Elahe Mohammadi Siahroodi

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Professional Experience

SEP 2022 - AUG 2024 (JOHNS HOPKINS UNIVERSITY)
Research Assistant

AUG 2020 - MAY 2021 (SHARIF UNIVERSITY OF TECHNOLOGY)
Research Assistant

JAN 2024 - MAY 2024 (JOHNS HOPKINS UNIVERSITY)
Teaching Assistant
Intro to Optimization, Computational Statistics

AUG 2020 - JAN 2021 (SHARIF UNIVERSITY OF TECHNOLOGY)
Teaching Assistant
Operational Research

MAY 2015 - MAR 2021
Tutoring
Middle, High School, University Undergrad Math

Research Experience

FEB 2024 - PRESENT (JOHNS HOPKINS UNIVERSITY)
Speed up Neural Network Parameters Optimization; E. Mohammadi, J. Schmidt.
Developed a first-order optimization method that achieves second-order convergence rates by applying a Jacobi preconditioner using curvature information. Conducted eigenvalue analysis to optimize distribution for efficient batching. This innovative method outperforms many well-known algorithms currently available, such as ADAM.

FEB 2024 - PRESENT (JOHNS HOPKINS UNIVERSITY)
Robust Optimization Approach for Online Learning; E. Mohammadi, A. Raman.
Applied distributionally robust optimization techniques to enhance the performance and reliability of inverse reinforcement learning models.

FEB 2022 - 2024 (JOHNS HOPKINS UNIVERSITY)
Uncertainty in Inverse Optimization; E. Mohammadi, K. Ghobadi.
Developed a novel approach to inverse optimization by incorporating data-driven uncertainty, employing methods like stochastic programming and robust optimization to enhance decision-making. Applied advanced statistical techniques and machine learning to improve model accuracy and robustness, with applications in radiotherapy.

AUG 2022 - DEC 2022 (JOHNS HOPKINS UNIVERSITY)
Forecasting Adverse Effect of Drugs Based on Drug Similarities in Terms of Protein Targets; E. Mohammadi, N. Wang, K. Sharma.
Analyzed drug similarities using various graph measures to predict adverse effects. Applied diverse machine learning methods to forecast these effects with high accuracy.

AUG 2020 - MAY 2021 (SHARIF UNIVERSITY OF TECHNOLOGY)
Network Alignment Method in Protein-Protein Interactions (Master's Thesis); E. Mohammadi, M.H. Foroughmand.
Conducted an in-depth literature review on network alignment methods for protein-protein interactions. Developed an online version of the alignment model, applying the stochastic dual primal mirror descent algorithm for efficient optimization. Utilized Python for model development and implementation.

AUG 2020 - JAN 2021 (SHARIF UNIVERSITY OF TECHNOLOGY)
Genome Scale Reconstruction of Metabolic Pathways in Cancer; M. Kashkouli, E. Mohammadi, S. Ramezanzade.
Spearheaded the theoretical framework and algorithm design for modeling cancer cell metabolic networks, identifying crucial pathways. Developed spectral algorithms in Python and Matlab for efficient community detection, uncovering vital biological communities. Designed and evaluated machine learning models to forecast the effects of metabolic pathways on cancer progression, enhancing understanding of cancer metabolism.

Summary

"The beauty of mathematics shows itself to patient followers."

Detail-oriented researcher with expertise in Optimization, Machine Learning, and Mathematical Modeling. Experienced in developing and implementing numerical algorithms and machine learning models, conducting statistical analysis, and utilizing data-driven decision-making. Strong background in interdisciplinary collaboration, publishing research findings, and delivering clear and visually engaging presentations. Skilled at solving complex problems and driving innovation, with a keen interest in continuous learning and growth. Seeking to contribute my skills to a research-focused role in a dynamic environment.

Education

2022 – 2024 **Master of Science, *Systems Engineering***
Johns Hopkins University

2018 – 2021 **Master of Science, *Applied Mathematics***
Sharif University of Technology

2013 - 2018 **Bachelor of Science, *Pure Mathematics***
Sharif University of Technology

Certificates

IBM Data Science Professional Certificate
IBM

Deep Learning Specialization
DeepLearning.AI

Computer Skills

PROGRAMMING	Python, MATLAB, R, HTML
ML & DATA SCIENCE	PyTorch, TensorFlow, Scikit-Learn, SQL
OPTIMIZATION	CVX, COBRA, Gurobi, PuLP
OTHERS	LaTeX, Microsoft Office

Skills and Courses

Optimization:

Continuous Optimization, Combinatorial Optimization, Convex Optimization, Numerical Methods for Optimization, Large Scale Optimization

Machine Learning:

Theory of ML, Supervised and Unsupervised Learning, Online and Reinforcement Learning, Data Analysis, Statistical Analysis, Regression,NN and Transformers

Operation Research:

Mathematical Modeling, Mathematical Analysis, Algorithm Design, Stochastic Process and Probability Theory, Graph Theory

Numerical Analysis:

Numerical Linear Algebra, Numerical Optimization, Scientific Computing