Danial Ramezani

Contact Information

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Education

- **Kharazmi University**   **Iran-Tehran**
  M.Sc. Industrial Engineering – Systems Optimization   **2022-2024**
  - ❖ **Thesis:** Novel approaches for portfolio optimization and index tracking problems under cardinality constraints.
  - ❖ **GPA**: (18.91/20) – (3.88/4)

- **Iran University of Science and Technology**   **Iran-Tehran**
  B.Sc. Industrial Engineering   **2016-2021**
  - ❖ **Thesis**: A new user-friendly decision-making website for multi-criteria decision-making for experts and regular users.
  - ❖ **GPA**: (15.97/20) – (3.28/4) Last two years: (17.41) – (3.65)

Research Interests

- **Operations Research**
- **Optimization**
- **Supply Chain and Logistics**
- **Data Mining and Machine Learning**
- **Data-Driven Decision Making**
- **Healthcare**
- **Heuristics and Soft Computing**
- **Scheduling**

Publications

- ❖ **Research Papers**
  - ❖ ***Ramezani Danial.***; *Abouei Ardakan Mostafa.* "Fast-converging and extensive search strategies for evolutionary algorithms in large-scale portfolio optimization under cardinality constraint **",** *Optimization and Engineering* – Under Review,
    This paper presents strengthening strategies for multi-objective evolutionary algorithms that can provide a faster convergence rate and extensive search ability in the portfolio optimization problem under cardinality constraints. For this purpose, a unique solution representation along with new repair and mating mechanisms is implemented on an evolutionary algorithm. The customized algorithm is subsequently tested against the standard one using well-known market indices in the benchmark. Results indicate that

the proposed strategies not only provide better approximations in a shorter time but also converge faster with no loss of performance in larger markets.

- ❖ ***Ramezani Danial.;*** *Abouei Ardakan Mostafa.; Mohammadreza Dehghani Ahmadabad"* A novel robust mixed integer linear programming model for index tracking problem under no rebalancing: heuristic optimization approach"**,** *Soft Computing* – Under Review.
  In this paper, a new robust mixed integer linear programming model that performs better in out-of-sample data compared to state-of-the-art formulations is proposed for the index tracking problem. Furthermore, due to the NP-hardness of the problem, a new heuristic algorithm is developed to solve the proposed formulation that is capable of converging to the global optima in small size and outperforms commercial solvers in larger size in less computation time.
- ❖ ***Ramezani Danial.;*** *Abouei Ardakan Mostafa.; Mohammadreza Dehghani Ahmadabad"* A novel mathematical model and heuristic for tracking Tehran Stock Exchange's (TSE) index"**,** *Financial Research Journal* – Under Review (In Persian).
  This paper proposes an efficient framework for tracking the TSE index and analyzes the tracking portfolios. Additionally, the impact of excluding large-cap stocks on these portfolios is analyzed and compared against a novel, artificially constructed benchmark that represents the overall state of the stock market.

Academic Projects

- ❖ **Master's Thesis**; in the first part of my thesis, novel fast-converging approaches are proposed for evolutionary algorithms and implemented on a Non-Dominated Sorting Genetic Algorithm (NSGA-II) for the portfolio optimization problem that can approximate better results compared to regular NSGA-II in a shorter time (in Python). In the second part, a novel, robust, mixed integer programming model along with a new hybrid algorithm is proposed that can achieve lower tracking error in out-of-sample compared to state-of-the-art formulations. Master's Thesis, Dr. Abouei Ardakan Mostafa, Mohammadreza Dehghani Ahmadabad; 2024.
- ❖ **Survey of application of Blockchain technology in the agri-food supply chain;** the study aimed to determine the current state of the adoption of Blockchain technology in the agri-food supply chain and examine the opportunities and challenges of the aforesaid technology in the supply chain by reviewing recent peer-reviewed papers. Project of the course: "Supply chain and logistics", Dr. A. H. Gholam Saryazdi; 2023.
- ❖ **Application of clustering in multi-objective Pareto Fronts;** I analyzed the clustering of solutions found in Pareto Fronts in multi-objective algorithms (I coded an NSGA-II algorithm for mean-variance portfolio optimization) by using clustering algorithms, such as K-means and Fuzzy C-means (Implemented in Python). Project of the course: "Data mining: applications and algorithms", Dr. M. V. Sebt; 2023.
- ❖ **Coding and analyzing the optimization model of the vehicle routing problem with drones and time windows;** the purpose of the project was to code the mathematical model of the paper "Vehicle routing problems with drones considering time windows" with GAMS and analyze the model for improvement and mistakes. Project of the course: "Integer programming", Dr. A. Mozdgir; 2023.

- ❖ **Solving reliability optimization problem with water cycle algorithm and simulated annealing;** I coded the water cycle and simulated annealing algorithms in Python for solving the reliability optimization problem. Project of the course: "Combinatorial optimization", Dr. M. Abouei; 2022.
- ❖ **Review of mining queuing system in Bitcoin's blockchain;** analyzing the queuing system in Bitcoin's Blockchain. Project of the course: "Queueing theory", Dr. A. Mirzazadeh; 2022
- ❖ **A new user-friendly decision-making website for experts and regular users**; a new user-friendly website for multi-criteria decision-making methods (SAW-TOPSIS-ARAS-WASPAS-VIKOR) with different settings for usage of academic and regular users, currently deployed at "de-decision" (Implemented in React JS, JavaScript). Bachelor's Thesis, Dr. A. Makui; 2021.
- ❖ **Designing the industrial unit for the production of jet fan tunnels;** the project aimed to plan a factory that produces fans for tunnels from scratch. Project of the course: "Planning industrial units", Dr. M. S. Jabalameli; 2020.
- ❖ **Investigating the effects of inappropriate use of cell phones on the human body;** the Goal of the study was to review the effect of the usage of mobile phones on the eyes, neck, and so on by reviewing recently published peer-reviewed journals. Project of the course: "Ergonomics", Dr. R. Ghousi; 2020.
- ❖ **Comparison of Business Process Management Software (BPMS);** the Purpose of the project was to compare the most common BPMS. Project of the course: "System analysis", Dr. M. S. Pishvaee; 2020.
- ❖ **Study of Iran's economy;** I studied Iran's economy from GDP growth, infrastructure, inflation, population crisis, and challenges by reviewing publicly available data published by the Iranian government. Project of the course: "Macroeconomics", Dr. S. Mirzamohammadi; 2019.

