

# Ayush Bharadwaj

Data Scientist - Machine Learning, Optimization

ayusbhar2.github.io

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## EDUCATION

M.A. Mathematics | Optimization, Algebraic Geometry

*San Francisco State University*

01/2020 – 01/2023

*San Francisco, CA*

M.S. Operations Research

*Case Western Reserve University*

08/2012 – 01/2014

*Cleveland, OH*

B.Tech. Civil Engineering

*Indian Institute of Technology*

06/2000 – 07/2004

*Varanasi, India*

## PROJECTS

Robustness Verification of Neural Networks using Optimization Methods

01/2022 - 01/2023

*Python implementation of optimization methods to verify robustness of classifier networks*

Complex Critical Points of Deep Linear Neural Networks

01/2022 - 01/2023

*Research exploring the loss landscape of neural networks using computational algebraic geometry*

## EXPERIENCE

AI Safety Researcher

05/2024 – present

*Supervised Program for Alignment Research (SPAR)*

*San Jose, CA*

- Research work (in-progress) on parametrization-invariant mechanistic interpretability of neural networks. Investigated the approximations of the local learning coefficient (LLC), a measure of the model complexity of neural networks, by using a second-order Taylor series expansion of the loss function.
- Implemented a unified experimentation framework for computing the eigenvectors of the loss function for various model architectures.

Data Scientist, Risk / Fraud Detection

05/2016 – 10/2019

*Postmates (acquired by Uber) | On-demand delivery*

*San Francisco, CA*

- As the first data scientist, bootstrapped the company's ML system for payment fraud detection.
- Trained random forest models to mimic human judgment in the absence of ground truth.
- Introduced a new error metric for diagnosing model ensembles under very high class skew.
- Wrote the decision engine for model-informed as well as rule-based real time decisions.
- Developed data pipelines for online and offline feature generation and storage.
- Built a simulation based experiment design framework to measure model performance in production.

Risk Analyst, Consumer Risk

05/2014 – 05/2016

*PayPal | Fintech*

*San Jose, CA*

- Investigated payment fraud trends by identifying anomalous events in financial transaction data.
- Optimized decision thresholds to reduce the Risk system's overall cost of misclassification.
- Researched the information value of new variables to include in machine learning models.

Software Engineer / Consultant

06/2004 – 07/2012

*Infosys Limited | Software Services*

*Bangalore, India*

- Software development • Query optimization • Systems Integration • Incident management