Satender

Profile

PhD student specializing in Optimization and Machine Learning, equipped with knowledge in advanced computational tools and libraries.

Research Interest

I am interested in modeling the equity structure in power planning tools, such as integrating energy equity in expansion planning models, by leveraging from stochastic optimization theory.

Skills

- *Libraries*: Gurobi, CPLEX, SCIP, Pyomo, Scikit-learn(TensorFlow), PyTorch, SciPy
- Python, SQL, R, Matlab
- MS Word, Excel, PowerPoint
- Communication and team collaboration

Experience

Teaching Assistant at *Information and Decision Sciences (University of Illinois Chicago)* **2024.08–Present**
Supervisor: Prof. Selvaprabu Nadarajah
✦ Assisting in developing coursework for the department. Further, working on my PhD research work in building equitable expansion planning models.

Research Aide (Graduate) at *Argonne National Laboratory, Illinois* **2024.05–2024.08**
Supervisor: Dr. Todd Levin
✦ Working in ESIA research team with the A-LEAF's GTEP model to analyse the traditional GTEP models for their energy justice state. Further, to work on expansion models to design multi-objective optimization approaches for trade-off between energy justice and cost of plannings.

Graduate Research Assistant at *Information and Decision Sciences (University of Illinois Chicago)* **2023.08–2024.04**
Supervisors: Prof Selvaprabu Nadarajah[1], Dr. Fatemeh Sarayloo[2]
✦ [1] Designed an algorithm for weakly-coupled Markov Decision Processes with improved bounds over recent network-based formulations and assisted Chicago-area counties in managing greenhouse gas inventories for effective policy development; [2] Developed an admission recommender system tailored for the Business Analytics Master's Program at UIC.

Research Associate at *Centre for Data Science and AI (Indian Institute of Management Ahmedabad)* **2021.09–2023.07**
Supervisor: Prof Ankur Sinha, (Multi-Objective) Bilevel Programming and Optimization
✦ *An Exact Algorithm for Generalized Interdiction Problems:* Developed an optimized bilevel optimization method by improving Yen Tang's x-space algorithm. The algorithm uses bilevel-specific preprocessing and a penalized formulation for efficiency. Implemented in Python using Gurobi and SCIP in a branch-and-cut framework, with intersection cuts and informed no-good cuts based on Matteo Fischetti's work to enhance robustness.

Education

PhD. Information and Decision Sciences. *University of Illinois Chicago*. **2023–Present**
✦ Research Interests: *Reinforcement Learning, Mathematical Optimization, Bilevel Programming*

Bachelor and Master of Science (BS-MS). Mathematical Sciences. *Indian Institute of Science Education and Research (IISER) Mohali, India*. **2016–2021**
✦ *Thesis*: Study of Algebraic Number Theory Algorithms for Primality testing and (Polynomial) Factorization
✦ *Projects*: (ML) News Article Recommender Systems, (ML) House Price Predictions using Regression Models, (Maths) Study of Polynomial Rings and Field Extensions

ACCREDITATIONS

Regression Analysis for Business; R for statistics and data science; Databases and SQL for Data Science with Python. *(Coursera)* **2021**

✦ *Key Learnings :* Inferential Statistics, Central Limit Theorem, Regression Analysis, R (tidyverse, ggplot2, dplyr and dbplyr), Exploratory Data Analysis.