

# Divit Rawal

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## EDUCATION

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### University of California, Berkeley

Aug. 2023 – Present

*Physics, Mathematics, Electrical Engineering & Computer Science (Minor)*

*Berkeley, CA*

- **Relevant Coursework:** Quantum Mechanics, Abstract Linear Algebra, Advanced Programming in R, Data Structures, Deep Learning for Visual Data, Abstract Algebra, Discrete Mathematics, Probability Theory
- **Activities:** Launchpad AI/ML, Data Structures Peer Tutor, Hands-On PCB Engineering Course Staff

## EXPERIENCE

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### Berkeley Artificial Intelligence Research (BAIR)

Sep. 2024 – Present

*Researcher*

*Berkeley, CA*

- Studying regression and classification task in-context learning in Neural Tangent Kernel machines
- Using mechanistic interpretability techniques to analyze how multi-layer perceptrons perform in-context learning

### ExperienceFlow AI

May 2024 – Sep. 2024

*Machine Learning Engineering Intern*

*Remote*

- Reduced necessary training set size by 99% (from 5000 to 50) with minimal impact on performance by developing novel efficient machine learning techniques
- Designed, implemented, and evaluated recurrent neural network-based, deep Q-Learning, and SARSA techniques for predicting time evolution of finite state machines and maximizing rewards

### Amazon

Aug. 2023 – Dec. 2023

*Software Engineering Intern*

*Remote*

- Developed K-means clustering algorithm in Java, improved unit test coverage (from 66% to 78%), and resolved critical data pipeline issues affecting over 1 million users in [ml-commons](#) repository
- Selected as member of 2023 OpenSearch Contributor Initiative, collaborating with industry professionals and Amazon Machine Learning Engineers worldwide to build an open-source data analytics and visualization platform

### UC Irvine, Department of Physics & Astronomy

Feb. 2022 – Jul. 2023

*Researcher*

*Irvine, CA*

- Developed, trained, and tested deep learning models using TensorFlow/Keras to address data scarcity in high momentum collision analysis, achieving over 90% accuracy (compared to 80% previously)
- Simulated particle collisions with MadGraph, Pythia8, Delphes, and ROOT; designed and implemented reconstruction algorithms in C++ and Python, successfully predicting particle mass with less than 2% error

## PROJECTS

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### Antichess | *Python, Statistical Decision Making, PyTorch*

- Developed PyPI package to play and simulate antichess games with single or multi-player modes
- Implemented decision making techniques including Minimax with alpha-beta pruning and Monte Carlo Tree Search to enhance strategic gameplay
- Currently designing and implementing from-scratch spatial attention-based model to score board positions

### Neural Navigator | *Graph Neural Networks, Recommender Systems*

- Developed deep-learning based recommender systems to recommend users activities and events in the Bay Area
- Implemented collaborative filtering with LightGCN and matrix factorization methods
- Built web application for user interaction using the React.js and Django frameworks

### Physics Directed Reading Program | *Monte Carlo Methods, Machine Learning*

- Studied applications of statistical physics to machine learning in UC Berkeley Physics Directed Reading Program
- Examined Boltzmann machines, Monte Carlo methods, and Markov Chain Monte Carlo methods
- Delivered engaging presentation about the intersection of physics and machine learning to physics students

## SKILLS

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**Languages:** Python, R, Julia, SQL, C, C++, Java, HTML/CSS, JavaScript

**Frameworks:** ROOT, Flutter, Flask, Mockito, ReactJS, React Native

**Libraries:** PyTorch, TensorFlow Keras, Pandas, NumPy, Matplotlib, SciKit-Learn, BeautifulSoup