Divit Rawal

divit.rawal@berkeley.edu | divitr.github.io | divitr | /in/divit-rawal

Education

University of California, Berkeley Aug. 2023 – Present

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

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

Experience

UC Berkeley, Department of Physics Sep. 2024 – Present

Researcher *Berkeley, CA*

- Conducting research on the emergence of In-Context Learning in wide neural networks using Neural Tangent Kernel theory
- Designing and evaluating deep neural networks within the kernel regime to assess their generalization capabilities

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

Kairos Academics Apr. 2023 – Present

Tutor *Remote*

- Provide one-on-one tutoring to high school students in math and science
- Develop personalized lesson plans and study strategies to address individual student needs and learning styles
- Monitor student progress and adapt teaching methods to ensure comprehension and academic growth

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

SimpleMath Foundation Aug. 2021 – Jun. 2023

Head of Tutoring *Irvine, CA*

- Led a team of 11 tutors to provide academic support to children from underserved communities, helping improve their understanding and confidence in math
- Personally tutored 2 students each week, tailoring instruction to meet individual needs and learning styles
- Created and published a series of engaging and informative YouTube videos on key math concepts

Projects

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

3-D Filament Fuser | *PCB Design, KiCad, Circuit Design*

- Conceptualized and designed device that automatically joins 3-D filament together, allowing users to change filament color without interrupting their print
- Designed schematic, layout, and custom-printed circuit board in KiCad
- Presented final product to Apple engineers and UC Berkeley EECS faculty

Research-Engine | *Natural Language Processing, Full-Stack Web Development, Flask, Web Scraping*

- Led team of 3 to develop a search engine that provides an overview of a topic and recent related research
- Deployed full-stack web application with Flask and Svelte hosted on AWS (EC2 instance)
- Implemented web scraping (Beautiful Soup) and natural language processing (BERT) to obtain and summarize information

Watersort Solver | *Flutter SDK, Dart, Java*

- Designed and developed mobile app in Java and Flutter to quickly solve any watersort brainteaser
- Published to Google Play Store with 4.5 star rating and over 160 downloads

Certifications

Machine Learning *IBM*

- Studied data analysis, supervised, unsupervised, and semi-supervised learning with a focus on deep learning
- Completed capstone project using machine learning to build recommender systems

Decision Making and Reinforcement Learning *Columbia University*

- Studied theoretical and mathematical foundations of reinforcement learning strategies for dynamic environments
- Implemented algorithms such as Q-learning and SARSA in Python

Game Theory *Stanford University*

- Studied multi and single player games, using mathematical modeling to optimize outcomes

Skills

Languages: C, C++, Python, R, Java, HTML/CSS, JavaScript, SQL
Frameworks: ROOT, Flutter, Flask, Mockito, ReactJS, React Native
Libraries: PyTorch, TensorFlow Keras, Pandas, NumPy, Matplotlib, SciKit-Learn, BeautifulSoup