

Ekin Akyürek

COMPUTER SCIENCE & ARTIFICIAL INTELLIGENCE LABORATORY, MIT

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Education

Massachusetts Institute of Technology

Cambridge, MA

PH.D. STUDENT IN ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

Sept 2019 - Present

- Advisor: Prof. Jacob Andreas
- GPA: 5.00/5.00
- Related Classes: Algorithms for Inference (6.438), Statistical Learning Theory (9.520), Theory of Computation (6.840), Advanced NLP (6.864), Neuro-Symbolic Models for NLP, Optimization Methods (6.255)

Massachusetts Institute of Technology

Cambridge, MA

M.S IN ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

Sept 2019 - June 2021

Koç University

Istanbul, TR

B.S. IN ELECTRICAL AND ELECTRONICS ENGINEERING; B.S IN PHYSICS

Sept 2013 - Feb 2019

- Research Advisor: Prof. Deniz Yuret
- Summa Cum Laude; 2nd rank in the University; 1st rank in the Physics Department
- GPA: 4.07/4.30
- Related Classes: Linear Systems Theory, Deep Learning, Random Process, Digital Image and Video Processing, Digital Signal Processing

Izmir Science High School

Izmir, TR

- Won a bronze medal in International Physics Olympiad in 2013

Sept 2009 - Feb 2013

Publications

- [1] E. Akyürek, J. Andreas, D. Schuurmans, T. Ma, and D. Zhou, *What learning algorithm is in-context learning? investigations with linear models*.
- [2] A. Drozdov*, N. Schärli*, E. Akyürek, N. Scales, X. Song, X. Chen, O. Bousquet, and D. Zhou, *Compositional semantic parsing with large language models*.
- [3] E. Akyürek, T. Bolukbasi, F. Liu, B. Xiong, I. Tenney, J. Andreas, and K. Guu, "Tracing knowledge in language models back to the training data", *Findings of the Conference on Empirical Methods in Natural Language Processing, EMNLP, 2022*.
- [4] E. Akyürek and J. Andreas, *Compositionality as lexical symmetry*, 2022.
- [5] S. Li, X. Puig, C. Paxton, Y. Du, C. Wang, L. Fan, T. Chen, D.-A. Huang, E. Akyürek, A. Anandkumar, J. Andreas, I. Mordatch, A. Torralba, and Y. Zhu, "Pre-trained language models for interactive decision-making", *Neural Information Processing Systems, 2022*.
- [6] E. Akyürek, A. Edelman, and B. Wang, "Backpropagation through Back substitution with a Backslash", *Neurips Differential Programming Workshop, 2021*.
- [7] A. F. Akyürek, E. Akyürek, D. Wijaya, and J. Andreas, "Subspace Regularizers for Few-Shot Class Incremental Learning", *International Conference on Learning Representations, 2022*.
- [8] E. Akyürek and J. Andreas, "Lexicon Learning for Few-Shot Neural Sequence Modeling", in *Proceedings of the 58th Annual Meeting of the Association for Computational Linguistics*, Association for Computational Linguistics, 2021.
- [9] E. Akyürek, A. F. Akyürek, and J. Andreas, "Learning to Recombine and Resample Data For Compositional Generalization", in *International Conference on Learning Representations, 2021*.
- [10] E. Akyürek*, E. Dayanık*, and D. Yuret, "Morphological Analysis Using a Sequence Decoder", *Transactions of the Association for Computational Linguistics*, vol. 7, 2019.
- [11] A. Börütecene, I. Bostan, E. Akyürek, A. Sabuncuoglu, I. Temuzkusu, Ç. Genç, T. Göksun, and O. Özcan, "Through the glance mug: A familiar artefact to support opportunistic search in meetings", in *Proceedings of the Twelfth International Conference on Tangible, Embedded, and Embodied Interaction*, ACM, 2018.

Honors & Awards

INTERNATIONAL

- | | | |
|------|--|----------------|
| 2016 | Regional Finalist , Hult Prize | London, UK |
| 2013 | Bronze Medal , International Physics Olympiad | Copenhagen, DK |
| 2013 | AP Scholar Award , College Board | U.S |

DOMESTIC

2018	Best Senior Design Project , Koç University Electrical Engineering Department	<i>Istanbul, TR</i>
2016	Best Design Award , TUBITAK UAV Competition	<i>Istanbul, TR</i>
2016	2nd Place , Istanbul Technical University Robotics Olympics	<i>Istanbul, TR</i>
13'-19'	Full-Merit Undergraduate Scholarship , Koç University	<i>Istanbul, TR</i>
13'-19'	TUBITAK Undergraduate Scholarship , TUBITAK	<i>Ankara, TR</i>
2012	Gold Medal , TUBITAK National Physics Olympiad	<i>Ankara, TR</i>

Research Experience

Computer Science & Artificial Intelligence Laboratory, MIT

Cambridge, MA

PHD STUDENT

Sept 2019 - Present

- My recent work [1] aims at understanding finding simple biases that will enable compositional generalization in neural language models to achieve human-like generalization.
- Working on using language to guide few-shot learning of image classifiers and robot policies in multi agent settings.

