YASH PANSARI

Tel: +1 (510) 977 3650 │ yashpansari@berkeley.edu │ LinkedIn │ GitHub

EDUCATION

University of California, Berkeley — Berkeley, CA
B.A. in Computer Science & Applied Mathematics — *2021 - 2024*
CGPA: 4.00/4.00 | GRE: 335/340 (170 Quant, 165 Verbal) | Dean's List (every year), EECS Honors Program

Calcutta International School (High School) — Kolkata, India
GPA: 4.00/4.00 | SAT 1580 | SAT II 800 (Math, Physics) | 4 A Levels (4/4 A*), 6 AS (6/6 A), 9 IGCSEs (9/9 A*) — *2017 - 2021*

RESEARCH EXPERIENCE

UC Berkeley's Assistive Technology and Cursor Control Lab — Berkeley, CA
Undergraduate Researcher [GitHub] under EECS Professor Brian A. Barsky* — *Jan 2023 - Present*
- Developed an intuitive, disability-friendly, and contactless (without a keyboard or mouse) two-handed gesture control suite, using hand gestures read by a webcam and processed to facilitate functionalities such as cursor movement, air writing, etc.
- Authored low-latency code for real-time hand segmentation, gesture tracking, and input analysis, by developing specialized CNN classifiers for alphanumeric key recognition and using MediaPipe API with stochastic averaging for stable hand tracing
- Researched vision transformers for multi-frame gesture recognition and graph neural networks for pose analysis on moving hands to implement functionalities such as 3D touch, dragging across devices/applications, and swiping/scrolling
- Achieved ~96% accuracy (state of the art) on alphanumeric keys and 100% accuracy on no-touch cursor control

Lawrence Berkeley National Lab — Berkeley, CA
Machine Learning Research Affiliate [GitHub] under Research Scientist Giorgio Vallone* — *Jul - Dec 2022*
- Developed software to analyze cracks in Nb3Sn superconducting filaments within accelerator magnets via microscope images
- Created a light-weight computer vision architecture to detect these cracks, using real-time contouring and image segmentation
- Reduced the software's compute time by incorporating efficient self-supervised methods (Canny Edge Detection, Flood-Fill)
- Deployed under proof of concept for CERN's Large Hadron Collider achieving 200x speedup with 94% accuracy

US Department of Energy, ATAP — Berkeley, CA
Computational Physics Research Intern [GitHub] under Senior Researcher Paolo Ferracin* — *Jan - Jun 2022*
- Analyzed damage to accelerator magnets under operational stress (radial, azimuthal, equivalent) using Ansys APDL designs
- Implemented hyper-parameter tuning in PyTorch Magnum to find experimental solutions that stabilize the design simulations
- Explored analytical solutions for the above using Statistical Learning on mathematical models of the Airy Stress Function
- Helped develop 2D models for a 20T Accelerator Magnet design, 43% stronger than the global state-of-the-art

* (Code for these projects is not entirely open source and GitHub links only contain sections allowed to be displayed publicly)

PROFESSIONAL EXPERIENCE

Optiver — Austin, TX
Incoming HFT Research Intern, Delta One Market Making — *Jun - Aug 2024*
A global leader in high-frequency trading, offering a dynamic, high-reward environment

Goldman Sachs — New York, NY
Quantitative Research Intern, Prime Inventory Management and GCEM Market Making — *Jun - Aug 2023*
An American multinational market maker, investment bank, and financial services company
- Developed and productionized borrowing strategies to hedge the risk of trade failure (cancellation or late settlement) and prevent the imposition of penalties via the Central Securities Depositories Regulation (CSDR) in EMEA markets
- Refactored mathematical models and codebases to compute charge for Foreign Exchange Options (FXO) and Latin American Interest Rate Swaps; optimized databases to store live risk and inventory, and built a robust backtesting suite for charge models
- Pushed all three models for live testing on the trading floor and achieved significant improvements in speed and accuracy
- Secured approval to deploy the FXO Model onto Marquee (Goldman's client platform) for small to medium tickets

Vyrill — San Francisco, CA
Contract Machine Learning Engineer, Project Manager — *Sep - Dec 2022*
An AI-driven video analytics platform allowing various brands to view marketing insights
- Built a pipeline to identify unique people in videos and extracted demographic information, emotions, etc. using DeepFace
- Used Google FaceNet for embeddings, RetinaFace for localization, and unsupervised methods (such as DBScan and K-Means clustering in 512-dimensional confidence-weighted average facial embedding space) for facial differentiation
- Achieved 5x speedup with 95% accuracy and employed the code to re-factor In-Video Search, the company's flagship product

AWARDS

1st Place at the Berkeley EECS & Research Symposium (BEARS) — *2022*
Awarded 1st Place for the STEDNet Weather Now-caster at BEARS, sponsored by Citadel and IEEE

Finalist at ClimateHack.AI (Worldwide Invitational AI Hackathon) — *2022*
Qualified in the top 5 and selected as the UC Berkeley Team Captain; received 100% sponsorship to fly to Harvard for the Finals

Telegraph School Award (Top <1% Nationally) — *2021*
Received the Award for Academic Excellence by a Student (across high schools in India), facilitated by The Telegraph

World Topper of IGCSE Mathematics (500,000+ Students) — *2020*

Highest Scorer in the World for the IGCSE Mathematics Board Examination held by Cambridge International Education

