Tu Feng

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SUMMARY

A third year Ph.D. student with solid background in **math optimization and coding**, which are demonstrated through multiple industrial and research experiences in developing modeling solutions and theoretical extensions to power system, cybersecurity, and manufacturing.

EDUCATION

The Ohio State University Columbus, OH
Ph.D. Operations Research 08/2021-Present

- Core Courses: Integer/Stochastic/Linear/Non-linear Optimization, Reinforcement Learning, Decomposition, Quantitative Models in Production and Distribution Logistics

The Ohio State University Columbus, OH
B.S. Industrial System Engineering (Minor: Economics) 08/2019-05/2021

- Honors Research Distinction (w/ thesis) GPA: 3.9/4.0 (Major: 3.97)

Sichuan University Chengdu, China
B.Eng. Industrial Engineering 09/2017-07/2021

- Honor: 2018 and 2019 University Scholarships (academic performance and community engagement)

WORK EXPERIENCE

Data and Artificial Intelligence Lab, Siemens Technology (Siemens Ltd., China) Beijing, China
PhD Algorithm Research Intern (Supervisor: Dr. Cheng Feng, Dr. Xiaole Han) 05/2023- 07/2023

- Developed an optimal control model of water pump group control, verified performance with experimental results, improved the economic objective by at least 30% over other prevalent control methods.
- Tuned parameters and implemented an interface for a chatbot based on a large language model (QRA-LLM), which is an AI system for searching product information, maintenance diagnostics, and documentation.
- Worked on a dock inventory management and scheduling problem for a consulting project.

Siemens (University Talents Program) Columbus, OH
PhD Intern (Manager: John Keeton) 06/2022- 08/2022

- Streamlined and improved a data analytics engine in R program for a NASA research site and cut the run-time by 30%, which process more than 5000 data points for monthly report.
- Presented relevant research on energy optimization and cybersecurity to the management.
- Being selected as an outstanding intern and invited to meet with the CEO, Barbara Humpton.

PROJECT & RESEARCH EXPERIENCE

Analysis of Electric Vehicle Aggregators in the Electricity Market (Sponsored by Ford) 08/2023- Present
(Advisor: Dr. Antonio Conejo)

- Developed planning models for electricity systems considering EV aggregators.
- Modeled bilevel problems to analyze the operations and benefits of EV aggregators in the electricity network (market clearing, price-taker, price-maker).
- Ran computational experiments for the mathematical models.

Resilience Optimization in Cybersecurity 12/2022- Present
(Co-advised by Dr. Antonio Conejo and Dr. Theodore Allen)

- Modeled the cyber security resilience as a two-stage stochastic problem.
- Developed the optimal experimental and sequential analysis procedures that minimize parametric uncertainties.
- Developed efficient solving techniques using reduced scenarios and compared with other solving techniques.

- Proved convergence and efficiency of the proposed method.

Optimal Classification Tree with Mixed Integer Linear Programming 08/2022- 06/2023

- Modeled the decision tree method as a MILP for classification tasks, to obtain the optimal structure and misclassification, implemented using Python (Gurobi).
- Results show that Optimal Classification Tree (OCT) performs consistently better than xgboost, and some existing formulations, providing good optimality and less overfitting in all scales.
- Applied OCT in a twitter-based cyber vulnerability prioritization system in Python, obtained 97% accuracy.

Data-Driven Building Analytics (Sponsored by Engie & Siemens) Columbus, OH

Project Manager (Supervisor: Nate Ames, Dr. Theodore Allen) 08/2021- 07/2022

- Digitalized aging gauges using computer vision and Raspberry-Pi camera (Python - OpenCV).
- Collected and analyzed baseline performance data for a 98,000 ft^2 manufacturing research center for energy and process optimization.
- Visualized a monitoring system with more than 40 sensors/ cameras and auto-generating analysis in a professional IIOT environment. Coordinated an advisory panel with heads in Battelle, AEP, etc.

Ohio Cybersecurity Initiative in Mobility and Manufacturing (OCIMM: #60076508**)** Columbus, OH

Research Assistant (Advisor: Dr. Theodore Allen) 03/2020- 08/2021

- Provided statistical analysis on manufacturing data and visualization for an intelligent industrial system.
- Developed a dynamic dashboard with real-time input from Programmable Logic Controller (PLC) using the leading platform PTC Thing Worx.

Nash Equilibrium of Evolutionary Game Theory Chengdu, China

Sichuan University (Advisor: Dr. Zheng Yang) 03/2019-07/2019

- Proved Nash Equilibrium of four classic game models, optimal conditions, and extension to repeated games.
- Modeled the changing distribution of strategies among players over time computationally.

SERVICES

INFORMS Student Chapter at The Ohio State University Columbus, OH

President (Advisor: Dr. Sam Davanloo) 04/2022 – present

- INFORMS Annual Award: Magna Cum Laude

SKILLS

- Programming: java, Python(Gurobi API, Cplex API, OpenCV, scikit-learn), Matlab, SQL, R, GAMS, C++
- Software: Minitab, Arena, JMP, VBA, CATIA, AutoCAD, Photoshop

PUBLICATION & CONFERENCE

- 2023 INFORMS Annual Meeting – Session of Learning and Optimization, (Oct 18, 2023); Presentation: “Stochastic Programming and Resilience Experiments Applied to Cybersecurity”.
- 2022 INFORMS Annual Meeting – Session of Social Media Analytics, (Oct 17, 2022); Presentation: “Interpretable AI Modeling of Cyber Vulnerabilities with Exploits”.
- 2021 INFORMS Annual Meeting – Session of Nonlinear Optimization in Cybersecurity, Virtual (Nov 13, 2020); Presentation: “Cybersecurity Analytics in Industrial Internet of Things (IIOT)”.
- Allen, T. T., McCarty, J., **Feng, T.**, Tseng, S. H., Buck, V., & Pardee, R. (2021, December). The Ohio State Model For ICS Cybersecurity. In 2021 International Conference on Maintenance and Intelligent Asset Management (ICMIAM) (pp. 1-4). IEEE.
- (Pending) **Feng, T.**, Alomair, A., & Albert, A. L., Allen, T. T. (2023) Stochastic Programming and Resilience Experiments Applied to Cybersecurity. IISE Transactions.