Parshan Pakiman

🏠 parshanpakiman.github.io   in linkedin.com/in/parshan-pakiman   ⓞ github.com/parshanpakiman   ✉ ppakim2@uic.edu   ☏ +1 312 493 1304   ⟳ April 2021

OVERVIEW

I am a Ph.D. candidate in Information and Decision Sciences at the University of Illinois at Chicago. My research advances methods that optimize decision trajectories for real-world business problems. I specifically work towards developing off-the-shelf Reinforcement Learning (RL) algorithms for Operations and Marketing applications. Adapting conventional RL methods to a given problem often requires challenging hyperparameter tuning and heuristic approximations. To sidestep these practical hurdles and broaden RL's applicability in real-world business problems, I develop algorithms that self-adapt to different datasets and problem instances without requiring significant hand-engineering. I employ machine learning, optimization, and high-dimensional sampling techniques and use state-of-the-art platforms such as Gurobi, Pyomo, CVXPY, and OpenAI-Gym to test RL algorithms.

EDUCATION

University of Illinois at Chicago (UIC), Chicago, IL   Spring 2017 -
(Expected) Fall 2021

Ph.D. in:	Information and Decision Sciences
Thesis title:	*Mitigating Model Risk in Reinforcement Learning: Self-adapting Methods with Applications in Operations and Marketing*
Co-advisors:	Professors Selva Nadarajah and Negar Soheili

University of Illinois at Chicago, Chicago, IL   Spring 2017 -
(Expected) Fall 2021

M.Sc. in:	Business Analytics

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

B.Sc. in:	Applied Mathematics

WORK EXPERIENCES

— 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 (a related paper is under review at *ICML 2021*).   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

— Learning stochastic models from data trajectories that manage risks associated with model misspecification and poorly tuned hyperparameters.

— Working towards off-the-shelf RL algorithms that sidestep hyperparameter tunings and heuristic hand-engineerings, making RL accessible to users without domain-knowledge.

— Tackling real-world problems in dynamic pricing, marketing, e-commerce, and sustainable warehousing by implementing methods based on novel machine learning and optimization platforms, i.e., TensorFlow and Gurobi.

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

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

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[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 first round review at **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

— P. Pakiman, S. Nadarajah, Y. F. Lim. *Guiding Agents via Menus when Optimization and/or Learning Costs are High.* Under review at **Thirty-eighth International Conference on Machine Learning**, 2021.

— 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**.

— D. R. Jiang, S. Nadarajah, P. Pakiman, Y. Wang. *Comparing Approximate Dynamic Programming Algorithms on Operations Management Applications.* Working paper.

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 .... Fall 2021
— POMS 30th Annual Conference, Washington D.C. .... Spring 2019
— INFORMS Annual Meeting, Phoenix, AZ .... Fall 2018
— POMS 29th Annual Conference, Houston, TX .... Spring 2018

SMOILE: A Shopper Marketing Optimization and Inverse Learning Engine

— ACM SIGKDD, International Conference on Knowledge Discovery & Data Mining, **Link**, Anchorage, AK ..... Summer 2019

POSTER PRESENTATIONS

Self-guided Approximate Linear Programs

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

SMOILE: A Shopper Marketing Optimization and Inverse Learning Engine

— ACM SIGKDD, International Conference on Knowledge Discovery & Data Mining, **Link**, Anchorage, AK ..... Summer 2019

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

- 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 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