Pouria Nozari

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Professional Summary

- Versatile researcher and **certified data scientist** with **10 years of research/professional experience** in predictive modeling, machine learning, data & AI, and robotics.
- Holder of a Ph.D. in Biomedical Engineering, AI certifications, and an internship at Goldman Sachs as a quantitative strategist associate.
- Being adept at turning complex technical problems into actionable insights, I am eager to leverage my diverse technical and scientific communication skills to contribute to businesses' AI and data solutions as a ***data scientist*** or ***AI/ML engineer***.

Professional Experience

Doctoral Researcher (Graduate Research Assistant) 08/2017 – 08/2023

LOCOMOTOR CONTROL LAB (LCL), UNIVERSITY OF SOUTHERN CALIFORNIA Los Angeles, CA

- Initiated and led a novel research agenda on using physics-based modeling, machine learning, and optimization to develop novel simulation platforms for studying human motor control, playing a key role in securing a $1.2M R01 research grant.
  - Completed a Doctoral Dissertation on this initiative, leading to five publications as the lead author, including a review and a book chapter.
  - Developed distributed computing codes that optimized resource utilization, achieving a 100x reduction in simulations ensemble runtime.
  - Devised a stochastic inverse optimization framework that addressed the long-standing problem of multicollinearity among biological motor objectives, achieving 95% variance explained in the cost space.
- Organized and chaired the within-division Computational Motor Control & Learning Journal Club for weekly scientific discussions.
- Contributed to the lab's open-source projects. Provided feedback for team members in math, coding, and experimental design.

Quantitative Risk Economics Strategist & Data Scientist (Summer Associate) 06/2022 – 08/2022

GOLDMAN SACHS & CO LLC New York, NY

- Led a pivotal project on *Causal Inference of Macroeconomics in Retail Financial Products*.
  - Applied advanced analytics, econometrics, machine learning, and time series forecasting using Python, SQL, and Excel sheets.
  - Devised creative data solutions that isolated factors predicting risk core metrics with 97% accuracy explaining 80% of macroeconomic trends.
- Developed impactful visualization dashboards to effectively communicate actionable data insights from the Retail Portfolios.
  - Enhanced the division-wide understanding of retail portfolio dynamics, presenting the potential for driving informed business solutions.

Advanced Statistical Modeling & Machine Learning Teaching/Lab Assistant 01/2022 – 05/2022

DIVISION OF BIOKINESIOLOGY, UNIVERSITY OF SOUTHERN CALIFORNIA Los Angeles, CA

- Facilitated hands-on learning for a class of 15 Ph.D. students in programming, Machine Learning and Statistical Analysis.
  - Built and managed complex data sets and code repositories for hands-on sessions. [Link]
- Provided feedback and mentorship for students in coding, analytical research methodology, and hypothesis testing.

Robotics & Software Engineer (Research Associate) 11/2014 – 07/2017

HUMAN & ROBOT INTERACTION LAB (TAARLAB), UNIVERSITY OF TEHRAN Tehran, IR

- Led a multidisciplinary team of four in conducting projects on algorithms for navigation of parallel robots, leading to four publications.
  - Innovated and designed a highly dexterous parallel mechanism, and accomplished its successful collision-free navigation for surveillance by applying robotics, algorithms, and programming and using technologies including MATLAB, C++, Maple, and SolidWorks. [Link]

Technical Skills

Programming Languages: Python • R • MATLAB • SQL • Bash • Shell Scripting • C++ • LaTeX

Platforms & Frameworks: Azure • AWS • TensorFlow • Scikit-Learn • PyTorch • Plotly • Matplotlib • ggplot2 • Pandas • DASK • Numba • Spark • Git

AI & Machine Learning: Regression/Classification • Dimensionality Reduction • Clustering • SVM • Recommendation Systems • Ensemble Techniques • XGBoost • Deep Learning • Computer Vision • Natural Language Processing (NLP) • Reinforcement Learning • Autoencoders • GANs

Data Analytics: Data Visualization • Exploratory Data Analysis • ETL • Data Mining • Data Structures & Algorithms • Statistical Analysis / Modeling

Physics/Math: Optimal Control • Optimization Theory • Stochastic Algorithms • Numerical Computation • Robotics • Multibody Dynamics

Certifications

- **Microsoft AI-900 Azure AI Fundamentals** Certification, *2023* | Link
- **Google Data Analytics** Professional Certificate, *2023* | Link
- **Certified Data Scientist Associate**, DataCamp, *2023* | Link
- **NVIDIA: Accelerated Data Science**, *2023* | Link; **AI Applications for Anomaly Detection**, *2023* | Link; **Deep Learning**, *2021* | Link

Education

Doctor of Philosophy (Ph.D.) - Biomedical Engineering, University of Southern California 08/2023

