Parshan Pakiman

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OVERVIEW

I am a Ph.D. candidate in Information and Decision Sciences at the University of Illinois at Chicago. I work towards developing off-the-shelf Reinforcement Learning (RL) algorithms for Operations and Finance applications. My research advances methodologies reducing hyper-parameters tuning, approximation architecture design, and model calibration that are practical hurdles arising when one computes optimized decisions in a stochastic environment. My research broadens the applicability of RL by developing algorithms that "self-adapt" to different datasets and problem instances without requiring significant hand-engineering. I leverage data as well as machine learning, optimization, and high-dimensional sampling techniques to design these algorithms and test their performance using large-scale simulation and optimization performed via state-of-the-art platforms, i.e., Gurobi, Pyomo, CVXPY, SimPy, and Gym.

EDUCATION

University of Illinois at Chicago (UIC), Chicago, IL — Spring 2017 - (Expected) Fall 2022

Ph.D. in: Information and Decision Sciences

Thesis title: *Mitigating Model Risk in Reinforcement Learning: Self-adapting Methods with Applications in Operations and Finance*

Co-advisors: Professors Selva Nadarajah and Negar Soheili

University of Illinois at Chicago, Chicago, IL — Spring 2017 - (Expected) Fall 2022

M.Sc. in: Business Analytics

University of Tehran, Tehran, Iran — Fall 2012 - Fall 2016

B.Sc. in: Applied Mathematics

WORK EXPERIENCES

- Worked in the Advanced Solutions team at Guidehouse as a research intern on developing a simulation-based and scalable RL algorithm for a deterministic and offline workflow scheduling problem. — Fall 2021
- Collaborated with a major e-commerce company to design an AI system that minimizes packaging waste by jointly learning packaging workers' preferences and optimizing cardboard boxes' dimensions — Spring 2021
- Worked with Foresight ROI to design a framework for mining past marketing data and for optimizing future marketing campaigns (**Link** to the resulting paper published in *KDD 2019*). — Fall 2017 - Summer 2019
- Teaching experience in graduate classes with Business Data Mining, Statistical Learning, Intro to Machine Learning, and Intro to Operations Management. — Since Fall 2014
- Collaborator on a multi-university and industry initiative to develop an open-source reinforcement learning and approximate dynamic programming platform for business applications. — Fall 2019

RESEARCH INTERESTS

- Working towards off-the-shelf RL algorithms that sidestep hyper-parameter tuning and heuristic hand-engineering, making RL accessible to users without domain-knowledge.
- Learning stochastic models from data trajectories that manage risks associated with model misspecification and poorly tuned hyper-parameters.
- Tackling real-world business problems in dynamic pricing, options pricing, inventory control, marketing, and e-commerce by implementing methods based on novel machine learning, simulation, and optimization platforms.

AWARDS AND HONORS

BGS[1] membership:	College of Business, University of Illinois at Chicago	Since Spring 2021
Doctoral fellowship:	Department of Information and Decision Sciences, University of Illinois at Chicago	Since Spring 2017
Best student award:	Department of Mathematics, Statistics and Computer Science, University of Tehran	Fall 2016
Technical qualification:	RoboCup Iran open, soccer 2D simulation league	Fall 2016
Technical qualification:	Khwarizmi international award, soccer 2D simulation league	Fall 2010

[1]Beta Gamma Sigma (BGS) is an International Business Honor Society (**Link**).

PUBLICATIONS

Journal Papers

- B. Chen, S. Nadarajah, P. Pakiman, S. Jasin. *Self-adapting Robustness in Demand Learning* (**Link**). Under revision for resubmission to **Operations Research**.
- P. Pakiman, S. Nadarajah, N. Soheili, Q. Lin. *Self-guided Approximate Linear Programs* (**Link**). Under second round review at **Management Science**.

Conference Papers

- A. Chenreddy, P. Pakiman, S. Nadarajah, R. Chandrasekaran, R. Abens. *SMOILE: A Shopper Marketing Optimization and Inverse Learning Engine* (**Link**). **Proceedings of the 25th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining**, 2019. Acceptance rate 6.4%.

Workshop Papers

- P. Pakiman, S. Nadarajah, N. Soheili, Q. Lin. *Self-guided Approximate Linear Programs* (**Link**). Accepted in **NeurIPS Workshop on Self-Supervised Learning – Theory and Practice**, 2020.

