Shivank Joshi

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Summary

Engineer with applied and research experience in statistical modeling, optimization, and evaluation across diverse fields, including commodity trading, portfolio construction, neurostimulation, and industrial processes.

Education

University of California, Berkeley — Berkeley, CA
Master in Industrial Engineering and Operations Research, Financial Technology Concentration — May 2024

Carnegie Mellon University — Pittsburgh, PA
Bachelor of Science in Chemical Engineering, Minor in Computer Science — May 2023

Skills and Coursework

Software: Fluency in Python (PyTorch, Tensorflow, Pyomo, Pandas), C, SML. Competency in Julia, Java
UC Berkeley Coursework: Stochastic Optimization in Machine Learning, Network Flows and Graphs, Machine Learning in Electronic Markets, Risk Modeling, Financial Engineering
CMU Coursework: Machine Learning, AI Representation & Problem Solving, Parallel and Sequential Data Structures and Algorithms, Computer Systems, Operations Research

Experience

Investor — May 2024 – Present
iSeed Ventures — San Francisco, CA
- Invested in early-stage AI startups, performing quantitative analysis to aid decision-making
- Closely followed AI research and industry trends in AI and robotics to inform investment strategy

Supply Chain and Market Modeling Intern — May 2023 – Aug 2023
ExxonMobil Research and Engineering — Houston, TX
- Parallelized commodity trading model in Python and deployed on Azure to enhance trading team analysis
- Developed bilevel formulation for portfolio valuation model to further speedup model inference

Real-Time Optimization Intern — May 2022 – Aug 2022
ExxonMobil Research and Engineering — Houston, TX
- Trained deep learning models with enforced physical constraints to predict chemical byproduct in dynamic system
- Wrote tooling to integrate Tensorflow models into real-time optimization software, unlocking $1M/yr lost profit
- Developed evaluation tools, including tailored visualizations, to assess model performance under domain-specific constraints and changing conditions

Chapter President & Project Lead — 2019 – 2023
Engineers Without Borders, Carnegie Mellon University Chapter — Pittsburgh, PA
- Led teams to complete global projects: biogas digester in Zimbabwe, autonomous drones for rural mapping

Research

Integrating Optimization as Differentiable Layer in Neural Network | *IEOR, UC Berkeley* — 2023 – 2024
- Researched model-agnostic approaches to integrate model stages in predict-then-optimize problems, particularly for the financial portfolio allocation problem. (Publication preprint)
- Improved explainability and robustness of attention-based models to prediction errors by integrating differentiable optimization problem into neural network, enabling use of downstream task gradient in training
- Used cost-sensitive regression approach to improve robustness of predictions from ALSTM and other large sequential models when downstream tasks are asymmetrically affected by prediction errors (20% lower variance)

Robust Neurostimulation | *Grover Lab, Electrical & Computer Engineering, CMU* — 2022 – 2023
- Developed iterative robust optimization approach for electrode setup for neurostimulation given uncertainty in the relationship between injected current and resulting electric field in the brain
- Improved worst-case leakage of current into brain tissue by 12% with particle swarm optimization to solve robust optimization formulation for spherical harmonic system, enabling researchers to design safer neurostimulation studies

Representation of Optimization Problems | *Grossmann Group, Chemical Engineering, CMU* — 2021 – 2023
- Designed and implemented method to support nonlinear constraints for reformulation of mathematical optimization models written following Generalized Disjunctive Programming (GDP) paradigm
- Publication for DisjunctiveProgramming.jl, open-source software supporting GDP modeling in Julia Mathematical Programming (JuMP). DOI: 10.21105/jcon.00117
- Simulated and tested models for supply chains as queueing networks for mathematical optimization