Computer Science & Artificial Intelligence Laboratory, MIT

Cambridge, MA

VISITING RESEARCHER

Jul. 2018 - June 2019

- Worked on linear algebraic formalization of automatic differentiation to enable matrix operations on the computation graph with Prof. Alan Edelman (a paper is in-print)
- Implemented [DPMM.jl](#), a modular Julia Library implementing distributed non-parametric Bayesian algorithms for efficient parallel inference in DPMMs (with John W. Fischer).
- Contributed to core Julia machine learning libraries including [KnetLayers.jl](#) and [Knet.jl](#)

Artificial Intelligence Laboratory, Koç University

Istanbul, TR

RESEARCHER

July. 2017 - July 2018

- Developed new state-of-the-art neural models for morphological analysis and generation [2].
- Worked on visual-language grounding and implemented a state of the art Visual Q & A [model](#) on GQA dataset in Julia.

Arçelik Research Center for Creative Industries, Koç University

Istanbul, TR

ELECTRONICS DESIGNER & SOFTWARE ENGINEER

Sept 2016 - July 2017

- Designed and programmed a prototype of interactive mug with speech recognition and artificial intelligence capabilities [3].

Work Experience

Google

Seattle, WA

STUDENT RESEARCHER

June 2022 - September 2022

- Worked on understanding in-context learning properties of neural sequence models.

Google

Mountain View, CA

RESEARCH INTERN

June 2021 - August 2021

- Worked on zero-shot retrieval with language models for knowledge intensive tasks.

Aselsan

Ankara, TR

DIGITAL DESIGN ENGINEER INTERN

June 2017 - July 2017

- Designed an interface on the FPGA board which drives specific IC circuits which are used in wireless communication.

Balfis

Austin, TX

SOFTWARE DEVELOPER INTERN

June 2016 - August 2016

- Designed a Django web server for the company's cross-platform mobile application
- Coded server-side communication part of the application, written in Ionic framework

Molocate

Istanbul, TR

FULL-STACK DEVELOPER

January 2016 - August 2016

- Created the UI of the IOS application that enable users to share videos with location tagging and view videos from followed locations and users.
- Added back-end communication functionality to the front-end application written in the Swift language.

Teaching Experience

Fall 2021 **Teaching Assistant**, Advanced Natural Language Processing, MIT
15'-16' **Tutor**, Signal & Systems, Circuit Design, Electromagnetism classes in Koç University
14'-15' **Teaching Assistant**, Physics, TUBITAK Science Olympiad Summer and Winter Schools

Cambridge, MA
İstanbul, TR
Ankara, TR

Talks

2021 **Compositional Models for Few Shot Sequence Learning**, AIR Seminars, Boston University

Boston, MA

Skills

Programming Pytorch, JAX, Python, Julia, Java, MATLAB, C++, JavaScript
Electronics DSP, SPICE, PCB Design, VHDL Design, Microcontrollers

Volunteer Work

Make a Wish Turkey

İstanbul, TR

VOLUNTEER

2014-2017

- With a group of volunteering peers, we visited cities around the country to make the utmost dreams of the children with life threatening diseases. We raised funds and arranged events for children

Koc University Education Society

İstanbul, TR

VOLUNTEERING TEACHER

2013-2014

- Gave free lectures for secondary school kids from families with low socio-economical status to support with their classes

Leadership & Club Activities

IEEE Robotics & Automation Society, IEEE Student Branch

İstanbul, TR

CHAIRMAN

July 2015 - June 2016

- Hold 5-week Arduino & Electronics Design Courses for the freshman engineering majors in the Koç University
- Arranged 5-week Raspberry Pi Development Courses given by a Microsoft MVP which provided students with internship opportunities at Microsoft
- Organized Techno-Date which brings together students and tech startups. During the event students had the chance to listen-up numerous start-up journeys
- Completed two projects with the team and appointed to local awards (Drone.NET and KUAV)

IEEE Student Branch

İstanbul, TR

BOARD MEMBER

Sept 2014 - June 2018

- Organized 12th IEEE Turkey Student & Young Professional Congress in 2015 with 400 IEEE members in Koç University
- Organized "Bi' Fikir Bi' Şirket" which is a 2-day comprehensive event for students interested in technology enterprises and startups, including seminars, workshops and entertainment. The event also comprises a competition for startups to receive support from Koc Incubation Center