ABTIN MOGHARABIN

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Education

Middle East Technical University (Ankara, Turkey) October 2020 – Present

- Major in Statistics CGPA = 3.90/4.00
- Minor in Mathematics CGPA = 4.00/4.00

Experience

TEKNOFEST (Adana, Turkey)

Data Team Leader | ML Engineer in AI competition (Advisor: İlkay Ulusoy) January 2024 – Present

- Participated in 'Technology for Humanity' and 'Biotechnology Innovation' Competitions as a team of 10. The goal is to construct a Multi-Modal diagnosis system for Alzheimer's.
- As the data team leader, designed and oversaw the preprocessing and analysis process of ADNI's fMRI, MRI, and GWAS genetic datasets.
- As a member of the technical team, designed a novel VAE model to extract gene expressions.

Middle East Technical University (Ankara, Turkey)

Undergraduate Researcher (Advisor: Ceylan Talu Yozgatlıgil) February 2024 - Present

- Contributing to the development of Sequential Monte Carlo Models for Time Series Structure Discovery.
- Working on the improvement of the fundamental $O(n^3)$ scaling bottleneck over dense Gaussian processes.

Undergraduate Research Assistant (Advisor: İlkay Ulusoy) July 2023 – January 2024

- Using fMRI and MRI images of the Brain to analyze Alzheimer's and Normal brain information.
- Using deep earning approaches to construct a diagnosis system for Alzheimer's.
- Worked on Dynamic Bayesian Networks developed from fMRI images, applying statistical tests and comparing Alzheimer's vs Normal Brain region's connectivity.

Undergraduate Researcher (Short-Term Advisor: Ramazan Gökberk Cinbiş) February 2023 – December 2023

- Contributing to the development and implementation of transformers-based deep learning models for Carotid Artery Ultrasound segmentation.
- Implemented multiple deep learning-based architectures. Contributed to surpassing previous benchmark results on Carotid Artery Ultrasound segmentation.

Student Teaching Assistant (Course Instructor: Zeynep Işıl Kalaylıoğlu) December 2022 – May 2023

- Student assistant in the courses Mathematical Statistics I (STAT 303) and Mathematical Statistics II (STAT 304) during the 2022/2023 academic year.
- Led office hours for undergraduate students of the same year, providing weekly individualized support and guidance on course material and problem-solving.

Projects

Scheme interpreter January 2024 – Present

- A Scheme interpreter was implemented in Julia.
- For a large part, the project was executed based on the content of "Structure and Interpretation of Computer Programs" textbook by Gerald Jay Sussman, Hal Abelson, and Julie Sussman

Semantic Parser using CCG (link) December 2023 – Present

- During the project, a semantic parser was implemented in Python. The implementations included a number of the topics learned in COGS543 (Computational Semantics) and COGS532 (Computational Morphology and Syntax) graduate courses.
- For the syntactic rules, Combinatory Categorical Grammar (CCG) alongside internal merge grammar was used. For the logic and semantics, Modal Logic was implemented.

Bayesian analysis on BART (link) October 2023 - January 2024

- Using Bayesian methods, multiple models were used to analyze the BART (Balloon Analog Risk Task) cognitive test.
- Bayesian Linear and Non-linear models, Bayesian Mutli-level Models, and Bayesian Gaussian processes were implemented using PyMC.

Human activity recognition by smartphones (Kaggle Competition) July 2023 – August 2023

- Predicting human activity using smartphones Kaggle data on Python. Conducted tests using various Machine learning models such as assemble methods, Bayesian models, and gradient boosting.
- Implemented various deep learning approaches in PyTorch, achieving an accuracy of 98.3%

Survey research project November 2022 – January 2023

- Conducted a survey on international students at 17 Turkish universities about their motivations, expectations, and satisfaction using the poststratification sampling method
- Analyzed the survey results by the use of Statistical inference and machine learning modules including Logistic Regression, Naïve Bayes, K-NN, Kernel SVM, and Gradient Boosting

Developed an R Shiny app (link) December 2021 – February 2022

- Designed an interactive R Shiny app using asylum seekers' data.

Skills and Coursework

Programming Skills Proficient in Python, R, and Julia. Prior experience with WebPPL, Church, MATLAB, and Haskell

Miscellaneous Experienced in Excel, UNIX and LaTeX

Research Interests Probabilistic Programming, Computational Linguistics, Cognitive Science, Machine Learning

Selected Coursework Probability Theory (PhD level), Intro. to Probabilistic Programming (Graduate), Computational Semantics (Graduate), Computational Syntax and Morphology (Graduate), Advanced Deep Learning (Graduate), Deep Learning (Graduate), Intro. to optimization, Stochastic processes, Artificial Intelligence: Applications in Education

Languages Persian (Native)**,** English (Full Professional Proficiency)

Awards and Achievements

- The First rank, Achieving the highest cumulative GPA among all fourth-year statistics students (Present).
- Received the METU's 100% international students' tuition fee payment scholarship (2021-Present).
- Ranked in the top ~ 0.5% in Iran's National Mathematics and Physics University Entrance Exam (2019).
- Ranking first in Isfahan's teen robotic contest, creativity section (2011).