Prasanna Sanjay Raut

Master's Student
University of Washington, Seattle

https://prasanna5raut.github.io/
raut@uw.edu
Contact: +1 206-887-8611

Interests

Data Science, Machine Learning, Optimization and Statistics, Decision-making under Uncertainty

Education

- **University of Washington (UW)** — Seattle, USA
  Master of Science (GPA: 3.92/4.00) — *2018 - Present*
- **Indian Institute of Technology (IIT) Gandhinagar** — Gandhinagar, India
  Bachelor of Technology (GPA: 8.25/10.00) — *2014 - 2018*

Technical Skills

- **Languages/Tools**: Java, Python, Spark/PySpark, SQL, Git

- **Libraries**: Numpy, MLlib, Matplotlib, Pandas

Projects

- **Master's Thesis** *Advisor: Maryam Fazel (April '19 - Present)*
  - Worked on online optimization with budgetary constraints, analyzing a novel setting where objective functions are adversarial but constraints are stochastic. Existing literature considered adversarial constraints, ignoring the stochastic component of the environment - the thesis aims to bridge this gap.
  - Introduced a new algorithm *OLFW* which balances objective maximization with budget consumption while exploiting the stochastic nature of the problem. Analyzed the algorithm and provided theoretical guarantees in terms of the regret metric, in expectation as well as high probability.
  - Conducted numerical experiments for an online joke recommendation system on the *Jester* dataset, comparing performance of *OLFW* to other strategies. *OLFW* has the best overall performance.
  - One paper accepted to **NeurIPS 2020** as a *spotlight* paper and another conference paper under submission.

- **Bayesian Inference using Markov Chain Monte Carlo** (*Random Processes*): Implemented the Metropolis-Hastings Algorithm to estimate the posterior distribution for the bias of a coin based on different priors. The algorithm also gives a way to actually sample from a probability distribution.

- **Modeling the evolution of language demography** (*COMAPS Mathematical Contests in Modeling 2018*) Formulated a model to forecast the trend for population of speakers of different languages over time by incorporating factors such as the population changes, government policies encouraging the use of a particular language, migration. Concluded that for most common languages, the trend is dominated by birth-rate and death-rates. Received *Honorable Mention* prize.

- **Seam Carving** (*Data Structures and Algorithms*): Class project implementing content-aware resizing of images. Modeled the image as a graph and included appropriate graph augmentations. Used data-structures and graph-based algorithms such as Kruskal's/Dijkstra's for identifying least relevant pixels in an image and removing them to reduce the image size. Implementation in Java.

Relevant Coursework

- **Machine Learning**: Machine Learning for Big Data, Online Learning
- **Optimization**: Convex Optimization, Network Optimization, Numerical Optimization
- **Statistics**: High Dimensional Probability and Statistical Learning, Random Processes
- **Computer Science**: Artificial Intelligence, Robotics, Data Structures and Algorithms

Extra-Curricular Activities

- **Teaching**
  - Was an instructor for a student-run course on MATLAB, delivered tutorial-type lectures and created exercises for a batch of 150 students.
  - TA for class ME 565 (Engineering Mathematics) at UW. Grader for various classes.

- **Senator, Student Senate 2016-17, 2017-18**: Help solve the problems faced by the student community and deliberate on various aspects of student life at IIT Gandhinagar.