Reza Mirjalili

Operations Research Scientist

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SUMMARY

Operations Research Scientist with 5+ years of experience in optimization and AI-driven decision-making. Skilled in developing scalable exact algorithms and leveraging reinforcement learning for logistics, supply chain, and routing problems. Proficient in MIP, column generation, and GPU-accelerated deep learning.

EXPERIENCE

Systems Optimization and Computing Laboratory (SOCL) Sep 2020 – May 2025

Research Assistant *Houston, TX*

- Developed Branch-and-Price-and-Cut algorithm for the Mothership Drone Routing Problem; introduced valid inequalities that improved LP bounds by 5–10%.
- Proposed bound inference strategy reducing pricing model calls and improving convergence by 18–50%.
- Applied deep reinforcement learning to prioritize pricing subproblems in column generation, accelerating convergence by 20–30%.
- Built high-performance bidirectional label-setting algorithm using NumPy and Cython.
- Designed CG-cut heuristic using Deep Q-Learning and TD Learning, reducing cut generation time by 25%.
- Introduced novel hybrid inequality combining Cover, CG, and conflict cuts, closing 8% more optimality gap.

Transportation and Logistic Lab – SUNY Stony Brook Sep 2018 – May 2020

Research Assistant *Stony Brook, NY*

- Formulated stochastic Branch-and-Price model for home healthcare scheduling.
- Developed resiliency indices and time forecasts for NYC transportation network under snow hazards.

EDUCATION

University of Houston PhD, Industrial Engineering, GPA: 3.75/4 Aug 2020 – Aug 2025
SUNY Stony Brook University MS, Civil Engineering, GPA: 3.8/4 Aug 2018 – May 2020
Sharif University of Technology MS, Industrial Engineering, GPA: 3.4/4 Aug 2013 – Jan 2016

SKILLS

Optimization Tools Gurobi, CPLEX, SCIP, Pyomo, Column Generation, Branch-and-Price

AI & ML PyTorch, TensorFlow, Deep RL, Graph Neural Networks, CUDA

Programming Python, C++, Cython, Bash, MATLAB

Parallelization OpenMP, MPI, CUDA, Cython nogil/threading

Tools Git, LaTeX, Linux, Jupyter, VS Code

CERTIFICATIONS

- MLOps Specialization, Duke University (2025)
- LLMOps Specialization, Duke University (2025)
- Deep Learning Fundamentals, NVIDIA (2024)
- CUDA C/C++ Programming, NVIDIA (2024)
- Neural Networks, deeplearning.ai (2023)

PROJECTS

Stock Price Forecasting with LSTM 2024
- Achieved 96% directional accuracy and <2.5 RMSE on Apple stock predictions using 8 years of data.
- Reduced forecast error by 35% vs. moving average baseline.

Image Classification and Hyperparameter Tuning 2024
- Reached 80%+ CIFAR-10 accuracy using Optuna-based CNN tuning.
- Built custom GPU-enabled pipeline with PyTorch.

English-to-French Translation with T5 2024
- Improved BLEU score by 61% on OPUS Books dataset; reduced validation loss from 2.14 to 1.47.
- Used FP16, prompt tokenization, and optimizer tuning with HuggingFace Trainer.

Find Chvátal-Gomory Cuts via Deep RL 2023
- Used Deep Q-Learning and TD to predict CG multipliers, achieving 25% faster cut generation.

Lip-Based Biometric Authentication Robust to Emotions 2023
- Designed triplet Siamese network for robust authentication; audio input improved training by 20%.

Crypto Default Prediction 2022
- Built logistic regression and tree-based models (92% and 83% accuracy respectively) to predict default.

Drunk Driving Detection Using DNN 2020
- Developed age-range classification pipeline; up to 94% accuracy in some groups.