Self-Motivated Projects, Research, and Papers

- ❖ **Objective learning in football fantasy;** investigating interpretable machine learning models to define an optimal objective function for building fantasy football teams that maximize scores in upcoming gameweeks; working paper.
- ❖ **Generating data for drug response dataset using Variational Autoencoder (VAE);** a VAE is employed to generate new data for the Drug Classification dataset using PyTorch; 2025.
- ❖ **Decoding risk factors in heart failure prediction: a neural network approach with SHAP analysis;** this project employs a neural network model (in PyTorch on Heart failure clinical records dataset) trained on clinical data to predict heart failure outcomes, utilizing SHAP to elucidate the contribution and impact of each factor; 2025.
- ❖ **Investigating the impact of optimizers on neural network performance in heart disease prediction;** this project analyzes the effects of common deep learning optimizers on neural network performance in predicting heart diseases, using UCI Heart Disease Data; 2025.
- ❖ **Explaining CNN decisions in classifying Fashion Clothing;** a CNN is trained on the FashionMNIST dataset. The model's predictions are then explained using heatmap-like images, which visually highlight the regions of the input images that contribute most to the classification decisions; 2025.
- ❖ **Predicting diabetes using neural networks;** the project uses a neural network to predict the likelihood of diabetes in patients, utilizing the Pima Indians Diabetes dataset, and is implemented with the PyTorch library; 2025.

- ❖ **Artificial neural network for trading using technical analysis in the crypto market;** an artificial neural network is used to predict the direction of a possible trade. The features of this dataset are technical analysis attributes of 60,000 records of large-cap cryptocurrencies; 2024.
- ❖ **Application of autoencoders in image processing;** investigating how different autoencoders (denoising, compressing, generating, convolution) can be used for handwritten digit recognition using the MNIST dataset, Tensorflow; 2024.
- ❖ **Framework for statistical arbitrage;** a framework for trading cointegrated pairs in the crypto market using different time-series and machine-learning models (Implemented in Python); 2024.
- ❖ **Optimization model for pairs trading;** a mathematical formulation for finding cointegrated pairs with different sizes of long-short portfolios alongside their optimal weight; 2024.
- ❖ **Application of reinforcement learning in trading;** reinforcement learning model for trading in the cryptocurrency market using TensorFlow and Open AI gym libraries; 2024.
- ❖ **A machine learning framework for technical trading;** a Random Forest model is implemented on customized data (using technical indicators alongside pattern recognition and economic indicators for features and custom target values) to predict whether a long or short trade will be successful or not (average score of 75%); 2024.
- ❖ **Optimization model for football fantasy;** an optimization model to find the best players to be in the starting eleven, constrained to budget, formation, and so forth that are expected to achieve maximum points (Implemented in Python using Pyomo package); 2023.
- ❖ **Market price prediction;** the price of the next period of the asset is predicted using the last two months' data with LSTM, (Implemented in Python using the TensorFlow library); 2022.
- ❖ **Ranking web-developing programming languages with MADM methods;** the aim was to determine the best programming languages for new learners in the web-developing industry based on various criteria; 2021.

Related Professional Experiences

- ❖ **Research Assistant**   **Iran-Tehran**
  - ❖ Assistant to Dr. M. Abouei, researching optimization   **2022-Present**
  problems in financial markets and serving as a co-reviewer for
  academic papers
- ❖ **Teaching Assistant – Simulation and modeling**   **Iran-Tehran**
  - ❖ Assistant to Dr. H. Izadbakhsh in a simulation and modeling   **2023**
    course for a semester, coding examples, teaching Python,
    and organizing projects.
  - ❖ GitHub repository related to the course:
    https://github.com/danialramezani/Simulation-via-python

- ❖ **Quality control engineer– Intern**   **Iran-Rasht**
  - ❖ Three months of work as a quality control engineer at ZAM-   **2021**
    ZAM corporations.

Skills

- ❖ **Programming Skills**
  Python, GAMS, JavaScript

- ❖ **Software and Libraries**
  Pyomo (optimization), TensorFlow, PyTorch, SHAP, Scikit-learn (machine learning, deep learning, and data mining), LaTeX, Microsoft Office, Weka, Minitab, Bizagi, Adobe Photoshop, ReactJS (front-end web development)
- ❖ **Other skills**
  Academic Writing, Time-series Forecasting, Developing Algorithms/Heuristics, Statistical Arbitrage, Feature Engineering, Analyzing Stock (Fundamental, Technical), Problem-solving

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Languages

- ❖ **English: Fluent (IELTS 7.5: Listening=8, Reading=7, Writing=7, Speaking= 7.5)**   **2025**

Related Certificates

- ❖ **Game Theory-**Stanford University   **2022**

References Are Available Upon Request.