Cevahir Koprulu

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Education

University of Texas at Austin, Austin, TX, USA — M.S. 2023, PhD 2026
Electrical and Computer Engineering — GPA: 3.93/4
Research Interests: Reinforcement Learning (RL), Multi-task RL, Curriculum Learning for RL, and Meta RL.

Bilkent University, Ankara, Turkey — B.Sc. June 2021
Electrical and Electronics Engineering — GPA: 3.73/4

Honours/Awards:
Bilkent University Comprehensive Scholarship
Scholarship of Turkish Prime Ministry
Bilkent University EEE Department High Honours
University Entrance Exam, Ranked 24^{th} among 2 million students
FIRST Robotics Competition 2015: Recycle Rush, Rookie All-Star Award

Work Experience

Honda Research Institute - US — Ann Arbor, MI
Research Intern (all work is under NDA) — June 2024 - August 2024
Python, Pytorch

- Developed **an action advising framework**, Gen2Spec, that leverages generalist agents to train specialist agents in a continual learning setting. This framework accelerates the training of an RL agent via action advice from a transformer-based meta-RL agent that can adapt to unseen tasks.

Eatron Technologies — Istanbul, Turkey
Engineering Intern (all work is under NDA) — June 2020 - June 2021
Python, C++, Pytorch, ROS

- Designed **graph convolutional** and **self-attention**-based neural network architectures to extract spatio-temporal features of a traffic scene for trajectory prediction in a Level-2+ ADAS powered vehicle.

ROKETSAN (in collaboration with Bilkent University) — Ankara, Turkey
Industrial Design Project (all work is under NDA) — Sept 2019 - June 2020
Python, C++, Pytorch, ROS

- Developed a mobile robot that follows a human leader, combining **YOLOv3 for object detection** and **artificial potential field method for path planning** in a mapped area with unknown dynamic obstacles.

Research Work

Neural Stochastic Differential Equations for Uncertainty-Aware, Offline Reinforcement Learning — *Under Review*
Cevahir Koprulu*, Franck Djeumou, Ufuk Topcu*

Safety Prioritizing Curricula for Constrained Reinforcement Learning — *Under Review*
Cevahir Koprulu*, Thiago D. Simão, Nils Jansen, Ufuk Topcu*

Dense Dynamics-Aware Reward Synthesis: Integrating Prior Experience with Demonstrations — *Under Review*
Cevahir Koprulu*, Po-han Li, Tianyu Qiu, Ruihan Zhao, David Fridovich-Keil, Sandeep P. Chinchali, Ufuk Topcu, Tyler Westenbroek*

Risk-Aware Curriculum Generation for Heavy-tailed Task Distributions — *UAI, 2023*
Cevahir Koprulu*, Thiago D. Simão, Nils Jansen, Ufuk Topcu*

Reward-Machine-Guided, Self-Paced Reinforcement Learning (Full Paper) — *UAI, 2023*
Cevahir Koprulu*, Ufuk Topcu*

Reward-Machine-Guided, Self-Paced Reinforcement Learning (Extended Abstract) — *AAMAS, 2023*
Cevahir Koprulu*, Ufuk Topcu*

Joint Learning of Reward Machines and Policies in Environments with Partially Known Semantics — *Artificial Intelligence, 2024*
Christos Verginis, ***Cevahir Koprulu****, Sandeep Chinchali, Ufuk Topcu*

Act to Reason: A Dynamic Game Theoretical Driving Model for Highway Merging Applications — *CCTA, 2021*
Cevahir Koprulu*, Yildiray Yildiz*

Technical Skills

- Programming languages: (Competent) Python, (Knowledgeable) C++, Java, MATLAB, Julia
- Frameworks: Jax, Pytorch, TensorFlow, ROS

Relevant Coursework

- **UT Austin**: Online Learning, Causality and Reinforcement Learning, Statistical Machine Learning, Learning-based Optimal Control, Game-Theoretic Modeling of Multi-Agent Systems, Program Synthesis, Cyber-Physical Systems, Reinforcement Learning, Convex Optimization, Probability and Statistics, and Complex Networks in the Real World.
- **École polytechnique fédérale de Lausanne** (Exchange - Spring 2019): Image Analysis and Pattern Recognition (Grad), Convex Optimization (Grad), Deep Learning (Grad), and Biological Modelling of Neural Networks (Grad).
- **Bilkent University**: Statistical Learning and Data Analytics (Grad), Robust Feedback Theory (Grad), Introduction to Financial Mathematics (Grad), Neural Networks, and Game Theory.

Relevant Jobs, Research and Leadership Experiences

Center for Autonomy — Austin, TX
Ph.D. Student — Aug 2021 - Ongoing

Systems Laboratory — Ankara, Turkey
Undergraduate Researcher — Sept 2019 - July 2021

- Developed **human driver models** from real-traffic data that can change its reasoning level dynamically by combining **level-k game theory** and **reinforcement learning**.

IEEE Robotics and Automation Society at Bilkent University — Ankara, Turkey
Chairman — May 2017 - June 2018

- Organized "Mühendis Kafası" in cooperation with Technology Development Foundation of Turkey: Series of sessions on Computer Vision and Deep Learning.
- Gave lectures on robotics, control techniques, and related micro-controller programming: EE-101: Introduction to Robotics with Arduino.

Language Skills

- Turkish: Native proficiency
- English: TOEFL 110/120 (Fall 2020)
- French: DELF B1 (Spring 2015)

Recreational Interests

I enjoy climbing, cycling, watching soccer (football :)), and learning about history and psychology.