Dhruva Sundararajan

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Education

Virginia Polytechnic Institute and State University (Virginia Tech), Blacksburg, USA

PhD, Industrial and Systems Engineering, Aug 2024 – Present
Department: ***Grado Department of Industrial and Systems Engineering***

Academic Research Concentration: Operations Research

Advisor: Dr. Rohit Kannan

GPA: 3.67/4

Coursework: Optimization I: Introduction to Linear Programming, Optimization II: Linear and Non-linear Programming, Mathematical Probability and Statistics for Industrial Engineers, Introduction to Deep Learning

Amrita Vishwa Vidyapeetham, Coimbatore, India

MSc (Integrated), Data Science, July 2019 – June 2024
Department: ***Department of Mathematics***

GPA: 8.51/10

Coursework: Linear Algebra, Calculus, Numerical Methods, Optimization Techniques, Convex Optimization, Design & Analysis of Algorithms, Data Structures, Probability and Statistics, Statistical Inference Theory, Random Process, Graph Theory, Fuzzy Sets, Logic & Systems, and Applications, Machine Learning, Deep Learning, Reinforcement Learning, Multivariate Statistics, and more.

PSBB Learning Leadership Academy, Bangalore, India (Affiliated to CBSE, India)

Class 12 (Higher Secondary School), March 2019

Percentage: 85.2%

Subjects: Physics, Chemistry, Mathematics & Biology (Group 1)

Class 10 (High School), March 2017

CGPA: 9.8/10

Work Experience

Graduate Research Assistant Virginia Tech, Blacksburg, USA (Jan 2025 - Present)

Currently involved in the following projects

- Learning to Predict Feasible Solutions for Quaratically Constrained Quadratic Programming (QCQPs) using Graph Neural Networks.
- Learning for Global Optimization in AC-Optimal Power Flow (AC-OPF) Problems.

Graduate Teaching Assistant – Virginia Tech, Blacksburg, USA (Aug 2024 - Dec 2024)

Subject: Theory of Organization

Research Internship – IIT Madras, Chennai, India (July 2023 - June 2024)

Guide: Dr. Sridharakumar Narasimhan *(Department of Chemical Engineering)*

- Developed a shrinking horizon MPC for scheduling the distribution of water by minimizing the overall power and meeting all the demands.
- Contributed to building a Graph Neural Networks (GNN) for Column Generation (CG) problems that utilizes Mixed-Integer Linear Programming (MILP) for scheduling the distribution of water in a water network.

- Modernized an existing web application for sensor placement in water distribution networks by migrating it to a Python and HTML-based architecture, utilizing FastAPI for enhanced performance and scalability.

Internship – Calligo Technologies, Bangalore, India (Aug 2022 - June 2023)

- Conducted research on Intermediate Representation of Graphs to optimize various deep neural network (DNN) architectures such as Resnet, VGG, and Mobilenet.
- Successfully implemented IR graph concepts to enhance accuracy and reduce inference time for a range of deep learning models and architectures.
- Utilized GLOW compiler to implement these optimizations and improve overall performance.
- Conducted benchmarking analyses comparing the performance of the GLOW compiler with other available Graph compilers such as TVM.

Research Internship – RBG Labs, IIT Madras, Chennai, India (March 2021 - March 2022)

Guide: Dr. Rajkumar Elagiri Ramalingam

- Conducted a comprehensive literature review on Road Safety techniques utilizing Deep Learning & Image Processing across India and worldwide.
- Analyzed existing Computer Vision-based Road Safety models such as YOLOv5, including road damage detection, vehicle detection, and road feature detection (traffic signs, median, pavements, etc.).
- Created a deep-learning model using the YOLOv5 architecture and Intel's India Driving Dataset to identify automobiles, placing emphasis on the identification of standard vehicles found on Indian roads, such as commuter two and three-wheelers.

Internship – Calligo Technologies, Bangalore, India (June 2020 - August 2020)

- Created a Python library that improves the time efficiency of numerical and statistical algorithms on DataFrames.
- Utilized Dask, Vaex, and Modin Python libraries to enhance the performance of the developed library.
- Improved the speed and efficiency of data processing through this work.

Scholarships & Fellowships

- **John Grado, Jr. Graduate Teaching Assistantship** at Grado Department of Industrial and Systems Engineering, Virginia Tech, Blacksburg, VA, USA.

Publications

Please find a list of my publications on my Google Scholar Profile: scholar.google.com

Peer Reviews

Papers reviewed till date: 1

Journals: Annals of Operations Research (ANOR)

Leadership and Involvement

- Organizing Committee Head of Algorithm Quiz (2020, 2021 & 2023) at Anantham Club (Mathematics Club of AVV).
- Secretary, Nādam Club (Classical Music Forum of AVV), 2021-22.
- Vice President, Nādam Club (Classical Music Forum of AVV), 2022-23.
- President, Nādam Club (Classical Music Forum of AVV), 2023-24.

Extracurricular Activities

- Accomplished Carnatic composer, vocalist, and percussionist, Learning Carnatic music for over 15 years.
- Secured 3rd Rank in Karnataka State Junior Exam for Carnatic Vocal, 2017