

AJAY VIKRAM PERIASAMI

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EDUCATION

Duke University | Durham, North Carolina, USA

Aug 2025 - Present

MS in Computer Science, Specialization in Artificial Intelligence/Machine Learning

Coursework: Introduction to Deep Learning, Theory and Algorithms of Machine Learning, Building Intelligent Agents with Frontier Models

Member: Duke Robotics Club – Computer Vision Team

National Institute of Technology Karnataka (NITK) | Surathkal, Karnataka, India

Dec 2020 - Apr 2024

Bachelor of Technology, Computer Science and Engineering (GPA: 9.46/10, Department Rank: 4/130)

Coursework: Machine Learning, Deep Learning, Digital Image Processing, Big Data Analytics

Leadership: Placement Coordinator, Volunteer Mentor for Leadership Development at Team Everest NGO

PUBLICATIONS

- *ViTFuser: Advancements in Global Context Understanding for Autonomous Vehicles*, MIND 2024 (accepted).
- *HOMI: Ultra-Fast EdgeAI Platform for Event Cameras*, IEEE Transactions on Circuits and Systems for Artificial Intelligence (under review).
- *Asynchronous High-Speed Tracking of Astronomical Objects Using Neuromorphic Camera for Edge Computing*, ICASSP (under review).

WORK EXPERIENCE

Machine Learning Intern | Lamarr | Remote

Mar 2024 - Apr 2024

- Developed AI-driven automation tools, including a Draft Bot that fetches and fills document templates with customizable placeholders, and a SalesGPT agent for automated timed email outreach for service promotion, streamlining document preparation and client communication.
- Enhanced backend intelligence and model performance by integrating Table Transformer and TrOCR for scanned/handwritten text, and fine-tuning Qwen1.5-14B on custom datasets using Llama Factory, to align responses with legal and business-specific requirements.

Software Intern | Qualcomm | Hyderabad, Telangana, India

May 2023 - July 2023

- Engineered and optimized a memory analysis tool, achieving an 85% reduction in processing time and a 75% drop in memory usage.
- Enhanced the user experience by simplifying the workflow to a single changelist ID input and providing automated email notifications.
- Improved data interpretability with a React UI including interactive memory graphs, filtering, sorting, and tree-based memory organization.
- Automated CI/CD pipeline using Jenkins, Docker, and Kubernetes, including load balancing and user authentication.
- The tool was integrated team-wide and resulted in a full-time offer based on its measurable impact.

RESEARCH EXPERIENCE

Graduate Research Assistant | Duke Institute for Brain Sciences | Duke University | Durham, North Carolina, USA

Sept 2025 - Present

- Developing advanced deep learning methods for Functional Magnetic Resonance Imaging (fMRI) signal analysis and motion correction.

Machine Learning Research Intern | Indian Institute of Science (IISc) | Bengaluru, Karnataka, India

May 2024 - July 2025

- Designed a clustering-based, asynchronous satellite tracking algorithm from neuromorphic data, optimizing it in C with advanced data structures and multithreading techniques for real-time, high-throughput inference on ARM Cortex-A72 and Cortex-M7 processors.
- Optimized CNNs and SSMs through Quantization and Ternarization, for efficient integer-only inference on resource constrained devices.
- Participated and ranked 5th in the IEEE BioCAS 2024 Grand Challenge by deploying efficient LSTM models for primate neural decoding.
- Benchmarked State-Space Model (SSM) architectures (S4, LMU, Mamba) for gesture, speech emotion, and human activity recognition.

PROJECTS

Self-Improving Humanoid Skill Learning Framework | Python

Sept 2025 - Present

- Built an LLM-guided reward generation and refinement framework enabling humanoid agents to self-evolve by learning new skills.
- Integrated dynamic task decomposition, skill discovery, and evaluation feedback loops, achieving improvement in reward-policy alignment.

Decoding Hand Kinematics in BCIs with State-Space Models | Python, PyTorch, Neurobench

Aug 2024 – Sept 2024

- Used spike recordings from non-human primate sensorimotor cortex to predict continuous 2D hand trajectories, training LMU and S4 state-space models with sub-window binning; achieved $R^2 = 0.75$ (S4) with reduced model memory, outperforming LSTMs and CNN baselines.

Ternarized CNN for Human Activity Recognition | Python, PyTorch, Metavision

June 2024 – July 2024

- Designed a 2D CNN trained on radar spectrograms for human activity recognition, applying Ternarization and Quantization-Aware Training to achieve 16x model compression with <1% accuracy drop, enabling efficient integer-only inference on resource constrained devices.

Autonomous Driving on CARLA | Python, PyTorch, CARLA

Oct 2023 - Mar 2024

- Developed ViTFuser, a Transformer-CNN network combining RGB and LiDAR modalities for global context understanding, with Feature Pyramid Network (FPN) for object detection, achieving 26% higher driving score and 67% lower memory use than the baseline TransFuser.

Breast Cancer Detection in Mammograms | Python, TensorFlow

Sept 2023 - Dec 2023

- Developed a model in collaboration with a PhD student to detect breast cancer from digital mammograms, classifying on BIRAD scores.
- Engineered a Transformer pipeline, improving classification accuracy to 75% by leveraging patch-wise ROI training on a limited dataset.

TECHNICAL SKILLS

- **Machine Learning:** PyTorch, TensorFlow, Scikit-learn, Hugging Face, Brevitas, LangChain, Llama Factory, OpenCV, NumPy, Pandas
- **Programming:** Python, C/C++, MATLAB, HTML/CSS, JavaScript, React, Material UI, SQL, ROS2
- **MLOps & Tools:** Docker, Kubernetes, Jenkins, Git, MLflow