Rafid Mahmood

Mechanical and Industrial Engineering
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Education

University of Toronto, Mechanical and Industrial Engineering

Ph.D Industrial Engineering (Operations Research) 2015–2020

Advisor: Professor Timothy C. Y. Chan

Vector Institute Postgraduate Affiliate, 2019–2020

Prospective Professors in Training Program, 2019

University of Toronto, Electrical and Computer Engineering

M.A.Sc. Electrical Engineering 2013–2015

Advisor: Professor Ashish Khisti

Thesis: Rank metric convolution codes with applications in network streaming

B.A.Sc. Electrical Engineering 2008–2013

Graduated with Honours

Publications

Articles for operations research journals use alphabetical author ordering. The primary author is starred.

In Preparation

1. A. Babier, T. C. Y. Chan, A. Diamant, and **R. Mahmood***, Learning to Optimize with Hidden Constraints, *Target journal Operations Research (Working draft available)*.

2. T. C. Y. Chan, A. Diamant, and **R. Mahmood***, Markov Chain Monte Carlo Sampling from the Complement of a Polyhedron, *Target journal Operations Research Letters*.

Under Review

1. A. Babier, T. C. Y. Chan, T. Lee, **R. Mahmood***, and D. Terekhov, An Ensemble Learning Framework for Model Fitting and Evaluation in Inverse Linear Optimization, *under review at INFORMS Journal on Optimization*, 2019.

   Previous title Multiple observations and goodness of fit in generalized inverse optimization. **Won Honorable Mention at CORS 2018 Best Student Paper Competition: Open Category.**

2. A. Babier*, **R. Mahmood**, A. McNiven, A. Diamant, and T. C. Y. Chan, The Importance of Evaluating the Complete Knowledge-Based Planning Pipeline, *under review at Physica Medica European Journal of Medical Physics*, 2019.

3. M. J. Crowson*, A. Hamour, **R. Mahmood**, V. Lin, D. Tucci, and T. C. Y. Chan, Deep Learning for Automatic Audiogram Interpretation, *under review at Otology & Neurotology*, 2019.

4. M. J. Crowson*, P. Dixon, **R. Mahmood**, J. W. Lee, D. Shipp, T. Le, V. Lin, J. Chen, and T. C. Y. Chan, Predicting Post-Operative Cochlear Implant Performance Using Supervised Machine Learning, *under review at Otology & Neurotology*, 2019.

Journal Articles

1. A. Babier*, **R. Mahmood**, A. McNiven, A. Diamant, and T. C. Y. Chan, Knowledge-based Automated Treatment Planning with Three-dimensional Generative Adversarial Networks, *accepted at Medical Physics*, 2019.

2. **R. Mahmood***, A. Badr, and A. Khisti, Streaming Codes for Multiplicative-Matrix Channels with Burst Rank Loss, *IEEE Transactions on Information Theory*, 64(7), 5296–5311, 2018.

3. **R. Mahmood***, A. Badr, and A. Khisti, Convolutional Codes with Maximum Column Sum Rank for Network Streaming, *IEEE Transactions on Information Theory*, 62(6), 3039–3052, 2016.

Conference Proceedings

1. A. Babier*, **R. Mahmood***, A. McNiven, A. Diamant, and T. C. Y. Chan, Automated Treatment Planning in Radiation Therapy with 3-D Generative Adversarial Networks, *NeurIPS Workshop on Machine Learning for Health*, 2018.

   Workshop version of Knowledge-based automated treatment planning with three-dimensional generative adversarial networks.

2. **R. Mahmood***, A. Babier, A. McNiven, A. Diamant, and T. C. Y. Chan, Automated Treatment Planning in Radiation Therapy with Generative Adversarial Networks, *Machine Learning for Healthcare*, Proceedings of Machine Learning Research 85, 484–499, 2018.

   Won Runners' Up at CORS 2019 HCOR Student Presentation Competition.

3. **R. Mahmood***, A. Badr, and A. Khisti, Low Delay Network Streaming Under Burst Losses, *IEEE International Symposium on Information Theory*, 2898–2902, 2016.

4. **R. Mahmood***, A. Badr, and A. Khisti, Convolutional Codes with Maximum Column Sum Rank for Network Streaming, *IEEE International Symposium on Information Theory*, 2271–2275, 2015.

