

İlker Işık

Doctoral Researcher in AI
Boston, Massachusetts, United States

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Researcher experienced in formal methods and reinforcement learning, primarily aims to develop innovative techniques in machine learning by exploring formal methods and neurosymbolic reasoning.

Experience

- Doctoral Researcher** September 2025 - Present
Boston University **Python, Rust**
 - Developing novel machine learning methods with a focus on domain-specific language models and reinforcement learning.
- Researcher** June 2024 - September 2025
Novator Energy Inc. **Python, Rust, JavaScript**
 - Research on post-disaster power system restoration using deep reinforcement learning.
- Research and Teaching Assistant** September 2022 - September 2025
METU (Middle East Technical University) **PyTorch, MATLAB, Rust**
 - Research on linear temporal logic and deep learning [8, 2]. Sponsored by Turkish Research Council (TÜBİTAK), project number: 122E249.
 - Teaching experience in computer vision, computer architecture and embedded systems.
- Research Internship & Student Researcher** July 2020 - September 2022
Cyber-Physical Systems Research Group (METU) **JavaScript, Python**
 - First author of a reinforcement learning paper [6].
 - Created a web-based interface for a disaster management system using visualization frameworks and geographic information systems. See PowerRAFT, used in [5].
- Software Engineering Internship** July 2021 - August 2021
ASELSAN **C#, JavaScript**
 - Internationalization of a program by using C# Reflection. Benchmarking serialization protocols.
- Freelance Software Developer** October 2019 - June 2020
Bubble IVS (Remote) **JavaScript**
 - Developed an online game using MongoDB, Node.js, JavaScript and HTML5 Canvas.
 - Implemented a login system, integrated the app to the third-party payment services.

Education

- Boston University** Massachusetts, USA
PhD in Computer Engineering 2025 - Present
 - CGPA: 4.00/4.00 (High Honor), working with Prof. Wenchao Li [1, 3, 7]
- Middle East Technical University** Ankara, Turkey
MSc in Computer Engineering 2022 - 2025
 - CGPA: 4.00/4.00 (High Honor), full marks (AA) in 7 courses.
 - Implemented and trained SaShiMi from scratch, a deep generative model architecture for raw audio. For more information, samples and code: <https://necrashter.github.io/sashimi-796>

- Implemented “Fine-tuning Image Transformers using Learnable Memory” from scratch. For more information and code: <https://necrashter.github.io/transformers-learnable-memory>

- **Middle East Technical University**

Ankara, Turkey

BSc in Computer Engineering

2018 - 2022

- CGPA: 3.96/4.00 (High Honor), full marks (AA) in 38 courses. Ranked 5th out of 266 students.
- Senior project: “ProGeCT”, generating a city procedurally for training machine learning models.

Publications

- [1] İlker Işık and Wenchao Li. “Names Don’t Matter: Symbol-Invariant Transformer for Open-Vocabulary Learning”. In: *International Conference on Machine Learning (ICML)*. 2026. URL: <https://arxiv.org/abs/2601.23169>.
- [2] İlker Işık, Ramazan Gokberk Cinbis, and Ebru Aydin Gol. “Interchangeable Token Embeddings for Extendable Vocabulary and Alpha-Equivalence”. In: *International Conference on Machine Learning (ICML)*. 2025. URL: <https://arxiv.org/abs/2410.17161>.
- [3] Zijian Guo, İlker Işık, H M Sabbir Ahmad, and Wenchao Li. “One Subgoal at a Time: Zero-Shot Generalization to Arbitrary Linear Temporal Logic Requirements in Multi-Task Reinforcement Learning”. In: *The Thirty-ninth Annual Conference on Neural Information Processing Systems*. 2025. URL: <https://openreview.net/forum?id=NGgLhJKttI>.
- [4] İlker Işık, Ayşenur Uzunalioğlu, Umur Deveci, and Murat Göl. “Implicit Solutions for Line Partitions in Electrical Distribution System Restoration MDP”. In: *2025 IEEE PES Innovative Smart Grid Technologies Conference Europe (ISGT Europe)*. 2025, pp. 1–5. DOI: 10.1109/ISGTEurope64741.2025.11305616.
- [5] İlker Işık and Ebru Aydin Gol. “Field teams coordination for earthquake-damaged distribution system energization”. In: *Reliability Engineering & System Safety* 245 (2024), p. 110050. ISSN: 0951-8320. DOI: <https://doi.org/10.1016/j.res.2024.110050>. URL: <https://www.sciencedirect.com/science/article/pii/S095183202400125X>.
- [6] İlker Işık, Onur Yigit Arpali, and Ebru Aydin Gol. “Optimal Policy Synthesis from A Sequence of Goal Sets with An Application to Electric Distribution System Restoration”. In: *IFAC-PapersOnLine* 54.5 (2021). 7th IFAC Conference on Analysis and Design of Hybrid Systems ADHS 2021, pp. 271–276. ISSN: 2405-8963. DOI: <https://doi.org/10.1016/j.ifacol.2021.08.510>. URL: <https://www.sciencedirect.com/science/article/pii/S2405896321012854>.

Preprints

- [7] İlker Işık, Ayşenur Uzunalioğlu, Umur Deveci, Murat Göl, and Wenchao Li. “Optimal and Scalable Black-Start Planning via Dynamically Factored Markov Decision Processes”. In: (Feb. 2026). DOI: 10.36227/techrxiv.177220109.93165743/v1. URL: <http://dx.doi.org/10.36227/techrxiv.177220109.93165743/v1>.
- [8] İlker Işık, Ebru Aydin Gol, and Ramazan Gokberk Cinbis. *Learning to Estimate System Specifications in Linear Temporal Logic using Transformers and Mamba*. 2024. arXiv: 2405.20917 [cs.CL]. URL: <https://arxiv.org/abs/2405.20917>.

Other

- First place winner in KODTÜ 3 programming contest. Also participated in other competitions.
- **Open Source Contributions** (<https://github.com/necrashter>) **C++, JavaScript, Python**
 - Created a blockchain-based federated learning intrusion detection system using PyTorch.
 - Ported DeepLTL to PyTorch.
 - Implemented char-mamba: Simple Mamba-based Character-level Language Modeling.
 - Contributed to LMMS (digital audio workstation) and Godot (game engine).
 - Other projects: a user interface for controlling UAVs, Vulkan compute shader demo, and more.
- Participated in several game jams: <https://necrashter.itch.io/>
- Amateur electric guitar player and musician. YouTube, SoundCloud.