

# Pranaya Jajoo

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## Education

### University of Alberta

Edmonton, AB

MASTER OF SCIENCE, COMPUTING SCIENCE

2024 - 2026 (expected)

- Courses: Reinforcement Learning I, Machine Learning Essentials, Deep Reinforcement Learning, Intermediate Machine Learning
- Advised by **Prof. Martha White**
- Recipient of the University of Alberta Graduate Recruitment Scholarship
- TA for CMPUT 301: Introduction to Software Engineering, CMPUT 291: Introduction to File and Database Management

### Veerмата Jijabai Technological Institute

Mumbai, India

BACHELOR OF TECHNOLOGY, ELECTRICAL ENGINEERING | GPA: 7.36/10.0 (FIRST CLASS)

2015 - 2019

- Courses: Computer Programming and Problem Solving, Numerical Methods, Optimization Techniques, Microprocessor & Microcontroller, Applied Linear Algebra, Mathematics for Engineers, Signals & Systems, Digital Signal Processing

## Publications

- *RL Zero: Zero-Shot Language to Behaviors without any Supervision* ([arxiv](#))  
Harshit Sikchi\*, Siddhant Agarwal\*, **Pranaya Jajoo\***, Samyak Parajuli\*, Caleb Chuck\*, Max Rudolph\*, Peter Stone, Amy Zhang, Scott Niekum (\* Equal Contribution)

## Projects

### RL Zero: Zero-Shot Language to Behaviors without any Supervision

September 2024 - Present

- Developed the first zero-shot language-to-behavior policy using unsupervised Reinforcement Learning and closed-form imitation learning that enables RL agents to mimic observations.
- Generated zero-shot policies for target behavior using prompts and cross-embodied videos such as those scraped from YouTube.

### Policy Parameterization

September 2024 - Present

- Surveyed existing literature regarding policy parameterization in continuous control environments.
- Conducted experiments in continuous control environments with different types of policy parameterizations to evaluate how it impacts policy performance.

### Small Batch Reinforcement Learning for Continuous Action spaces

September 2024 - December 2024

- Evaluated the impact of reducing batch size in continuous action space environments from the MUJOCO suite using Soft Actor-Critic to determine if it improved performance and sample efficiency.

### Adaptive Discount Factor in Reinforcement Learning

October 2024 - December 2024

- Evaluated the role of discount factor in Reinforcement Learning on a set of grid-world and some MUJOCO environments using Q-learning.

### Automatic Traffic Control using Computer Vision | Bachelor Thesis

May 2018 - May 2019

- Worked on a project to address vehicular traffic problems in Mumbai by devising an effective system using data collected from 11 traffic signal cameras and applying object detection and tracking techniques to identify traffic patterns.

## Experience

### Wayfair LLC | LLM's, RAG, SQL, ML, Forecasting

Boston, MA

SENIOR DATA ANALYST, MACHINE LEARNING FOR PLANNING AND INVENTORY MANAGEMENT

January 2023 - December 2023

- **Inventory demand forecasting:** Built models that take data from multiple sources of differing modalities, and generate improved forecasts and order quantities. Explored various time-series models ranging from classical methods like ARIMA to deep architectures like transformers. My tool has since been tested for over a year, used to order inventory worth over **\$800M**, and productionalized into a web application.
- **Retrieval-augmented generation (RAG):** Developed a unifying interface for incorporating fine-tuned language models using Llamaindex to interact with the internal data. These include: enabling text-to-SQL queries directly on internal databases with language models and retrieval-augmented generation (RAG) for extracting factual information from document databases.
- **Metrics and QA:** Defined key metrics that served as heuristics, allowing us to measure supplier performance, and developed new data pipelines to capture new and existing key performance indicators (KPIs). Developed unit tests for QA that helped discover several data discrepancies and shortcomings in the legacy in-house inventory tool causing over-ordering and leading to deadstock.
- **Automated data cleaning:** Implemented automated data cleaning and validation algorithms to enable for replenishment of **8500 high-velocity products** with forecasted sales of over **\$300M** over the next 12 months.

