AKHILESH SONI

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Career Summary

 4^{th} year Ph.D. student with expertise in mathematical optimization and machine learning.

Education

University of Wisconsin Madison

August 2023 (expected)

Ph.D. in Industrial & Systems Engineering (Operations Research)

Thesis: "Discrete optimization methods for scheduling and matrix completion"

University of Wisconsin Madison

May 2022

M.S. in Computer Science, GPA: 3.82/4.0

University of Wisconsin Madison

December 2019

M.S. in Industrial & Systems Engineering, GPA: 3.69/4.0

Indian Institute of Technology (IIT) Dhanbad, India

May 2017

B.Tech. in Mechanical Engineering, GPA: 9.32/10

Work Experience

University of Wisconsin Madison

• Research Assistant

Collaboration with ExxonMobil Corporation

2018-2020

- Developed a mixed-integer programming based rolling horizon framework for crew scheduling in an unconventional oil field development.
- The proposed approach yields a solution at the daily time-scale by solving a sequence of coarser time-scale MILP problems.

Collaboration with American Family Insurance

2020-Present

- Developed Mixed Integer Subspace Selector with Dynamic Subspace Generation framework (MISS-DSG) for the subspace clustering with missing data problem.
- Integrated subspace generation and clustering in a single, unified optimization framework without requiring any hyperparameter tuning.
- Teaching Assistant Spring, 2020
 - ISyE 323: Operations Research-Deterministic Modeling

Amazon.com

• Research Scientist Intern, Group: Modeling and Optimization

June 2021-Aug 2021

- Graph neural net based learning approach for reducing search space of a network design model based on mixed integer programming.
- Research Scientist Intern, Group: Modeling and Optimization

May 2020-Aug 2020

 Developed a regional decomposition based solution approach for large scale mixed integer network design model using existing state-of-the art methods.

Schneider National

• Supply Chain Engineering Intern

 $June\ 2019\hbox{-}Aug\ 2019$

- Developed a cost forecasting model to predict carrier freight rates in spot market in USA.

Publications

- Soni, A., Linderoth, J., Luedtke, J., Pimentel-Alarcón, D. (2021) Integer Programming Approaches
 To Subspace Clustering With Missing Data, OPT2021: 13th Annual Workshop on Optimization for
 Machine Learning, NeurIPS
- Soni, A., Linderoth, J., Luedtke, J., Rigterink, F. (2020) Mixed-Integer Linear Programming for Scheduling Unconventional Oil Field Development, *Optimization and Engineering*

Conference Presentation

Mixed Integer Programming Workshop

• Integer programming approach to high rank matrix completion

May 2021

• Mixed Integer Programming for Unconventional Oil Field Development.

May 2020

INFORMS Optimization Society

• Integer programming approach to subspace clustering with missing data

March 2022

NeurIPS

Optimization and Machine Learning workshop

• Integer programming approach to subspace clustering with missing data

December 2021

Technical Strengths and Software Skills

- Mathematical Programming, Large scale and data driven optimization, Predictive Analytics, Transportation Modeling, Machine Leaarning, Network Optimization, Time-series forecasting
- Java, Python, Julia, AMPL, Emacs, Matlab, Gurobi, SQL, PyTorch, UNIX, Version Control, LaTeX

Graduate Coursework

- Industrial & Systems Engineering: Intro to optimization, Linear optimization, Integer optimization, Nonlinear programming, Engineering models for supply chain, Stochastic modeling, Machine learning in action, Simulation modeling, Dynamic programming, Stochastic programming
- Computer Science/ Maths: Intro to algorithms, Matrix methods in machine learning, Real analysis, Intro to combinatorial optimization, Mathematical foundations of machine learning

Academic Achievements

- Spotlight presentation, Optimization and machine learning workshop, NeurIPS, 2021
- Travel grant for mixed integer programming workshop, 2021
- Recipient of Vinod K & J. Gail Sahney Scholarship at UW-Madison, 2020
- Recipient of Mitacs Fellowship to intern at University of Windsor, Canada, 2016

Service

- Reviewer: Annals of Operations Research
- President of INFORMS UW-Madison Chapter, 2021-2022

References

- Prof. Jeff Linderoth, Indutrial & Systems Engineering, UW-Madison, linderoth@wisc.edu
- Prof. Jim Luedtke, Indutrial & Systems Engineering, UW-Madison, jim.luedtke@wisc.edu