PRANNOY KATHIRESAN

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EDUCATION

- **University of Illinois Urbana Champaign (UIUC)** Aug 2022 - May 2024
  Master's in Industrial and Systems Engineering (Advanced Data Analytics Concentration) GPA: 3.75/4.0
  Courses: Machine Learning, Deep Learning, Algorithms for Data Analytics, Database Systems, Big Data and Clustering, Analysis of Network Data, Computing for Quants
- **SSN College of Engineering (Anna University)** Jul 2015 - Apr 2019
  Bachelor's in Mechanical Engineering GPA: 8.1/10
  Courses: Calculus, Linear Algebra, Data Structures, Probability and Statistics, Robotics

TECHNICAL SKILLS

- **Programming Languages:** Python, C++, SQL, R Programming, CSS, HTML, JavaScript
- **Application Software and Cloud**: Gurobi, NetworkX, Tableau, Power BI, Ansys Fluent, Looker, AWS
- **Databases and Libraries:** MySQL, Postgres, PyTorch, TensorFlow, Scikit-learn, Pandas, Numpy, D3.js
- **Data engineering and ML Ops:** Snowflake, BigQuery, Airflow, Kubeflow

EXPERIENCE

Graduate Teaching Assistant (Fully Funded), UIUC Jan 2023 – May 2024

- Held office hours, led discussion sessions, and evaluated assignments in Computer Engineering (ECE 445), Finance (FIN 221), and Bioengineering (BIOE 415); mentored in signal processing, op-amps, circuit design, deep learning, and corporate finance.

Graduate Research Assistant in Data Science- Gies College of Business, UIUC Jun 2023 - Aug 2023

- Predicted hourly demand for each Lyft bike station in Jersey City, NJ, throughout the year to optimize fleet management.
- Developed a Gated Recurrent Unit (GRU) pipeline, fine-tuned hyperparameters, and achieved a test loss MSE of 0.0015, outperforming the baseline simple two-layer neural network (test loss MSE of 0.0157).**[GitHub]**

Operations Analyst- MRF Tires, India May 2019 – Aug 2021

Executive Engineer

- Queried production data from the data warehouse using MySQL, pre-processed the data, and utilized Python for predictive modeling and statistical analysis to optimize machinery placement and routing processes. This resulted in a 7% increase in daily net output (equivalent to 14 tons) for tire production, leveraging existing resources.
- Automated a Power BI dashboard for real-time equipment KPI monitoring, reducing data retrieval times by 10% and improving response rates by 15%. Boosted operational efficiency by streamlining data modeling and transformation using Power Query and DAX, integrated directly with the data warehouse.

Junior Executive Engineer

- Conducted time series analysis using ARIMA, feature engineering, and clustering on sensory and runtime data to set preventive maintenance thresholds. Integrated these parameters into the data warehouse, supporting a plant-wide maintenance system and improving mean time between failures by 12%.

PROJECT EXPERIENCE

Fast and Simple Spectral Clustering Algorithm on the Human Activity Recognition GitHub

- Implemented Classical Spectral Clustering and Fast-Simple Spectral Clustering algorithms using Python to classify human activities, including walking, walking upstairs, walking downstairs, sitting, standing, and laying.
- Reduced big data clustering run time from 16.782 to 16.0628 seconds and complexity by embedding Graph vertices into $O(log(k))$ dimensions instead of $O(k)$ using Fast-Simple Spectral Clustering, with minimal trade-offs in clustering efficiency (ARI and NMI).

MNIST Image Generation with VAE and GAN GitHub

- Implemented Variational Autoencoders and Generative Adversarial Networks for digit generation on the MNIST dataset using PyTorch, achieving convergence within 100 and 200 epochs respectively, and advanced image quality through encoding.

Network Data Analysis of S&P 500 Stocks GitHub

- Constructed a network graph of S&P 500 companies using NetworkX, analyzing correlations of adjusted close prices to identify key market sectors for optimizing portfolio management and risk assessment.
- Performed maximum clique analysis using binary variable formulation (integer programming) with Gurobi optimizer, achieving an optimality gap of 0.00% in 0.33 seconds over 59 iterations.

Predicting Returns of Exchange-Traded Funds (ETFs) and Mutual Funds (MFs) GitHub

- Conducted exploratory data analysis (EDA), regression, classification, decision tree modeling, and pruning on ETFs and MFs data using R-programming, considering varied investments, sectors and fund types.
- Leveraged Random Forest algorithm majorly due to its exceptional accuracy metrics (ETF-MSE: 0.00380, ETF-R^2: 0.8217, MF-MSE: 0.00020, MF-R^2: 0.966) to facilitate strategic investment decisions.

Production Optimization of a Manufacturing Industry GitHub

- Implemented a deterministic Simplex algorithm (linear programming) from first principles using MATLAB to optimize resource allocation in a manufacturing unit, addressing infeasibility and unboundedness issues.
- Integrated with MySQL for real-time data retrieval to optimize resource allocation in production environments.