Jaykrishnan Gopalakrishna Pillai

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Education

The Technion – Israel Institute of Technology, Israel
Doctor of Philosphy in Combinatorial Optimization — *July 2021 – December 2024*

The Technion – Israel Institute of Technology, Israel — GPA 85.9/100
Master of Science in Operations Research and Optimization — *March 2019 – July 2021*

National Institute of Technology, Tiruchirappalli, India — CGPA 8.39/10
Master of Technology in Industrial Engineering and Management — *June 2013 – May 2015*

University of Kerala, India — CGPA 8.18/10
Bachelor of Technology in Mechanical Engineering — *May 2008 – July 2012*

Research Experience

Approximation Schemes for variants of cardinality constrained bin packing and scheduling

Advisor: Prof. Asaf Levin, Faculty of Decision and Data Sciences — *MSc and PhD*

Developed Approximation schemes (EPTASs and APTASs) for bin packing and scheduling subjected to cardinality constraints and variants of it.

1. G. Jaykrishnan and A. Levin. EPTAS for load balancing problem on parallel machines with a non-renewable resource. *Discrete Optimization*, 48:100775, 2023
2. G. Jaykrishnan and A. Levin. EPTAS for parallel identical machine scheduling with time restrictions. *Journal of Combinatorial Optimization*, 47(2):10, 2024
3. G. Jaykrishnan and A. Levin. EPTAS for the dual of splittable bin packing with cardinality constraint. *Theoretical Computer Science*, 979:114202, 2023
4. G. Jaykrishnan and A. Levin. Scheduling with cardinality dependent unavailability periods. *European Journal of Operational Research*, 316(2):443–458, 2024
5. G. Jaykrishnan and A. Levin. APTAS for bin packing with general cost structures. *arXiv preprint arXiv:2407.07677*, 2024

Research Assistant

Advisor: Prof. Avi Ostfeld, Faculty of Civil Engineering — *September 2020 - December 2024*

Formulated linear and convex programs for water quality analysis, addressing both deterministic and uncertain scenarios. Employed Robust optimization techniques to mitigate uncertainty in program formulations.

1. B. S. Pankaj, G. Jaykrishnan, and A. Ostfeld. Optimizing water quality treatment levels for water distribution systems under mixing uncertainty at junctions. *Journal of Water Resources Planning and Management*, 148(5):04022013, 2022
2. S. P. Boindala, G. Jaykrishnan, and A. Ostfeld. Robust optimal booster disinfectant injection in water systems under uncertainty. *Water*, 15(9):1777, 2023

Technical Experience

EpyT-C

Python — *November 2023 – Present*

- Currently engaged in the development of a Python package for water quality modeling. In review for publication in the Journal of Open Source Software.

Deep learning

Python — *PhD*

- Gained hands-on experience with key algorithms such as linear regression, logistic regression, support vector machines, k-nearest neighbors, convolutional neural networks, recurrent neural networks, and generative adversarial networks.
- Developed an adversarial patch using deep learning techniques to disrupt the functionality of a visual odometry system, aiming to impair its operational performance.
- Improved the preprocessing stage of Simple Graph Convolution by integrating a self-supervised graph representation learning framework, selected through extensive experimentation and comparison with various graph learning models, including generation-based, auxiliary property-based, and contrast-based approaches.
- Applied MLOps practices to design and deploy a deep learning model pipeline, implementing CI/CD processes for automated model building and deployment on both local systems and Google Cloud Platform.

Teaching Experience

Adjunct Professor, Department of Mechanical Engineering
National Institute of Technology, Calicut, India *December 2015 – May 2016*

- Taught Principles of Management for Bachelor students.
- Handled Workshop Practice for first year students.

Extracurricular Activities

Placement Representative
National Institute of Technology, Tiruchirappalli, India *March 2014 – May 2015*

- Coordinated with and assisted the HR Managers of various companies in holding recruitment sessions in the campus.

Technical Skills

Languages: Python, C, LaTeX
Libraries: CVXPY, CVXOPT, PyTorch, PyG, DGL, PyTorch Lightning, Hydra
MLOps: Git, DVC, GitHub, Docker, Google Cloud Platform, CI/CD