Amin Aghalari

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Areas of Interest and Experience

Methodology: Discrete and Stochastic Optimization, Data Analytics and Statistical Learning, Data Driven Decision Making, Parallel Computing and Heuristics
Application Areas: Supply Chain and Logistics, Transportation and Network Design Problems, Energy System Design, Green Vehicle Routing, Inventory and Capacity Planning, Security Problems

Education

PhD in **Industrial & Systems Engineering** September, 2018-August, 2022
Mississippi State University, Starkville, MS, USA

Masters of Science (MSc) in **Industrial & Systems Engineering** September, 2015-January, 2018
Sharif University of Technology, Tehran, Iran

Bachelor of Science in Engineering (BSc) in **Industrial Engineering** September, 2010-September, 2015
Sharif University of Technology, Tehran, Iran

Employment

Academic

- **Research Assistant**, Mississippi State University, USA September, 2018-Present

Large-scale Optimization Projects

- Developed stochastic mixed-integer linear programming (MILP) models to solve supply chain network design problems in application areas such as port management problem, electric vehicle location-routing problem, biofuel supply chain network, Unmanned Aerial Vehicle (UAV) logistic design problem, and security problems
- Developed hybrid solution methods including enhanced Benders decomposition algorithm, Progressive Hedging (PH) algorithm, Sample Average Approximation (SAA), and Stochastic Dual Dynamic Programming (SDDP) algorithm with multiple acceleration techniques for stochastic integer programming (SIP) models
- Developed heuristic optimization algorithms using Adaptive Large Neighborhood Search (ALNS), Tabu Search, Clarke-Wright saving algorithm to solve different variants of vehicle routing and location-routing problems
- Applied parallel computing techniques to exact and heuristic algorithms to develop parallelized hybrid decomposition methods

Data Analytics Projects

- Developed predictive models using supervised learning techniques, namely logistic regression, Gaussian naïve Bayes, and random forest to aid dairy producers to detect heat-stress
- Developed a deep learning ensemble model to categorize a bacterial hypothetical/unreviewed protein's function (Functional annotation of proteins)
- Developed a tailored maximum entropy inverse reinforcement learning algorithm to assess workplace safety under an active shooter incident using different safety metrics

Industry

- **Iranian Modern Technology and Management Company**, Tehran, Iran March, 2017 - May, 2018

Project Control Specialist

- Assisting the Project Manager in the establishment of the project's Work Breakdown Structure (WBS)
- Development of project schedules
- Developing presentations about the project schedules, resources, and project performance
- Analyzing and forecasting time and cost impact on projects
- Performing controls related to the projects to monitor, analyze and trend information, providing insights to support operational improvements

Software Skills

- **Programming Languages:** Python (advance), R (intermediate), C# (intermediate)
- **Optimization Solvers:** GUROBI (advance), CPLEX (intermediate), GAMS (intermediate), LINGO (intermediate)
- **Machine Learning Framework:** Scikit-Learn(advance), TensorFlow(intermediate), Keras(intermediate), Spark(beginner)
- **Query language:** SQL (intermediate)
- **Mathematics:** MATLAB (intermediate), SAS (beginner)
- **Project Control:** Microsoft Project (advance)
- **Visualization:** ArcGIS (intermediate), Tableau (beginner), Microsoft Office (advance)

Licenses and Certifications

- **Deep Learning Specialization by DeepLearning.AI**, Coursera, March 2021 , (Credential)
  - Sequence Models (Recurrent Neural Network, Natural Language Processing, Long Short-Term Memory, Speech Recognition), March 2021 , (Credential)
  - Convolutional Neural Networks, February 2021 , (Credential)
  - Improving Deep Neural Networks: Hyperparameter Tuning, Regularization and Optimization, February 2021 (Credential)
  - Neural Networks and Deep Learning, February 2021 (Credential)
- **Databases and SQL for Data Science**, Coursera, October 2020 (Credential)
- **Machine Learning A-Z: Hands-On Python and R In Data Science**, Udemy, October 2020 (Credential)
- **Machine Learning by Stanford University**, Coursera, August 2020