Work in Progress

- P. Pakiman, S. Nadarajah, Y. F. Lim. *Putting Social Responsibility on the Menu: AI-Guided Tool Selection that Aligns Worker and Social Objectives.* In preparation to submit to **Manufacturing & Service Operations Management**.
- P. Pakiman, S. Nadarajah, N. Soheili, Q. Lin. *Average-Cost Self-guided Approximate Linear Programs.* Working paper.
- D. R. Jiang, S. Nadarajah, P. Pakiman, Y. Wang. *Comparing Approximate Dynamic Programming Algorithms on Operations Management Applications.* Working paper.

TECHNICAL SKILLS

Programming language:	Python, C++, C, R, Java, HTML, JavaScript
Python package:	NumPy, SciPy, Pandas, Matplotlib, TensorFlow, Scikit-learn
Optimization solver:	GUROBI, AMPL, Pyomo, Nevergrad, CVXPY
Operating systems:	Linux, MacOS, Windows

INVITED TALKS

Putting Social Responsibility on the Menu: AI-Guided Tool Selection that Aligns Worker and Social Objectives

- POMS 31st Annual Conference, Virtual — Spring 2021

Self-adapting Robustness in Demand Learning

- INFORMS Annual Meeting, Virtual — Fall 2020
- INFORMS Revenue Management and Pricing Student Live Paper Series, **Link**, Virtual — Fall 2020

Self-guided Approximate Linear Programs

- INFORMS Annual Meeting, Anaheim, CA
- POMS 30th Annual Conference, Washington D.C.
- INFORMS Annual Meeting, Phoenix, AZ
- POMS 29th Annual Conference, Houston, TX

SMOILE: A Shopper Marketing Optimization and Inverse Learning Engine

- ACM SIGKDD, International Conference on Knowledge Discovery & Data Mining, **Link**, Anchorage, AK

POSTER PRESENTATIONS

Self-guided Approximate Linear Programs

- NeurIPS 2020, Workshop on Self-Supervised Learning – Theory and Practice, **Link**, Virtual

SMOILE: A Shopper Marketing Optimization and Inverse Learning Engine

- ACM SIGKDD, International Conference on Knowledge Discovery & Data Mining, **Link**, Anchorage, AK

TEACHING EXPERIENCES

Lecturer, University of Illinois at Chicago Since Spring 2019

- Business data mining (IDS 472), refresher series on *introduction to R*, slides for **week 1**, **week 2**, and **week 3**.
- Statistical models and methods for business analytics (IDS 575), *refresher series on linear algebra, calculus, and probability theory.*
- Statistical models and methods for business analytics (IDS 575), *applications of regression, classification and likelihood maximization*, **slides**.

Teaching Assistant, University of Illinois at Chicago Since Spring 2017

- Advanced text analytics for Business (IDS 566)
- Business data mining (IDS 472)
- Business forecasting (IDS 476)
- Data science for online customer analytics (IDS 594)
- Introduction to operations management (IDS 532)
- Statistical models and methods for business analytics (IDS 575)

Teaching Assistant, University of Tehran Spring 2014 - 2016

- Introduction to numerical analysis and scientific computing
- Numerical linear algebra

SERVICE

Reviewer

- International Conference on Learning Representations (ICLR) Since Fall 2021
- Annals of Operations Research Since Fall 2020
- Computers & Operations Research Since Spring 2019
- Electronic Commerce Research Since Spring 2018
- Information Systems and Operational Research Since Fall 2018

Conference Organization

- Session co-chair, *Large-scale Linear Programs and Applications*, INFORMS Optimization Society Conference Spring 2022
- Session chair, *Recent Advances in Reinforcement Learning*, INFORMS Annual Meeting Fall 2021
- Session co-chair, *Social Responsibility and Risk in Supply Chains*, INFORMS Annual Meeting Fall 2021

Membership

- IDS committee for organizing curriculum of *programming in R* Spring 2021
- Beta Gamma Sigma (BGS) society Since Spring 2021
- Institute for Operations Research and the Management Sciences (INFORMS) Since Fall 2018
- Production and Operations Management Society (POMS) Since Fall 2018