workflow for policy evaluation

Graduate Researcher — CPS-VIDA Lab (Robotics & RL Team) Jan 2025 – Present

Advisor: Prof. Jyotirmoy V. Deshmukh University of Southern California, Los Angeles, CA

- Co-developed a specification-guided framework that converts Signal Temporal Logic (STL) gait specifications into dense rewards via smooth robustness, reducing reliance on hand-engineered reward functions
- Trained and evaluated a unified Barkour locomotion policy in MuJoCo MJX, achieving intended speed-dependent gaits across tested speeds of 0.3–2.1 m/s, unlike the heuristic baseline at high speeds
- Conducted Qwen-based video-to-specification locomotion experiments, comparing original and expert-filtered specifications through PPO training and policy evaluation; coordinated independent verification of results
- Developing uncertainty-triggered intervention methods for vision-language-action (VLA) policies, with evaluation pipelines for confidence-threshold tuning and policy reliability analysis across manipulation tasks

PUBLICATIONS AND PREPRINTS

Headings are descriptive; links open the original papers.

Specification-Guided Reinforcement Learning for Quadruped Locomotion

M. Atasever, K. Azbijari, C. Bakirci, et al. · [arXiv:2607.00442](https://arxiv.org/abs/2607.00442) · Under review, ICRA 2027

Grounding Temporal Specifications from Video for Robot Learning

M. Atasever, K. Azbijari, C. Bakirci, et al. · [arXiv:2609.37519](https://arxiv.org/abs/2609.37519) · Under review, ICLR 2027

LLM-Generated Specifications for Locomotion Learning

M. Atasever, K. Azbijari, C. Bakirci, et al. · [arXiv:2609.07111](https://arxiv.org/abs/2609.07111) · LAFR Workshop, IROS 2026

PROFESSIONAL EXPERIENCE

Senior Machine Learning Software Engineer Jun 2021 – Jul 2024

Beko/Arçelik Global, Istanbul, Turkey

- Promoted to Senior in two years, the fastest timeline permitted by company policy
- Co-founded and developed Search Helper, a scalable containerized string-matching microservice that corrected 210,000+ search query typos in its first month, improved search reliability by 89%, and increased product discoverability
- Founded and led ComMind, a self-correcting ML-based rating system recognized by Sabancı University and selected for incubation at Koç University
- Founded and led Oculus, an OCR-based computer vision system for automated stock and serial-number extraction, developing algorithms to identify target fields from noisy, non-standardized product labels across appliance lines
- Implemented digital commerce and fulfillment features in SAP Hybris using Java and Spring Boot

Software Engineer Aug 2020 – Jun 2021

Fairbit LLC, Orange, CA

- Built asynchronous reactive microservices using Eclipse Vert.x (Java 15) with PostgreSQL

SKILLS

Languages: Python, C++, C, Java, SQL, Kotlin, Bash

ML / RL: PyTorch, JAX, TensorFlow/Keras, scikit-learn, NumPy/SciPy, reinforcement learning, Signal Temporal Logic

Robotics / Simulation: MuJoCo/MJX, ManiSkill, Gymnasium, SimplerEnv, Isaac Lab, robot policy evaluation

Systems / Infra: Linux, SLURM, Docker/Apptainer, Git, Weights & Biases, Spring Boot, Django, Vert.x

EDUCATION

University of Southern California — M.S. Computer Science (Artificial Intelligence) May 2026

University of California, Santa Cruz — B.S. Computer Science, with Honors Mar 2020