5. A. Badr*, **R. Mahmood**, and A. Khisti, Embedded MDS Codes for Multicast Streaming, *IEEE International Symposium on Information Theory*, 2276–2280, 2015.

Clinical Abstracts

1. A. Babier*, **R. Mahmood**, A. McNiven, A. Diamant, and T. C. Y. Chan, The Importance of Evaluating the Complete Knowledge-based Automated Planning Pipeline, *International Conference on the Use of Computers in Radiotherapy*, 2019.

2. A. Babier*, **R. Mahmood**, A. McNiven, and T. C. Y. Chan, An Optimization Method for Knowledge-based Automated Planning that Leverages Ensemble Dose Predictions, *American Association of Physicists in Medicine*, 2019.

3. A. Babier*, **R. Mahmood**, A. McNiven, and T. C. Y. Chan, Comparing Deep Learning Architectures for Knowledge-Based Automated Planning, *American Association of Physicists in Medicine*, 2019.

Presentations

Interior Point Methods with Adversarial Networks

INFORMS Annual Meeting, Seattle, WA, USA 2019
CORS Annual Conference, Saskatoon, SK, Canada 2019
GERAD Invited Seminar, Université de Montréal, Montréal, QC, Canada 2019

An Ensemble Learning Framework for Model Fitting and Evaluation in Inverse Linear Optimization

(Scheduled) POMS Annual Conference, Minneapolis, MN, USA 2020
INFORMS Health Care, Boston, MA, USA 2019
CORS Annual Conference, Saskatoon, SK, Canada 2019
CORS Annual Conference, Halifax, NS, Canada 2018
INFORMS Annual Meeting, Houston, TX, USA 2017
CORS Annual Conference, Quebec City, QC, Canada 2017
INFORMS Annual Meeting, Nashville, TN, USA 2016

Automated Treatment Planning in Radiation Therapy with Generative Adversarial Networks

CORS Annual Conference, Saskatoon, SK, Canada 2019
MLHC Conference, Palo Alto, CA, USA 2018

Convolutional Codes with Maximum Column Sum Rank for Network Streaming

IEEE ISIT, Hong Kong, HK, China 2015

Teaching Assistantship

MIE 465: Analytics in Action 2017–2019
Responsible for curriculum development in 2017.

MIE 1620: Linear Programming and Network Flows 2018

MIE 258: Engineering Economics and Accounting 2016–2017

ECE 363: Communication Systems 2015

Students Supervised

1. Richard Chavez, Sliding Window Generative Adversarial Networks for Radiation Therapy, *Industrial Engineering 4th Year Thesis*, 2019.
   Co-supervised with Aaron Babier.
2. Michael Shin, Using Portfolio Theory to Optimize Selection of Daily Fantasy Basketball Contests, *Engineering Science 4th Year Thesis*, 2018.
   Co-supervised with Ben Potter.
3. Yusuf Shalaby, Inverse Optimization for Measuring Cancer Treatment Pathway Concordance, *Industrial Engineering 4th Year Thesis*, 2018.
   Co-supervised with Nasrin Youssefi.
4. Palmira Pereira, Netflix Prize Problem Using Inverse Optimization, *Masters of Engineering Thesis*, 2017.

Awards

1. Runners' Up, Health Care Operations Research Student Presentation Competition, CORS Annual Conference, 2019.
2. Postgraduate Affiliate Program, Vector Institute, 2019 ($12 000).
3. Honourable Mention, Student Paper Competition: Open Category, CORS Annual Conference, 2018 ($100).
4. Postgraduate Doctoral Scholarship, NSERC, 2017 ($42 000).
5. First Place, Waterfront International Ltd. Quantathon, 2016 ($7 500).

Industry Experience

Opus One Solutions, Toronto, ON, Canada 2019
Power Systems Optimization Expert

NHL Expansion Draft Optimizer (`http://nhlexpansiondraft.com`**)** 2017
Software Developer

Microsemi, San Jose, CA, USA 2011–2012
Product Engineer Intern

Service

Reviewer for NeurIPS ML4H Workshop 2019 and IEEE ISIT 2017.

Electrical and Computer Engineering Graduate Student Society 2014–2015
Treasurer

Electrical and Computer Engineering Graduate Students Symposium 2014
Organizing Committee Member

Personal

Languages: English (fluent), French (beginner)

Citizenship: Canadian

Last updated: October 26, 2019
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