

# SURAJ ANAND

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## EDUCATION

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### Brown University

Providence, RI | Expected Graduation Spring 2024

Concurrent M.S. Computer Science, B.S. Computer Science–Applied Mathematics, GPA: 4.0

- *Relevant Coursework:* Advanced Topics in Deep Learning (Grad), Parallel Computing (Grad), Machine Learning Algos, Numerical Optimization, Applications of Probability & Statistics, Information Theory, Discrete Structures, Statistical Inference, Linear Algebra, Data Structures & Algorithms, Compilers, Blockchains, Systems, Networks, Software Engineering

## EXPERIENCE

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### Data Science Intern, POINT72 MARKET INTELLIGENCE, PROPRIETARY RESEARCH

New York, NY | June 2023 - August 2023

- Engineered a distributed Automatic Model Selection framework for backtesting pharmaceutical quarterly earnings models to determine best forecasting models for 25 companies, eliminating a ~15 hour-long model development per company.
- Performed research on cross-correlation and autoregressive effects for nonstationary temporal multivariate data to reduce earnings predictive error for 47 companies by 52% on average with Apache Spark.

### Machine Learning (NLP) Intern, KAISER PERMANENTE MEDICAL INFORMATICS

San Diego, CA | May 2022 - August 2022

- Improved sentence embeddings of patient pre-hospital visit reason by migrating to a Sentence-BERT architecture which increased downstream predictive power by 10% (measured by AUPRC) and strengthened robustness to edge cases.
- Fine-tuned a GPT-J model with DeepSpeed parallelism to extract kidney stone features (size, laterality, etc.) from chunks of radiology reports with 80% accuracy, overcoming annotated data shortages with Self Learning and Active Learning.

### Machine Learning Engineer Intern, VOLKNO

Los Angeles, CA | January 2022 - January 2023

- Deployed a Dockerized Airflow DAG to compute and store scene-level trailer annotations including key objects, drugs & violence, actor demographic attributes, and actor face embeddings in MySQL and OpenSearch databases.
- Created REST API endpoint to get movie title metadata from an S3 bucket using Amazon API Gateway and AWS Lambda.
- Predicted Twitter sentiment about upcoming movies from user emotional response data collected during trailer viewing, achieved an AUROC of 0.80 by sophisticated feature engineering and user-scoring; advised by David Parkes of Harvard.

## TEACHING

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### Teaching Assistant, COMPUTATIONAL LINGUISTICS (CS1460)

Providence RI | Fall 2022 & Fall 2023

- Instructed 100+ students on Transformers, Hidden Markov Models, Dynamic Programming, Dependency Parsing, etc.
- Developed final project for Question Answering with BERT (2022) & Tracing Gender Bias in GPT2 with Mech Interp (2023)

## RESEARCH & PROJECTS

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### Research in LUNAR Laboratory | PYTORCH, TRANSFORMERLENS, SLURM

April-May 2022

- Reinforcement learning from AI feedback (RLAIF) and Transformers' learning dynamics research under Prof. Ellie Pavlick.
- Discovered polysemantic neurons in AlexNet and employed subnetwork analysis to verify that different semantic uses arose via statistically independent processes; visualized using reverse gradient visualizations ([code](#), [whitepaper](#))

### Parallelized Simulated Annealing | C++, OPENMP, CUDA, NVIDIA NSIGHT

August 2021

- Built an OpenMP parallel implementation of multi-start and coupled simulated annealing for combinatorial optimization.
- Accelerated updating & evaluation with warped CUDA kernels, enabling optimization of high-dimensional functions in seconds.

### Disentangling Causal Mechanisms with Projection | PYTORCH

November 2019 - April 2020

- Proposed a novel algorithm for disentangling generative factors in the latent space of an AutoEncoder by applying a projection-based classifier obstruction algorithm called R-LACE ([code](#), [whitepaper](#))

## SKILLS & INTERESTS

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**Technologies:** Python, Torch, C, SQL, MATLAB, Docker, Kubernetes, AWS, Spark, Airflow, Databricks, TypeScript, Java

**Achievements:** Intel International Science Fair Finalist, AIME Qualifier (x3), LA Country Science Fair Overall Winner