ACADEMIC PROJECTS

ResNet FPN Adversarial Binary Object Detection Model [Link]   *Jul - Sep 2022*
- Attempted to detect and locate non-planar geometric shapes like stars and pentagrams in Gaussian adversarial binary images
- Implemented a Feature Pyramid Network with a ResNet backbone (inspired by Meta AI paper) with < 1.5 Million parameters, and trained on a single GPU with a custom loss function for dynamic bounding boxes, achieving ~ 96% IOU accuracy

Num-C [Link]   *Jun - Aug 2022*
- Designed a library to support linear algebra operations in C using multithreading, data-level parallelism, cache blocking, etc.
- Achieved a 210x speedup for operations such as SVD, row-reduction, multiplication, inversion, and exponentiation

STEDNet Weather Now-Caster [Link]   *Jan - May 2022*
- Built a skip-connection convolutional time-series LSTM to predict short-term cloud cover using meteorological satellite imagery over some region in the past hour as input, and predicting the next two hours of imagery over a sub-region as output
- Encoded optical flow into the embeddings to dynamically quantify trends in the movement of cloud structures between frames
- Aimed to replicate state-of-the-art accuracy without heavy overfitting (Google's MetNet-2 had 225 Million trainable parameters); achieved ~80% multi-scale SSIM accuracy compared to MetNet-2 with <10% of the compute and 5% of the size

GitLet [Link]   *Jan - May 2022*
- Engineered a command line operated version control system in Java, inspired by Git and mimicking its base functionalities
- Constructed a robust design framework for the data structures and custom objects, allowing optimal time and space complexities for common functionalities such as branching, merging, checkout, diffs, staging, removal, commits, logs, etc.

Silent Disco Classifier [Link]   *Sep - Dec 2021*
- Classified videos (without audio) from Georgia Tech's *Let's Dance* dataset on style (Salsa, Hip-Hop, etc.); Achieved ~60% accuracy with a Mixed-Convolution ResNet on sparse temporal samples, disproving claims of visual overlap in the dataset

CLUBS & SOCIETIES

Machine Learning @ Berkeley (Student club, < 5% Acceptance Rate, Link)   *Sep 2021 - May 2024*
- Developed infrastructure for the club's new member training program and lectured in ML classics such as: SVMs, K-Means, Decision Trees, Unsupervised Learning, mathematical motivations for gradient descent, and foundations of CV, NLP, and RL
- Mentored a project for the detection of modified anatomical structures (Alzheimer's markers) in MRI scans using ensembled vision models, achieved 95% accuracy (higher than individual SOTA models) and honorable mention at BEARS (Symposium)

Medical Technology @ Berkeley (Student club, < 10% Acceptance Rate, Link)   *Sep 2023 - May 2024*
- Conducted a series of lectures about Computer Vision for assistive technology for the club's New Member Education Program
- Mentored a team working on self-supervised pre-training for Swin Transformers in 3D medical image analysis as part of an ovarian cancer subtype classification Kaggle competition

Peer Academic Tutor   *May 2020 - May 2024*
- Held private tutoring sessions, brainstorming sessions, homework discussions, and final review sessions (both, free and paid) for lower division CS, Data Science, and Math courses at Berkeley (extrapolated to classes for other schools as well)
- Taught after-school sessions in Additional Math and A-level Pure Math at CIS (my high school) for 2 years free of cost
- Provided free training to college students for resume writing, job applications, and 100+ coding assessments, helping them secure offers at Salesforce, TikTok, PayPal, Amazon, Optiver, IBM, DRW, etc.

SUMMER PROGRAMS

US Particle Accelerator School (US Govt. Sponsored) — 100% Scholarship   *2022*
Attended research seminars and lectures organized by Fermilab; Specialization: Nb3Sn Superconducting Accelerator Magnets

IE University (Madrid, Spain) — Best Project Award   *2020*
Won 1st Place at IE Innovation Consulting Challenge and received 100% Scholarship to attend; Awarded Best Project

Harvard University — Top of the Class   *2019*
Secured rank 1 within my specialization (Particle Physics)

ADDITIONAL INFORMATION

Other Coding Projects   (All open-source projects on GitHub)
- *Games*: Snake (C), Plants v Zombies (Python), TypeRacer (Python), Hog: Dice Game (Python), Checkers (Java), Tetris (Java)
- *Low-Level*: MNIST Classification Neural Network in Assembly Code (RISC V), Pipelined CPU (Logisim Circuits)
- *Others*: Random World Generation (Java), Enigma Encryption Machine (Java), Interpreter for Lisp (Python)

Technical Skills
- *Programming:* Python, Java, SQL, C/C++, R, Matlab, PHP, Javascript, RISC-V, (Unix) bash, Git, Docker, HTML/CSS, LaTeX
- *Frameworks:* Pandas, NumPy, Tensorflow, Keras, PyTorch, Torchvision, OpenCV, SciPy, Sklearn, Ansys, AWS, Logisim
- *Languages:* English (*Proficient*), Hindi (*Proficient*), Bengali (*Speaking*), French (*Intermediate*)

Extracurriculars
- *Volunteer Work:* Taught Math and English to underprivileged children at Rebecca Belilious English Institution
- *Debate & Model UN:* Awards at 24 national/international competitions (including 1st Place at 15); Chair/Moderator at 15 more; Founding Chairman of Calcutta MUN Society, which trained 1000+ students and 4 competitive teams (100% win rate)
- *Hobbies:* Studio Art [Link], Poker (Top 20 at SIG Spring Poker Tournament), Taekwon-do (U16 State Champion)