

# Rajat Jaiswal

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## EDUCATION

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|---|---|
| <b>Indian Institute of Technology Delhi</b><br><i>B.Tech. and M.Tech. in Computer Science and Engineering</i> | 9.33/10<br><i>July 2017 – June 2022(Expected)</i> |
| <b>Bansal Public School</b><br><i>Class XII, CBSE</i>   | 94.40%<br><i>Apr. 2015 – Mar. 2017</i>            |
| <b>Little Flower School</b><br><i>Class X, ICSE</i>   | 95.67%<br><i>Apr. 2014 – Mar. 2015</i>            |

## EXPERIENCE

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| <b>Tradescience</b><br><i>Quantitative Analyst</i>   | August 2020 – Present<br><i>Gurgaon, India</i> |
| <ul style="list-style-type: none"><li>Engaged in technical analysis of derivatives to design systems based on momentum &amp; volatility of underlying asset</li><li>Responsible for backtesting &amp; implementing strategy &amp; reviewing trade statistics to optimize strategy performance</li><li>Triangulating novel solutions to increase profit, reducing drawdown, for maintaining strong risk-adjusted portfolios</li></ul> |  |

## INTERNSHIPS

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

## SCHOLASTIC ACHIEVEMENTS

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- Department Rank:** Consistently ranked amongst top 4 in Computer Science & Engineering Dual Degree Batch of 2022
- Teaching Assistant:** Selected for courses Data Structures & Algorithms and Probability & Stochastic Processes 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

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

## **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

## **Traffic Simulator**

January 2019 – February 2019

- Characterized an Indian traffic road intersection on a simulator in C++, supporting realistic lane change behavior
- Visualized the deployment on terminal & revamped display for a graphical user interface, rendered using OpenGL

## **TECHNICAL SKILLS**

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**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

## **EXTRA-CURRICULAR & CO-CURRICULAR ACTIVITIES**

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### **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