GÖZDE ÖZCAN

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SUMMARY

Machine Learning Researcher with 5+ years of experience in solving discrete optimization problems with artificial intelligence applications. Detail oriented with strong mathematical and writing skills, publication record, history of collaborations and hands-on experience working with deep learning toolkits.

EDUCATION

Northeastern University, Boston, MA — September 2018 - August 2024 (expected)

- **Doctor of Philosophy** in Electrical Engineering, Dean's Fellowship
  GPA: 3.86/4.00
  Relevant Courses: *Advanced Machine Learning, Advances in Deep Learning, Algorithms, Graph Theory*

September 2018 - December 2021

- **Master of Science** in Electrical and Computer Engineering, Dean's Fellowship
  GPA: 3.84/4.00
  Relevant Courses: *Machine Learning & Pattern Recognition, Parallel Processing for Data Analytics, Probabilistic System Modelling & Analysis, Numerical Optimization Methods, Big Data and Sparsity*

Bilkent University, Ankara, Türkiye — September 2013 - June 2018

- **Bachelor of Science** in Electrical and Electronics Engineering, Comprehensive Scholarship
  GPA: 3.38/4.00 (Honor)
  Relevant Courses: *Nonlinear Systems, Probability and Statistics, Algorithms & Programming*

TECHNICAL SKILLS & LANGUAGES

Programming Languages & Software	Python, PyTorch, JAX, Tensorflow, Spark, Pandas, SQL, MATLAB
Languages	Turkish (native), English (proficient), German (upper intermediate)

RESEARCH EXPERIENCE

Northeastern University — September 2018 - Present
Graduate Research Assistant, Center for SPIRAL — *Boston, MA*

- **Submodular Maximization via Polynomials**
  - Developed efficient methods for optimizing various deterministic and stochastic submodular functions for machine learning applications by introducing a novel polynomial series estimator to approximate the multilinear relaxations of the objectives
  - Showed a variant of the continuous greedy algorithm achieves an approximation ratio close to 63% by utilizing this estimator
  - Performed numerical experiments using Python to validate the advantages of our approach across synthetic and real-life datasets
- **Team Formation**
  - Formulated a methodology for reducing online submodular maximization problems to online convex optimization problems with appropriate concave relaxation and randomized rounding schemes
  - Mathematically proved team formation problems, along with influence maximization and facility location problems, fall within a wide class of submodular functions

- Conducted extensive computational experiments using Python, comparing our proposed algorithms to existing work, performing hyper-parameter search, and reporting results

- **Neural Point Processes**
  - Developing a Gaussian process based neural network for predicting output values associated with pin positions on satellite image data (SpaceNet6) by leveraging spatial correlations in 2D space using PyTorch
  - Building a deep neural network architecture using Auto-Encoders and Denoising Diffusion Probabilistic Models

- **Learning Set Functions**
  - Leveraging implicit function theorem in the evidence lower bound (ELBO) maximization step of learning set functions using a maximum likelihood learning framework with variational inference
  - Replacing Monte Carlo sampling estimation of the multilinear relaxation of the objective set function with polynomial estimation and testing the performance of this approach using JAX

WORK EXPERIENCE

Meta Inc. May - August 2022
Software Engineer Intern, Machine Learning (PhD) *Menlo Park, CA*
- Designed a prototype ML model from scratch for Instagram's Well-being ML Fairness Team and achieved 70% accuracy with this initial classifier, crafted a pipeline for custom dataset generation with fairness related features

Facebook Inc. May - August 2021
Software Engineer Intern, Machine Learning (PhD) *New York City, NY*
- Developed a Signal Clustering Framework for Instagram's Well-being Signals & Insights Platform and presented results to the larger Well-being community and cross-functional teams of Instagram

Eczacıbaşı Holding September 2017 - June 2018
Senior Year Project Engineer *Bilecik, Türkiye*
- Developed an error detection system for ceramic sanitary ware products using visual data

Fraunhofer IIS June - September 2017
Summer Intern *Dresden, Germany*
- Designed PCBs; performed assembly, internal verification, and laboratory evaluation of test chips

PUBLICATIONS

Si-Salem, T., **Özcan, G.**, Nikolaou, I., Terzi, E., Ioannidis, S. (AAAI2024) **"Online Submodular Maximization via Online Convex Optimization"** ***(acceptance rate 23.75%)***.

Özcan, G., Ioannidis, S. (PAKDD2023) **"Stochastic Submodular Maximization via Polynomial Estimators"** ***(acceptance rate 17%)***.

Özcan, G., Moharrer, A., Ioannidis, S. (SDM2021) **"Submodular Maximization via Taylor Series Approximation"** ***(acceptance rate 21.25%)***.

TEACHING EXPERIENCE

Northeastern University September - December 2020
Teaching Assistant *Boston, MA*
- Led 1:1 office hours with a focus on PySpark programming for 50+ Master's level EECE5645 Parallel Processing and Data Analytics course students

Bilkent University October 2016 - January 2017
Teaching Assistant *Ankara, Türkiye*
- Supervised hands-on laboratory sessions for 40+ sophomore level Analog Electronics course students