Publications

Published Manuscripts

8. Duan G., **Aghalari A.**, Chen L., Marufuzzaman M., Ma J. (2020) "Dynamic Vessel Velocity and Direction based Vessel Routing Optimization for Marine Debris Collection." **Transportation Research Part E**, 152, 102414.
7. **Aghalari A.**, Aladwan B. S., Marufuzzaman M., Tanger S., Da Silva B.K., Gnaneswar V.G. (2020) "Optimizing a Pellet Supply System: Market-specific Pellet Production and Biomass Quality Considerations."**Computers & Chemical Engineering**, 153, 107417.
6. **Aghalari A.**, Morshedlou N., Marufuzzaman M. (2021) "Learning Civilian Response Past Behaviors using Inverse Reinforcement Learning." **IISE transaction**, in-press.
5. Marufuzzaman M., **Aghalari A.**, Ranta J.H., Jaradat R. (2021) "Optimizing Civilian Response Strategy under an Active Shooting Incident." **IEEE Systems Engineering**, in-press.
4. Becker C.A., **Aghalari A.**, Marufuzzaman M., Stone A.E. (2021) "Predicting Dairy Cattle Heat Stress Using Machine Learning Techniques." **Journal of Dairy Science**, 104(1):501-524
   - **Featured in the Editor's Choice Collection, 2021**
3. **Aghalari A.**, Nur F., Marufuzzaman M. (2020) "Solving a Stochastic Inland Waterway Port Management Problem using a Parallelized Hybrid Decomposition Algorithm." **Omega**, 102, 102316.
   - **ISE Best Student Paper Award, 2021**
2. **Aghalari A.**, Nur F., Marufuzzaman M. (2020) "A Bender's Based Nested Decomposition Algorithm to Solve a Stochastic Inland Waterway Port Management Problem Considering Perishable Product." **International Journal of Production Economics**, 229, 107863.
1. Marufuzzaman M., **Aghalari A.**, Buchanan R.K., Rinaudo C., Houte K.M., Ranta J.H. (2020) "Optimal Placement of Detectors to Minimize Casualties in an Intentional Attack." **IEEE Transactions on Engineering Management**, in-press.

Manuscripts under Review

3. **Aghalari A.**, Marufuzzaman M., Aladwan B. S., Tanger S., Da Silva B.K. (2021) "A Bilevel Model Formulation for Solving a Post-Hurricane Damaged Timber Management Problem." Submitted to **Computers & Industrial Engineering**, 1st round of review.

2. **Aghalari A.**, Salamah D. E., Kabli M., Marufuzzaman M. (2021) "Two-stage Stochastic Programming Model for an EV Fast Charger Location-Routing Problem under Ambient Temperature Uncertainty." Submitted to **Omega**, 1st round of review.

1. **Aghalari A.**, Salamah D. E., Marino C., Marufuzzaman M. (2020) "Electric Vehicles Fast Charger Location-Routing Problem under Ambient Temperature." Submitted to **Annals of Operations Research**, 2nd round of review.

Manuscripts In Preparation

5. Nandimandalam H., **Aghalari A.**, Gude G., Marufuzzaman M. (2021) "Multi-objective Optimization Formulation to Design Cost-effective Environmental-friendly Biofuel Supply Chain."
4. **Aghalari A.**, Nandimandalam H., Gude G., Marufuzzaman M. (2021) "Two-stage Chance Constraint Programming to Improve the Resiliency of the Biofuel Supply Chain."
3. Kerlin J., **Aghalari A.**, Marufuzzaman M. (2021) "Optimizing Civilian Response Strategy Considering Group Behavior through Machine Learning Techniques."
2. **Aghalari A.**, Pirim H., Tekedar H., Marufuzzaman M. (2021) "Deep Learning Ensemble for Function Prediction of Hypothetical Proteins from Edwardsiella Bacterial Species."
1. **Aghalari A.**, Kumar S., Marufuzzaman M. (2021) "Investigating Different Parallel Schemes to Improve the Performance of Adaptive Large Neighbourhood Algorithm."

Conference Proceedings

4. **Aghalari A.**, Salamah D. E., Marino C., Marufuzzaman M. (2021) "The Electric Location Routing Problem under Ambient Temperature." ISERC Conference, 22-25 May, virtual.
3. **Aghalari A.**, Aladwan B., Marufuzzaman M., Tanger S., Silva B.K., Gude G. (2021) "Pellet Production Optimization using a Parallelized Progressive Hedging Algorithm." ISERC Conference, 22-25 May, virtual.
2. Marufuzzaman M., **Aghalari A.**, Buchanan R. K., Rinaudo C. H., Houte K. M., Ranta J. H. (2020) "Optimal Placement of Detectors to Minimize Casualties on a Manmade Attack." ISERC Conference, 1-3 November, virtual.
1. **Aghalari A.**, Nur F., Marufuzzaman M., Puryear S. (2019) "Designing a Reliable, Robust Inland Waterway Transportation Network under Uncertainty." ISERC Conference, 18-21 May, Orlando, FL, USA.

Honors and Awards

- Nominee of Graduate Research Assistant of the Year, Mississippi State University, USA, 2021
- Bagley College of Engineering Graduate Student Travel Award, Mississippi State University, USA, 2021
- ISE Outstanding PhD Student Award, Mississippi State University, USA, March, 2021
- ISE Best Student Paper Award, Mississippi State University, USA, March, 2021
- Journal Article Featured in the Journal of Dairy Science Editor's Choice Collection, 2020
- Bagley College of Engineering Graduate Student Travel Award, Mississippi State University, USA, 2020

Extracurricular Activities

INFORMS Student Chapter at Mississippi State University, USA
- President — January 2021-Present
- VP of Recruitment — January, 2020-December, 2020

Transportation Working Group at Mississippi State University, USA
- Student coordinator — August, 2020-Present

Membership in Professional Organizations
- Institute for Operations Research and the Management Sciences (INFORMS) — July 2019-Present
- Institute of Industrial and Systems Engineers (IISE) — August 2020-Present