

Rajat Jaiswal

Rajat.cs517@cse.iitd.ac.in | rajat499.github.io

EDUCATION

Indian Institute of Technology Delhi <i>B.Tech. and M.Tech. in Computer Science and Engineering</i>	9.37/10 <i>July 2017 – June 2022(Expected)</i>
Bansal Public School <i>Class XII, CBSE</i>	94.40% <i>Apr. 2015 – Mar. 2017</i>
Little Flower School <i>Class X, ICSE</i>	95.67% <i>Apr. 2014 – Mar. 2015</i>

EXPERIENCE

Tradescience <i>Quantitative Analyst</i>	August 2020 – May 2021 <i>Gurgaon, India</i>
<ul style="list-style-type: none">Devised mean reversion strategy on Nifty large-cap coupled with commodity channel index and agnostic to trendsComposed intraday swing strategy for derivatives trading via custom implemented indicator; Optimized with ATRTrained ML-based indicator on tick market data to predict sentiments towards an instrument in steps of 5 seconds	

INTERNSHIPS

Disney+ Hotstar <i>Data Discovery</i>	June 2021 – July 2021 <i>Bangalore, India</i>
<ul style="list-style-type: none">Designed a data discovery portal from scratch to easily navigate for information in data lakes at scale of petabytesCreated CI/CD pipelines to deploy the tool via 5 microservices & to maintain infrastructure as code for scalabilityIndexed hive metastore through modular databuilder Airflow DAGs, schedulable & extendible to data warehouses	
Adobe Research <i>OPTIMA: Object-Adaptive Image Compression</i>	May 2020 – July 2020 <i>Bangalore, India</i>
<ul style="list-style-type: none">Modeled framework for deep learning-based lossy image compression with an end-to-end compressive autoencoderEffectuated an importance map network to guide bit allocation in image, adaptive to spatially variant local contentEnvisaged a novel rate-equivalence-distortion optimization for variable compression & imperceptible loss in quality	
Taipei Medical University <i>Analysis of Sleep Quality among Cancer Patients</i>	June 2019 – July 2019 <i>Taipei, Taiwan</i>
<ul style="list-style-type: none">Conducted an extensive study to understand correlation between objective & subjective measures of sleep qualityCollected objective data from a wearable actigraphy device and delineated questionnaires to get subjective dataInvestigated interrelationship between variables and found moderate correlation with high statistical significance	

SCHOLASTIC ACHIEVEMENTS

- Department Rank:** Consistently ranked amongst top 4 in Computer Science & Engineering Dual Degree Batch of 2022
- B-83 Merit Scholarship:** Awarded for excellent academic & co-curricular record by the Batch of 1983, IIT Delhi 2021
- Semester Exchange:** Selected by IIT Delhi for Concordia University, Canada in a 3-tier merit-based procedure 2019
- Outstanding Contribution to Cancer Research:** Acknowledged by Ministry of Science & Technology, Taiwan 2019
- IIT Delhi Semester Merit Award:** Conferred for ranking amongst top 7% students academically in institute 2019
- GASE Summer Program:** 1 of 34 international students to receive a research grant by Government of Taiwan 2019
- Alumni Merit Scholarship:** Received scholarship of 1 lakh per annum for 4 years based on academic excellence 2017

PROJECTS

Position Estimation of Flying Aircraft	February 2021 – March 2021
<ul style="list-style-type: none">Approximated coordinates & velocity of an airplane using observation of a noisy radar with uncertainty in motionInstrumented a Kalman filter to estimate state affected by velocity increments characterized as sine & cosine wavesScaled the solution to multiple agents by crafting data association strategy to map observations with latent states	

Fairness in Machine Learning

January 2021 – April 2021

- Construed definition of fairness from a model's perspective; Conceptualised evaluation metric for bias amplification
- Examined change in fairness by tweaking attribute conditioned class prior, regularization, model & data intricacy
- Quantified fairness versus accuracy trade off; suggested ways to mitigate unfairness to obtain pareto optimal point

PageRank using MapReduce

March 2020 – April 2020

- Conceptualised a pipeline to solve Google's PageRank algorithm using the MapReduce for distributed computing
- Developed multi-threaded MapReduce library utilizing Message Passing Interface for split-apply-combine strategy
- Achieved lowest latency for 100,000+ pages on comparison with MapReduce-C++ and MapReduce-MPI libraries

Torrent: P2P File Sharing

September 2020 – October 2020

- Developed a tool to download large files over Peer-to-Peer network with low latency & resilient to disconnections
- Spawned numerous connections using multi-threading & avoided duplicate downloading of chunk with bookkeeping
- Allocated segments to threads in dynamic manner & assured correctness with MD5 checksum after reconstruction

Gallbladder Extraction from Ultrasound Images

October 2020 – November 2020

- Composed a pipeline using traditional image processing techniques unaccompanied by any learning from the data
- Detected major contour of blob passing through Gaussian blurring, Otsu's thresholding, and Laplacian of Gaussian
- Attained mean intersection over union score of 91% on test set by hypertuning on validation set of only 10 images

Motion Planning for Mobile Robot

April 2021 – May 2021

- Determined policy for an autonomous agent in a grid world domain using value iteration reinforcement learning
- Modeled the problem as a Markov Decision Process with appropriate reward to states for optimal policy extraction
- Tweaked discount factor & formulated convergence criteria combining policy change & max norm of value change

Multi Agent Adversarial Search

November 2020 – December 2020

- Enabled the Pacman agent to act rationally & targeting to clear food pellets in a grid with ghosts acting against it
- Modeled decision-making task & implemented Expectimax algorithm with Alpha-beta pruning for better efficiency
- Improved the reflex agent with a better evaluation function acting on distance to food, power pellet, and adversary

Text Categorization System

September 2020 – October 2020

- Built an ensemble of linear classifiers for academic emails from set of annotated data sent to Dean of the institution
- Eradicated class imbalance in preprocessing, and vectorized with tf-idf to obtain 87% micro F1 and 85% macro F1
- Experimented by training BiLSTM with weighted cross-entropy over an embedding layer initialized by 840B GloVe

Named Entity Recognition for Real Estate Texts

November 2020 – December 2020

- Performed sequence labeling for tokenized shouts with contextual statistical modeling for structured predictions
- Constructed task-specific features achieving 82% token level macro F1 score with Conditional Random Field model

TECHNICAL SKILLS

Programming Languages: Python, PyTorch, Java, C/C++, OCaml, Matlab, VHDL, ARM Assembly, MySQL, PHP
Softwares & Frameworks: AWS, Terraform, GoCD, Docker, Airflow, Kubernetes, MapReduce, Git, OpenMP, MKL

TEACHING ASSISTANSHIPS

- Data Structures & Algorithms, Fall 2020
- Computer Networks, Fall 2021
- Probability & Stochastic Processes, Spring 2021
- Parallel & Distributed Programming, Spring 2022

EXTRA-CURRICULAR & CO-CURRICULAR ACTIVITIES

Recognitions:

- Significant Contribution to Cultural Activities, 2019
- Best Fresher, Zanskar Hostel, 2018

Academic mentor: for the course 'COL100: Introduction to Computer Science'; tutored first year undergraduates

Batch representative at Co-curricular & Academic Interaction Council: Voiced students' concerns during pandemic