Nikhil Jain

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Education

University of California, Berkeley — Berkeley, CA
B.A. in Computer Science & Applied Mathematics — *Class of 2029*

- **Relevant Coursework:** Data Structures & Algorithms, Structure and Interpretation of Computer Programs, Computer Architecture, Linear Algebra & Differential Equations, Principles and Techniques of Data Science
- **Organizations:** Berkeley Artificial Intelligence Research, Blockchain @ Berkeley, Underwater Robotics at Berkeley
- **GPA:** 3.75/4.0

Experience

Undergraduate Researcher — March 2026 – Present
Berkeley AI Research (BAIR) - AUTOLab — *Berkeley, CA*

- Built DAgger imitation learning pipeline on bimanual tape spool handover (Robosuite + MIKE) to fine-tune pi0.5 vision-language-action policy, collecting 64 expert demonstrations and 10 targeted recovery trajectories to correct out-of-distribution failure modes
- Engineered supporting infrastructure including W&B sweep orchestration, still-frame removal, trajectory clipping, and wrist-camera video logging to benchmark policy iterations
- Contributing to dense reward modeling research using bimanual manipulation as a testbed for distribution-shift correction in vision-language-action models

Software Engineer, Perception Team — January 2026 – Present
Underwater Robotics at Berkeley — *Berkeley, CA*

- Built and optimized YOLOv11 object detection models achieving 0.89 mAP50 for underwater gate detection, benchmarking across 5 architecture variants (nano to large) to optimize accuracy-latency tradeoffs
- Developed synthetic data generation pipeline producing 10,000+ augmented training images from 100 annotated source frames, enabling robust model training in low-visibility underwater conditions
- Deployed perception stack on Jetson Orin edge hardware achieving 30+ FPS real-time inference, integrating PyTorch-trained models into the AUV's onboard vision system

Software Engineer — December 2025 – March 2026
Visa Inc. (Contract) — *Remote*

- Built end-to-end compliance verification system integrating Claude AI, Chromium browser automation, and Python to process 1,600+ client records against 30+ international regulatory authorities, generating audit-ready reports with visual evidence
- Designed Docker-containerized pipeline for automated regulatory scraping, screenshot capture, and multi-source data validation that maps client attributes to appropriate authorities and validates compliance status

Projects

Reward-Shaped PPO for Humanoid Vertical Jump Optimization — February 2026
Reinforcement Learning | NVIDIA Isaac Lab | PyTorch | PPO, RSL-RL

- Developed a custom Direct RL environment in NVIDIA Isaac Lab (Isaac Sim) to train a 21-DOF torque-controlled humanoid to maximize vertical jump height using massively parallel GPU-accelerated physics simulation (4096 parallel environments)
- Designed a multi-objective reward function combining jump velocity incentives, center-of-mass height tracking, uprightness penalties (quaternion-based), energy regularization, and survival bonuses to produce stable, high-jumping locomotion policies

3D Facial Geometry Analysis System — February 2026
MediaPipe, FaceNet/ArcFace | TensorFlow Lite, ONNX | OpenCV

- Built a real-time facial recognition system leveraging MediaPipe's 478-point 3D mesh detection to extract biometric facial geometry, enabling identity-agnostic similarity matching across diverse face datasets
- Architected a geometric feature extraction pipeline computing scale-invariant facial descriptors (inter-pupillary ratios, mandibular angles, nasal bridge depth) to generate unique biometric signatures robust to lighting and pose variation
- Implemented high-dimensional face embedding comparison using cosine similarity search optimized with TensorFlow Lite XNNPACK, achieving sub-100ms inference latency on edge devices

Technical Skills

Languages: Python, JavaScript, TypeScript, Solidity, C/C++, SQL, HTML/CSS
ML & Systems: PyTorch, TensorFlow, OpenCV, YOLOv11, MediaPipe, ONNX, Pandas, NumPy, NLP
Tools & Frameworks: React, Next.js, Node.js, Docker, PostgreSQL, Prisma, Git, Linux