SENIOR DATA ANALYST, RETURNS MONETIZATION CHANNEL GROWTH

August 2022 - January 2023

- **Regression models:** Used regression models on historical data to evaluate the most profitable product categories to sell at the pilot of Wayfair's returned inventory outlet store; developed procurement and merchandising strategies to maximize profit, and built standardized reporting to track performance of the outlet store. The store achieved profitability within 3 months of opening with projected **\$500K** annual profit operating only one day/week and the outlet chain has been expanded to two more locations in the US and is being tested in the EU.
- **Software tools:** Developed an internal tool using excel and GBQ to generate details like description and list price of any returned product to be sold at Wayfair's outlet store and used API connectors to integrated data pipelines to and from the third-party point of sale system.

- **Databases:** Created new product and supplier databases for Specialty Retail Brands, Flagship Brands, and Physical Retail.
- **Visualization:** Developed and maintained long-term reporting for All Modern, Joss and Main, Birch Lane, and Wayfair's physical retail business in the form of KPI reports and dashboards; created a query database by writing custom SQL queries based on business requirements.

### Avant LLC | *Planning algorithms, Online Learning, Software Engineering*

Chicago, IL

SENIOR ANALYST, PRODUCT AND DATA

January 2022 - February 2022

- Developed a tool that converts historical data for process flow in customer-company interaction into weighted graphs and provides insights on the most important paths for conversion to self-service using planning techniques like Dijkstra's and A-star; managed the build, testing, and deployment of APIs with the development team to facilitate automated capabilities like 'Text-to-Pay' and 'Schedule Callbacks' within the Interactive Voice Response system, SMS, and mobile application, saving the company **\$150K** per year.

ANALYST, OPERATIONS STRATEGY

December 2020 - December 2021

- **Automate agent scheduling for customer interactions:** Proposed and developed online learning strategies like Upper-Confidence Bound (UCB) to automate agent-customer interaction and provably reduce customer regret and facilitate even load distribution.
- **Livevox SMS and dialing campaigns implementation:** Deployed LiveVox, a collections communications platform, to replace a disparate infrastructure of in-house and third-party applications that managed outbound dialing, email, and SMS leading to estimated savings of **\$100K** a year. Scripted python jobs for auto-migrating customer communication data from Livevox to Avant's CRM; deployed monitoring and testing for customer communication campaigns.

### Bhabha Atomic Research Center | *Multimodal Machine Learning*

Mumbai, India

RESEARCH INTERN

June 2018 - September 2018

- Worked under lead Scientific Officer, Parag Walinjkar, to predict the impact of radiation on surroundings depending on environmental factors. The data sources varied from readings from specialized instruments to weather readings. The project resulted in eliminating the need for analog and manual analysis.

### Siemens Limited | *Data Visualization*

Mumbai, India

SOFTWARE INTERN

June 2017 - August 2017

- Created a Tableau dashboard that tracked the required cycle time vs current production rate for circuit breakers, employee distribution on the assembly line, and status of defective appliances, raw materials, and missing orders, increasing the production rate by 3%.

## Certificates & Skills

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- **Machine Learning Coursework:** Reinforcement Learning (UAlberta Coursera), CS231n: CNN for Visual Recognition, CS229: Machine Learning (Stanford), Statistics: Fundamentals of Statistic (MITx), CS188: Intro to AI (UC Berkeley)
- **Fundamental Coursework:** Programming Languages and Paradigms, Intro to Computer Science, Python Data Structures and Algorithms (U Mich), Linear Algebra, Discrete Structures, Calculus III, Analytics I: Principles & Applications, Math Foundations for Data Analysis, Exploratory Data Analysis, Natural Language Processing (ongoing), Programming Using Python (MITx), Numerical Methods, Optimization Techniques, Microprocessor & Microcontroller, Signals & Systems, Digital Signal Processing
- **Frameworks:** Pytorch, LlamaIndex, greykite, Keras, AWS, Github, Numpy, Scikit-learn, Pandas, Looker, Google Data Studio, Tableau, OpenCV, Airflow, Power BI, Jira, Trello
- **Languages:** Python, R, SQL, C++, Java, HTML, CSS