Master of Science (M.Sc.) - Mechanical Engineering, Sharif University of Technology 08/2016

Bachelor of Science (B.Sc.) - Mechanical Engineering, Sharif University of Technology 05/2014

Select Courses: *Large-Scale Optimization in Machine Learning • Deep Learning & Neural Networks in Electrical Engineering • Advanced Statistical Learning • Surgical Robotics • Linear Algebra • Signals & Systems Analysis • Advanced Math • Numerical Computation • Differential Equations • Optimal Design • Applied Electronics • Measurement & Control Systems • Aerodynamics • Automatic Control • C++ Programming*

Technical Projects

** For a detailed list of all projects with their source codes, please see my **portfolio website** or my **GitHub portfolio page**.*

Machine Learning:

- **Anomaly Detection for Network Intrusion Data Using XGBoost** | Link | *Python, Scikit-Learn, RAPIDS, XGBoost, Pandas*
  - Designed an ensemble ML classification solution using XGBoost that detected anomalous network instances with 99.5% specificity.
- **NLP Problem of Language Classification for Complex Raw Speech Data** | Link | *Python, TensorFlow, Keras, RNN, Librosa, AWS*
  - Attained a 99% accuracy for the language classification from speech using gated recurrent units (GRUs) deployed on AWS Cuda.
- **Computer Vision for Digit Recognition from MNIST Data** | Link | *Python, NumPy, SciPy*
  - Achieved 98% prediction accuracy in digit classification for MNIST dataset via backpropagation of multilayer perceptrons (MLPs).
- **Titanic: Whoever Survived?! – Machine Learning from Disaster** | Link | *R, Logistic Regression, GLM, Tidyverse, caret, Preprocessing*
  - Built a machine learning model that made predictions as to whether the Titanic passengers survived with 83% accuracy.

Data Analytics Projects:

- **GPU-Accelerated Analytics of Infection Data using RAPIDS** | Link | *Python, RAPIDS, GPU with Google Colab, cuDF, cuML, cuPy*
  - Analyzed a gigantic dataset of infection using RAPIDS and DASK (e.g., cuDF, cuML, and cuPy) to identify important risk factors.
- **Stock Data Analytics: From Extraction to Visualization** | Link | *Python, Web Scraping, Data Mining, BeautifulSoup, yFinance, Plotly*
  - Extracted stock data from the web with different scraping methods and made visualization dashboards to communicate insights.

Reinforcement Learning & Predictive Optimization:

- **Model-Based Forward and Inverse Optimization to Understand Human Motor Control** | Link | *MATLAB, Python, R, Predictive Simulation, Robotics, Reinforcement Learning, Stochastic Optimization, Machine Learning, Statistical Analysis, Data Modeling, Distributed Computing*
  - Created a reinforcement-learning-based platform for predictive simulations of bipedal walking in SimuLink, achieving a stable gait.
  - Tested principles of optimization and good-enough control by making predictions of biological motor control in human walking.
  - Inferred motor objectives of human gait from demonstrations using Bayesian inverse optimization and reinforcement learning.
- **Grid-World Path Finding Using Markov Decision Processes** | Link | *Python, Optimal Control, Markov Decision Processes*
  - Solved for the optimal stochastic policy in a grid-world path-finding problem using Reinforcement Learning via value iteration.

Select Publications | Link

- **Nozari P*** & Finley JM. Utility of a Feature-Reduced Bayesian Inverse Optimization to Understand Human Locomotor Control. *In Prep*.
- **Nozari P***, Finley JM & Rebula J. Challenges and Opportunities in the Application of Inverse Optimal Control to Explain Human Locomotor Control: A Review. *Under Review*.
- **Nozari P***. Model-Based Approaches to Objective Inference During Steady-State and Adaptive Locomotor Control. *Doctoral Dissertation, University of Southern California*, 2023.
- **Nozari P*** & Finley JM. Development of a Platform to Evaluate Principles of Bipedal Locomotion Using Dynamical Movement Primitives. *2019 9th International IEEE/EMBS Conference on Neural Engineering (NER)*, San Francisco, CA, USA, 2019, pp. 1062-1065.
- **Nozari P***, Masouleh MT, & Kazemi H. Collision-free Path Planning of a Novel Reconfigurable Mobile Parallel Mechanism. *Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Eng. Science*, 231(20), pp. 3728–3742, 2017.
- Kazemi H, **NozariP***, Masouleh MT, & Novin RS. Path Planning of 3-RRR Parallel Robot by Avoiding Mechanical Interferences via Artificial Potential Field, *2015 3rd RSI International Conference on Robotics and Mechatronics (ICROM)*, Tehran, Iran, 2015, pp. 240-245.

***Peer Reviewer:** • IEEE Transactions on Neural Systems & Rehabilitation Engineering, 2023 • Journal of NeuroEngineering and Rehabilitation, 2022*