Yanru Guo

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Education

University of Michigan — Ann Arbor, MI
Master of Science, Industrial and Operations Engineering, GPA: 4.0/4.0 — *Aug. 2022 – Apr. 2024*

Beijing Foreign Studies University — Beijing, China
Bachelor of Science, Information Systems and Information Management, GPA: 3.8/4.0 — *Sep. 2018 – Jun. 2022*

Research Experience

Trust-Aided Distributionally Robust Resource Allocation — Jan. 2023 – Present
University of Michigan — *Ann Arbor, MI*

- Developed a trust-aided distributionally robust optimization (TA-DRO) model for better resource allocation against wildfire risks and reformulated it as a mixed integer linear programming (MILP) model
- Combined the predicted information from multiple sources to construct the ambiguity set used in solving the TA-DRO based on human trust
- Established a trust update process to simulate the trust variation during finite time steps
- Showed by computational results that under reasonable assumptions the TA-DRO model performs better than models based on single information source in terms of average loss in wildfire events

Support for Radiology Technologists Administration — Jan. 2023 – Aug. 2023
Center for Healthcare Engineering and Patient Safety — *Ann Arbor, MI*

- Collaborated with the team to gather staffing requirements from the Interventional Radiology (IR) Department at Michigan Medicine
- Developed an integer programming (IP) model incorporating necessary rules for a feasible schedule as hard constraints and perferences with different weights as metrics for room, shift, and overnight call assignments
- Prepared inputs for various planning horizons based on information provided by the IR Department
- Implemented the model in C++ using CPLEX to generate candidate schedules in seconds and continued to improve the model based on feedback to better capture staffing requirements at the IR Department
- Created user guide for illustrating how to set up and use the tool to generate schedules

Conference Talks, Presentations and Posters

Trust-Aided Distributionally Robust Resource Allocation with Multi-Source Reference Information, Presentation, 2023 INFORMS Annual Meeting, Phoenix, AZ

Support for Radiology Technologists Administration, Poster, 2023 CHEPS Symposium, Ann Arbor, MI

Honors and Adwards

2023, Rackham Conference Travel Grant, University of Michigan, Ann Arbor
2022, Outstanding Graduates, Beijing Foreign Studies University, Beijing
2022, Outstanding Dissertation Honor, Beijing Foreign Studies University, Beijing
2021-2022, First-class Scholarship, Beijing Foreign Studies University, Beijing

Projects

Continuous Optimization Methods | *Python, Matlab* — Mar. 2023 – Apr. 2023

- Implemented a package of total 10 line search and trust region methods for solving unconstrained optimization problems, i.e., Gradient Descent, Newton, and BFGS with backtracking line search and Wolfe line search
- Tested the methods on a set of 12 problems, and analyzed the performance of each method with different parameter settings
- Did numerical instances to investigate how does memory affect the performance of L-BFGS

Medical Home Care Delivery | *Python, Gurobi* — Nov. 2022 – Dec. 2022

- Formulated a two-stage multiple integer linear programming model for the multi-depot vehicle routing and appointment scheduling problem with time window under uncertainty of service time, travel time and cancellation

- Constructed the deterministic model and the two-stage stochastic model by Python with Gurobi to solve the problem and provided optimal solutions under different scenarios
- Compared the stochastic model with CWS heuristic algorithm to see differences between solutions and computational times

Influence of Gamification Elements on Users' Continuance Intention | *SPSS, Amos* Dec. 2021 – May. 2022

- Built conceptual model and put forward hypothesis based on Self-Determination Theory, Stimulus-Organism-Response Model and Technology Acceptance Model
- Designed questionnaire to measure users' evaluation of the gamification elements, their perceived gamification experience, perceived cost, attitude and continuance intention
- Verified the measurement model and hypothesis by SPSS 23.0 and Amos 26.0
- Offered possible suggestions on how to better use gamification elements to improve users' gamification experience

Coursework

- Linear Programming: IOE 510 (A+), IOE 610* (Currently Taking)
- Integer Programming: IOE 614* (Currently Taking)
- Continuous Optimization Methods: IOE 511* (A)
- Stochastic Process: IOE 516* (A+)
- Data Analysis: IOE 591 (A)
- Simulation: IOE 574* (Currently Taking)
- Healthcare Related Topics: IOE 413 (A+), IOE 813 (A)

Note: * denotes a coursed considered doctoral level in department

Industrial Experience

Pfizer Investment Co. Ltd. Beijing, China

Operations Intern, Salesforce Enablement Team *Jul. 2021 – Oct. 2021*

- Improved Customer Relationship Management System (CRM) training materials and recorded training videos for new salesforce members
- Performed data cleansing and daily maintaining to ensure the accuracy and validity of the database
- Assisted the team to conduct multi-dimensional analysis of products of Acute Disease Business Group based on data from 2020 Q1 to 2021Q3 and set targets for 2021 Q4 with suggestions on staffing adjustment

Service Activities

Volunteer, Center for Ergonomics (C4E) Inaugural Research Symposium, 2022, Ann Arbor, Michigan
Volunteer, National Olympic Committee (NOC) Assistant of Serbia, 2022 Olympic Winter Games, Beijing, China
Volunteer, Community Health Service Center, 2012-2022, Weifang, China

Professional Skills

Languages: Chinese (Native), English (Advanced), Spanish (Intermediate)
Programming: Python, R, C/C++, MATLAB
Optimization Tools: Gurobi, CPLEX, Pyomo
Developer Tools: Visual Studio, PyCharm