ARUL LOOMBA

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EDUCATION

University of California, Berkeley, *College of Engineering (GPA: 3.98)* Expected May 2026

B.S. Electrical Engineering & Computer Science, *minor in Global Poverty and Practice*

- **Coursework:** Discrete Math, Data Structures, Interpretation of Computer Programs, Designing Information Devices and Systems I/II, Algorithms, Databases, Computer Architecture, Integrated Circuits and Digital Design, Microelectronics

Involvements: SBC Consulting, Formula Electric @ Berkeley, BAIR, Indian Student Association, IM Volleyball

EXPERIENCE

Berkeley Artificial Intelligence Research **Berkeley, CA**
Undergraduate Research Assistant **January 2025 - Present**

- Developed low-cost robotic arm and collected 200+ episodes of feed-a-person task; trained an ACT/imitation learning policy using HuggingFace for data handling and Vision-Language-Action models for behavior cloning and fine-tuning
- Researched diffusion-based trajectory stitching and segment-level success extrapolation to convert sparse reward environments and signals into dense ones, making use of curiosity-driven RL, improving output diversity by ~50%
- Designed vision-language evaluation pipelines using transformers, enabling fine-grained debugging/evaluation

UC Berkeley, College of Engineering, EECS Berkeley, CA
Teaching Assistant **January 2024 - Present**

- Helped over 40 students complete projects in EECS16A class, Designing Information Technology, including song fingerprinting and projector creation, making use of Python's Numpy and Pandas packages and data analytics techniques
- Collaborated with instructors to develop over 30 different engaging and interactive lesson plans, each involving small group discussions on data visualization, probability, feature engineering, machine learning, and industry application
- Organized events and design competitions, working with EECS departmental committees to engage 900+ new students

Formula Electric **Berkeley, CA**
Autonomous Software Lead **August 2023 - Present**

- Led team of over 50 autonomous systems engineers, creating first $30,000 fully self-driving electric vehicle, including Robotic-Operating System pipelining with over 25 nodes, 4000+ lines of C+ code, and remotely accessible live simulation
- Constructed path optimization features using Python and Pytorch, including cone/race-track visualization and map creation, modeling over 300 different possible competition paths, and determining fastest route using SLAM algorithms
- Currently boosting real-time software calculation speed by 24% by modifying LiDAR, camera, and simulation features

Antrix **San Francisco, CA**
Software AI Agent Intern **August 2024 - Present**

- Utilized Microsoft Autogen, Amazon Bedrock, and Dialogflow to train 7+ foundational models, with LLMs, including Natural Language Processing features, providing customers with chatbot responses covering 1000+ intents and questions
- Developed goal and utility-based IRIS AI Agent to remotely and automatically access OpenFDA and EUDAMED APIs, parsing 1,000,000+ data points, and directing information to a central AWS server with access to 5+ databases in memory
- Deployed 5 interactive applications on Google Cloud, with form submission and data processing with Cloud Functions

Projects

Voice Recognition and Object Detection Model: Stack: Python, Tensorflow, Verilog

- Utilized tensorflow to develop YOLO-v8 object detection model, 250 household objects and items, and further expanded project by creating a Voice Synthesis application on an FPGA through Verilog, creating a conferencing app

RISC-V Neural Network: Stack: C, C++, Assembly, Logism

- Created working neural network at the assembly level, including matrix multiplication, ReLu, Max, memory efficiency features, and full machine learning interface using 32 bit registers, 10+ caches, and stock market application

MAE Encoder Pipeline: Stack: PyTorch, OpenCV, Gym, NumPy, Tensorboard, CUDA, Weights & Biases

- Engineered triple-stream Masked-Autencoder, using PyTorch, Cuda, and batch parallelization, to jointly encode visual and proprioceptive modalities from 500+GB data, pre-trained MAE (80 epochs), fine-tuned via MLP policy head

Mujoco Simulator Robot Arm Stack: Mujoco, Huggingface, CAD, Pandas, PyArrow, PySide6, MediaPy

- Designed and implemented fully functional Mujoco data collection pipeline, using inverse-kinematics and end-effector joint calculations in 6 different environments collecting 5+ hours robot task data using SO100, Franka, and Arx arms

SKILLS

Software: Python, Pandas, NumPy, Scikit-learn, Java, C, C++ API Integration, SQL, JavaScript, React, PyTorch, AWS, Amazon Bedrock, Google Cloud, Dialogflow, AI agents, NLP, Transformers, Verilog, Robot-Operating System, Tensorflow