Setareh Taki

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Summary

- **PhD student** in Industrial Engineering at the University of Illinois at Urbana-Champaign
- **Interest** in Research, Operations Research, Quantitative Research, and Data Science positions
- **Experience** in Python, Algorithmic Game Theory, Machine Learning, and Large-scale optimization
- **Work Authorization:** United States permanent resident (Green Card holder)

Education

University of Illinois at Urbana-Champaign (UIUC) *May 2022*
PhD in Industrial Engineering *GPA: 3.82/4.00*

Sharif University of Technology (SUT) *Aug 2015*
MSc in Industrial Engineering *GPA: 3.58/4.00, (16.85/20)*

Professional Experience

Operations Research Intern *Atlanta, GA*
Norfolk Southern Corporation *Feb 2021 - Present*

- Worked a large-scale optimization project on assignment and planning of railroad maintenance operations.
- (Unit Test:) Designed Unit Tests which resulted in confirming over 99% of the results and finding cause of errors in the rest.
- (Automation:) Initiated the automation process for the project which resulted in an efficient program with decreasing the number of lines, number of main files, and operation time.

Researcher - Fair Division (Algorithmic Game Theory) *Urbana, IL*
University of Illinois at Urbana-Champaign (Adviser: Jugal Garg) *Aug 2017 - Present*

- Worked on well-studied problem of maximin share (MMS) allocations in Fair Division. Our work resulted in
  - the simplest known approximation algorithm,
  - polynomial-time approximation scheme (PTAS) for highest known approximation factor,
  - the best known strongly polynomial time approximation algorithm,
  - first work on the MMS allocation in mixed manna, and on MMS and Pareto Optimal allocations.

Researcher - Assortment Optimization (Revenue Management) *Urbana, IL*
University of Illinois at Urbana-Champaign (Adviser: James Mario Davis) *Aug 2016 – Aug 2017*

- Design and analysis of algorithms for obtaining a set of items to agents to maximize the revenue using well-known customer choice models. Investigated evidence for the correctness of proposed algorithms in Python before proving them mathematically

Selected Projects

Machine Learning Course Project in Python - Object Detection in Images *Fall 2020*

- Loaded the CIFAR10 dataset using torchvision and normalized and transformed the training set
- Visualized a randomly picked sample of the pre-processed data using Matplotlib
- Initialized a neural network using the Xavier method in PyTorch and defined a convolutional Neural Network (CNN), a cross-entropy loss function, and an SGD optimizer
- Trained the network, saved the model, and tested the network after normalizing and transforming the test set

Data Science Course Project in Jupyter Notebook - "Harry Potter and the Sorcerer's Stone" *Fall 2019*

- Cleaned and tokenized the text of the book using regular expressions, spaCy, NLTK and converted the tokens into bigrams
- Extracted the characters of the book by analyzing the words(excluding stop-words) using three different methods: starting with a uppercase letter, two-name characters, and inbuilt functions in spaCy (the first two methods were significantly faster)
- Studied and visualized the development of the characters throughout the book (using NumPy and matplotlib libraries)

Integer Programming Course Project in Python - Routing and Scheduling *Spring 2016*

- *Placing drop centers:* heuristically, optimized the location of 20 drop centers by minimizing the distance of the origin and the destination of the 100,000 packages from their closest drop center using greedy approach
- *Scheduling:* Scheduled the visit and departure time of each courier in order to maximize the number of delivered packages within the time horizon

Technical Skills

Python: *PyTorch, Numpy, SciPy, Matplotlib, Pandas, scikit-learn, spaCy, NLTK, Pyomo* (*Gurobi and CBC solvers*)
Other Languages: Python | R | MATLAB

Selected Coursework

- **Algorithm:** Algorithms, Approximation Algorithms, Algorithmic Game Theory
- **Optimization:** Combinatorial Optimization, Integer Programming, Pricing and Revenue Management
- **Data Science:** Programming for Data Science, Applied Machine Learning, Machine Learning
- **Statistics:** Probability and Statistics I & II, Stochastic Processes & Applications

Publications

- "An Improved Approximation Algorithm for Maximin Shares" with Jugal Garg. In *Journal of Artificial Intelligence* (*Full Version*), *Proceedings of the 21st ACM Conference on Economics and Computation* (*EC 2020*) (*Extended Abstract*).
- "Approximating Maximin Shares with Mixed Manna" with Rucha Kulkarni and Ruta Mehta. In *Proceedings of the 22nd ACM Conference on Economics and Computation* (*EC 2021*)
- "On the PTAS for Maximin Shares in an Indivisible Mixed Manna" with Rucha Kulkarni and Ruta Mehta. Accepted in *Proceedings of the AAAI Conference on Artificial Intelligence* (*AAAI 2021*).
- "Approximating Maximin Share Allocations" with Jugal Garg and Peter McGlaughlin. In 2nd *Symposium on Simplicity in Algorithms* (*SOSA 2019*).

Teaching Experience

University of Illinois at Urbana-Champaign & Sharif University of Technology *Spring 2014 – Present*

- Trained students formally and informally in different courses such as Analysis of Data, Integer Programming, Deterministic Models in Optimization, Analysis of Network Data, Supply Chain Management, and Foundation of Quality Systems.
- Evaluated the performance of the students and provided constructive feedback

References

Dr. Jugal Garg
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