Aliakbar Izadkhah

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EDUCATION

Carnegie Mellon University — Pittsburgh, PA
Ph.D student in Chemical Engineering — *Aug 2018-May 2023*
Thesis advisor: Chrysanthos E. Gounaris
Thesis: Multi-period Vehicle Routing Problems: Optimization Approaches and Impacts on Last-mile Delivery

University of California, Davis — Davis, CA
Master's of Science in Mechanical Engineering — *Jul. 2018*
Thesis advisor: Jae Wan Park

Sharif University of Technology — Tehran, Iran
Bachelor's of Science in Chemical Engineering — *Jul. 2016*

PROJECTS

Ph.D. Research, Process Systems Engineering, Carnegie Mellon University — *Sept. 2018 - Present*
Supply Chain Optimization [multi-period vehicle routing problems]

- Developed a branch-price-and-cut exact optimization solver in C++ to address several variants of multi-period vehicle routing problem (multiple day trips, multiple depots, service choice, time windows, heterogeneous fleets). (C++, CPLEX, Gurobi) Mixed Integer Linear Problems (MILP).
- In collaboration with Linde PLC, I proposed a new variant of routing problem called "periodic vehicle routing with multiple day trips" to the literature -which arises in the Linde PLC supply chain operations- along with a novel exact branch-price-and-cut solution approach for the first time in the literature, (C++, CPLEX, Gurobi)
- Established a last-mile delivery simulation framework with incorporating existing historical data to evaluate the performance of new cost-effective delivery paradigms for Linde PLC (C++, CPLEX)

Coursework Projects

- Developing a PyTorch like deep learning package, with standard functionalities such as a GAN and more advanced features such as neural ODE layer. (Python, C++, CUDA) [course: Deep Learning Systems: Algorithms and Implementation]
- Implemented multiple model compression techniques (network slimming, magnitude-based pruning, ...) for deep learning models. (Python, Tensorflow) [course: Machine Learning for Large Datasets]
- Apache, AWS
- Implemented a quantum computing MILP solver using D-wave quantum computer for job shop scheduling problem (Python) [course: Quantum Integer Programming]

GRADUATE COURSEWORK

Computer Science & Machine Learning: Advance Data Structure & Algorithms, Introduction to Machine Learning, Machine Learning with Large Datasets, Deep Learning Systems: Algorithms and Implementation, Machine Learning Production

Operations Research: Linear programming, Integer programming, Convex programming, Quantum Integer programming

PUBLICATIONS & PRESENTATIONS

A. Izadkhah, A. Subramanyam, J. Lainez, J. Pinto, and C. E. Gounaris. Multi-period vehicle routing: Effect of customer flexibility in delivery day windows. *Submitted*, 2021b

A. Izadkhah, A. Wang, J. Lainez, J. Pinto, and C. E. Gounaris. Periodic vehicle routing problem with trips spanning multiple days. *In Preparation*, 2021d

A. Izadkhah, A. Subramanyam, and C. E. Gounaris. Multi-period vehicle routing: Effect of customer flexibility. *INFORMS Transportation Science and Logistics Workshop*, 2021a

A. **Izadkhah**, A. Wang, J. Lainez, J. Pinto, and C. E. Gounaris. Periodic vehicle routing with trips spanning multiple days. *INFORMS Annual Meeting*, 2021c

A. **Izadkhah**, A. Wang, and C. E. Gounaris. A unified branch-price-and-cut framework for various classes of periodic vehicle routing problems. *INFORMS Annual Meeting*, 2020b

A. **Izadkhah**, J. Lainez, J. Pinto, and C. E. Gounaris. A branch-price-and-cut approach for designing optimal periodic schedules to visit vendor-managed customers. *INFORMS Annual Meeting*, 2020a