Cagan Bakirci

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Summary

Software Engineer specializing in machine learning with nearly 4 years of production software and ML engineering experience across backend systems, ML services, and e-commerce platforms. Recently completed an M.S. in Computer Science (Artificial Intelligence) at USC, with graduate research experience in robot learning, safe reinforcement learning, uncertainty-aware policy evaluation, and specification-guided reward shaping.

Skills

Languages: Python, Java, C/C++, Kotlin, SQL
ML/AI: PyTorch, JAX, TensorFlow/Keras, NumPy/SciPy, scikit-learn, deep learning, reinforcement learning
Robotics/Simulation: Gymnasium, ManiSkill, MuJoCo, SimplerEnv, policy evaluation, uncertainty quantification
Systems: Linux, SLURM, Apptainer/Docker, Git, Bash
Backend/Web: Spring Boot, Django, Eclipse Vert.x, SAP Hybris, Angular, Node.js

Research Experience

Graduate Researcher — LIRA Lab (Robot Learning & Safety RL) Sep 2025 – Present
Advisor: Prof. Erdem Biyik University of Southern California, Los Angeles, CA

- Developing safety-aware reinforcement learning methods for robotic manipulation, focusing on reducing unsafe exploration while maintaining task success and sample efficiency
- Built evaluation infrastructure for simulated manipulation experiments, including custom ManiSkill environments, safety constraints, training and evaluation pipelines, ablation harnesses, Weights&Biases dashboards, and 3D hazard-region visualizations

Graduate Researcher — CPS-VIDA Lab (Robotics & RL Team) Jan 2025 – Present
Advisor: Prof. Jyotirmoy V. Deshmukh University of Southern California, Los Angeles, CA

- Co-authored a manuscript under review at CoRL 2026 on specification-guided reinforcement learning for robotic locomotion
- Developing uncertainty-aware evaluation and intervention methods for vision–language–action (VLA) robot policies; built reproducible pipelines for threshold tuning, failure analysis, and policy-level intervention studies across manipulation tasks
- Stabilized and evaluated reward-shaping approaches for decentralized multi-agent path finding, analyzing coordination, collision behavior, and task success across varying environment complexities

Professional Experience

Senior Software Engineer, Machine Learning Jun 2021 – Jul 2024
Beko/Arcelik Global, Istanbul, Turkey

- Promoted to Senior in two years, the earliest timeline permitted by company policy
- Co-founded and developed Search Helper, a scalable containerized query-correction microservice that corrected 210,000+ search typos in its first month, improved search reliability by 89%, and increased product discoverability in e-commerce search
- Founded and led ComMind, a self-correcting ML-based rating system recognized by Sabanci University and selected for incubation at Koc University
- Founded and led Oculus, a computer vision system automating stock and serial-number reading across Arcelik product lines, reducing reliance on manual serial-number inspection
- Architected and implemented digital commerce and fulfillment features in SAP Hybris Commerce using Java and Spring Boot, supporting backend services for large-scale e-commerce operations

Software Engineer Aug 2020 – Jun 2021
Fairbit LLC, Orange, CA

- Built asynchronous reactive microservices using Eclipse Vert.x (Java 15) with PostgreSQL, improving system reliability and throughput

Education

University of Southern California Aug 2024 – May 2026
M.S. in Computer Science (Artificial Intelligence)
Selected coursework: Machine Learning; Deep Learning and Its Applications; Analysis of Algorithms; Applied NLP; Foundations of AI; Online Optimization

University of California, Santa Cruz Mar 2020
B.S. in Computer Science, *with Honors*
Selected coursework: Machine Learning (Graduate); Machine Learning for NLP (Graduate); Artificial Intelligence

Selected Projects

EEG-to-Text Decoding with LLM Rescoring Sep 2025 – Dec 2025
Researcher, University of Southern California

- Implemented context-aware LLM rescoring for EEG-to-text generation; improved BLEU-1 by 32% (relative) over a strong baseline on the ZuCo dataset via beam-search optimization and n-gram penalty tuning

EEG-Based Music Stimulus Reconstruction Aug 2024 – Dec 2024
Researcher, University of Southern California

- Trained deep learning models to reconstruct music stimuli from EEG by mapping power-spectral features to mel-spectrograms; achieved 82.9% classification accuracy and 0.80 cosine similarity, improving over the EEG2Mel baseline

LANL Earthquake Time-to-Failure Prediction (Kaggle) Apr 2019 – Jun 2019
Researcher, UC Santa Cruz

- Built ML models to predict time-to-failure from real-time seismic data; achieved top 5% ranking in LANL's Kaggle competition

WikiTrust 2.0 Oct 2019 – Jan 2020
Algorithm/Research Team Lead — Advisor: Prof. Luca De Alfaro, UC Santa Cruz

- Led algorithm/research work for an open-source reputation system estimating trustworthiness of Wikipedia authors and content