Rajat Poovaiah Pattada

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Education

- **Stony Brook University** — Stony Brook, NY
  Masters of Science in Computer Science; GPA: 3.98 — *May 2021*
- **Indian Institute of Technology, Kanpur (IITK)** — Uttar Pradesh, India
  Bachelor of Technology in Aerospace Engineering — *July 2015*

Skills Summary

- **Languages**: Python (Expert) , C++ (Expert), Javascript (Proficient) , R , MATLAB
- **Scientific Computing Packages**: NetworkX (Expert), CGAL (Expert), NumPy , SciPy , Scikit-learn
- **Machine Learning Libraries**: PyTorch, Tensorflow
- **Data Visualization Tools**: Redash (Expert) , Matplotlib (Expert), Pyplot (Expert), ggplot , QT, Tableau
- **Data Stores**: MySQL (Expert), ElasticSearch (Expert), PostgreSQL , MongoDB

Research

- **Masters Thesis**: *Aisle Orientations in Grocery Stores: A graph theoretic evaluation* — *Spring 2020 - Spring 2021*
  - Path Planning, Computational Complexity, Computational Geometry, Combinatorial Optimization
  - Simulated the movement of customers in a store over undirected and directed graphs using Python with the help of the NetworkX and NumPy libraries and calculated the spread of infection over these movement patterns using a probabilistic model combined with a plane sweep algorithm to detect intersections among orthogonal lines
  - Computational Geometric calculations and initial prototypes were built in C++ using the CGAL library
  - Formulated the optimization problem of minimizing infection spread as an integer programming problem
  - Modelled the problem of minimizing infections in a store with a single path through it as a scheduling problem and proved this problem belonged to the set of NP-complete decision problems
  - Calculated the approximate solution for upto 15 items in the store (ATSP size of 2^{15} and for upto $n = 2^{15}$ customers with distinct item choices in the store) using RStudio with the Concorde(C++) TSP Solver
- **Course Project, Computational Geometry**: *Social Distancing as a Motion Planning Problem* — *Spring 2020*
  - Path Planning, Robotics, Computational Geometry, Mathematical Modelling, Computational Complexity
  - Compiled a Jupyter Notebook which, given a set of obstacles in the plane charts a path to navigate a path through the plane that maintains a minimum distance from all these obstacles
  - Designed an algorithm using the Voronoi diagram of obstacles in the plane that has useful applications in maintaining social distance while navigating through crowds and implemented this algorithm in C++ using CGAL
- **Undergraduate Thesis**: *Direct Numerical Simulation of 2D transonic flow around airfoil undergoing pitching oscillation* — *Fall 2014*
  - Finite Difference Methods, High Performance Computing, Scientific Computing, Numerical Analysis
  - Simulated flow past an airfoil undergoing pitching oscillation over a large computational domain using a high resolution, time-accurate compressible Navier-Stokes FDM solver (OUCS3 and optimised ORK3) written in Fortran

Work Experience

- **GlowRoad** — Bangalore, India
  Technical Consultant — *May 2019 - July 2019*
  - Tuned the parameters of the Java Virtual Machine to increase application stability and reduce resource utilization, thereby increasing uptime by 5% and reducing per instance costs by 50%
  - Automated and streamlined deployments to allow for seamless autoscaling and configuration management
  - Integrated monitoring utilities including the ELK (Elastic-Logstash-Kibana) stack for centralized logging and Sentry for error management and alerting
  - Established and encouraged adoption of core guidelines and best practices among the technology team and its shareholders
- **SigTuple** — Bangalore, India
  Senior Computer Scientist — *June 2017 - Aug 2018*
  - Designed and prototyped a program to run analyses directly on edge devices using TensorFlow to reduce turnaround times (by 38%) and alleviate the need for internet access

- Built a distributed job scheduling cluster to optimize resource utilization during the training of deep neural networks over large volumes of medical image data thereby cutting cloud costs by 40%
- Responsible for scaling the in house distributed, deep learning platform built on TensorFlow and Apache Spark through improvements to the architecture, data partitioning strategies and readability.
- Redesigned the platform as an ecosystem of Python packages each supporting a different use case (analysis, training, data processing)
- Architected and implemented a data access layer to act as an abstraction between applications requesting data from multiple cloud providers distributed as clients in multiple languages (Python, Javascript)
- Designed a website using ReactJS and Python to expose API's that given a dataset of a user's blood/urine test data would provide an AI powered diagnosis of possible underlying health conditions which won the first place at the company Hackathon

• **Finomena** Bangalore, India
Software Development Engineer *Sep 2016 – May 2017*
- Spearheaded efforts to increase the accuracy of an in house bank statement parser from approximately 65% to 97.3% with the help of computer vision and NLP techniques
- Migrated from a synchronous data upload model to a distributed, publish-subscribe based model to offset response times and build a more robust, reliable system of ingestion of large volumes of user data.
- Optimized multiple facets of our loan management system using a combination of query optimization, index tuning, result caching and network optimization

• **Quikr/Commonfloor** Bangalore, India
Software Development Engineer *June 2015 - Aug 2016 (By Acquisition, Commonfloor)*
- Integral team member in piloting a stack change to Node.js and ReactJs.
- Implemented a feedback loop for the recommendation engine to improve recommendations on similar items in inventory.

TEACHING EXPERIENCE

- **Teaching Assistant, Stony Brook University, Spring 2021**: *CSE595: Programming Abstractions*
- **Teaching Assistant, Stony Brook University, Fall 2020**: *CSE547/AMS547, Discrete Mathematics*
- **Teaching Assistant, Stony Brook University, Spring 2020**: *CSE307, Principles of Programming Languages*
- **Teaching Assistant, Stony Brook University, Fall 2019**: *CSE215, Foundations of Computer Science*
- **Academic Mentor, Counseling Service, IIT Kanpur, 2012-13**: *ESC101, Fundamentals of Computing*
- **Peer Mentor, CSE Dept, IIT Kanpur, Spring 2012**: *ESC101, Fundamentals of Computing*

RELEVANT COURSEWORK

- **Computational Geometry**: Classifiers, Clustering, Motion Planning, Nearest Neighbor Detection
- **Randomized Algorithms**: Linearity of expectation, Pattern Matching, Markov Chains, Randomized Incremental Construction
- **Finite Element Methods for Fluid Dynamics**: Galerkins Approximation, Guassian Quadrature, Matrix Equations
- **Discrete Mathematics**: GANs, Optimal Transport Theory, Probability and Statistics

PATENTS

- **A method and system for dynamically generating medical reports**: **Indian Patent Office, Patent No.: 311461** Duraikrishna Selvaraju, Kumudini Kakwani, Rajat Poovaiah et. Al.

LEADERSHIP EXPERIENCE

- **President, Group for Energy and Environment Engineering, IIT Kanpur (2013-14)**:
  - Conducted various activities and competitions to raise environmental awareness
  - Organized and monitored Green Opus 2011 and 2012, the intra-collegiate sustainability championship with 6000 participants across campus, resulting, on average, in a 40% reduction in electricity usage and 27% reduction in food waste generated
  - Approved and supervised the construction of the state's first solar tree on campus as part of the Golden Jubilee of the Students' Gymkhana
- **President, English Literary Society, IIT Kanpur (2013-14)**:
  - Conducted literary and debate activities and parliamentary debates and training teams to compete
  - Adjudicated the Parliamentary Debates at Antaragni 2013 and Antaragni 2014, one of the biggest college cultural festivals of Asia
  - Coordinated and adjudicated the intra-collegiate Parliamentary Debates and Creative Writing events held as part of Galaxy 2014 and 2015