AJAY VIKRAM PERIASAMI

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EDUCATION

Duke University | Durham, North Carolina **Aug 2025 - Present**
MS in Computer Science, Specialization in Artificial Intelligence/Machine Learning
Relevant courses: Introduction to Deep Learning, Theory & Algorithms of Machine Learning, Building Intelligent Agents

National Institute of Technology Karnataka (NITK) | Surathkal, Mangaluru, India **Dec 2020 - Apr 2024**
Bachelor of Technology, Computer Science and Engineering, GPA: 9.46/10
Relevant courses: Machine Learning, Deep Learning, Digital Image Processing

PUBLICATIONS

- **Ajay Vikram P**, Atanu Chatterjee, et al. "ViTFuser: Advancements in Global Context for Autonomous Vehicles," *6th International Conference on Machine Learning, Image Processing, Network Security, and Data Sciences (MIND 2024)* (accepted).
- Shankaranarayanan H, Satyapreet Singh Yadav, Adithya Krishna, **Ajay Vikram P,** Mahesh Mehendale, Chetan Singh Thakur. "HOMI: Ultra-Fast EdgeAI Platform for Event Cameras," *IEEE Transactions on Circuits and Systems for Artificial Intelligence* (under review).

ACHIEVEMENTS

- Ranked 4th out of 130 in the Computer Science department at NITK during undergraduate studies.
- Ranked 3rd out of 500 in Class 10 ICSE Board Examinations, achieving a perfect 100/100 in Computer Science.
- Awarded the Annual Proficiency Prize for Academic Excellence for 7 consecutive years.

TECHNICAL SKILLS

- **Programming Languages**: Python, C, MATLAB, CUDA, JavaScript
- **Machine Learning**: PyTorch, TensorFlow, Neural Networks, NLP, Computer Vision, Quantization, Brevitas, LangChain
- **Web Development**: HTML/CSS, React, Material UI
- **Platforms/Tools**: Jupyter Notebook, Docker, Visual Studio Code, Git, Kubernetes, Jenkins, Flask, MySQL, MongoDB

RESEARCH EXPERIENCE

Graduate Research Assistant | Duke Institute for Brain Sciences | Duke University **Sept 2025 - Present**

- Leveraging advanced deep learning methods for Functional Magnetic Resonance Imaging (fMRI) analysis.

Machine Learning Research Intern | Indian Institute of Science (IISc) | Bengaluru **May 2024 - July 2025**

- Designed an asynchronous satellite tracking algorithm using event-based clustering, optimized for real-time, high-throughput inference on ARM Cortex-A72 and Cortex-M7 processors.
- Engineered ternarized CNNs, reducing memory requirements 16x with a 0.5% accuracy loss for radar-based human activity recognition.
- Achieved top 5 in 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 activity recognition; implemented 8-bit quantization of the LMU for efficient deployment.
- Technologies used: Python, C, PyTorch, Metavision SDK.

WORK EXPERIENCE

Machine Learning Intern | Lamarr | Remote **Mar 2024 - Apr 2024**

- Developed a Draft Bot that fetches relevant legal document templates from user prompts, auto-generates placeholders for customization, and enables downloads in Word/PDF, streamlining the process of preparing legal drafts for end-users.
- Performed backend integration of Table Transformer and TrOCR into the existing pipeline, enhancing the system's ability to handle scanned tables and handwritten text for more reliable document automation.
- Fine-tuned the Qwen1.5-14B model on a custom dataset, adapting the model's responses to legal and business-specific requirements for improved task alignment.
- Built a SalesGPT agent to automate timed email communication, supporting consistent outreach and promoting services without manual intervention.
- Technologies used: Python, LangChain, Llama Factory.

Software Intern | Qualcomm | Hyderabad **May 2023 - July 2023**

- Developed and optimized a memory analysis tool, resulting in 85% faster processing and 75% memory savings.
- Improvements made include automation of the entire pipeline, faster loading, cloud-based deployment, enhanced UI, authentication, user notification, and load balancing.
- Simplified the user process to just provide a changelist ID and receive memory analysis notifications via email.
- Enhanced UI with memory graphs, memory organization in a tree layout, filtering, and sorting for better interpretability.
- Automated the pipeline with Jenkins, deployed using Docker + Kubernetes with authentication and load balancing.
- The tool was widely adopted across teams and led to a full-time offer based on performance.
- Technologies used: Python, Vite, React, Node, MongoDB, Jenkins, Docker, Kubernetes.

PROJECTS

YouTube Assistant | Python, LangChain **Mar 2024 - Apr 2024**

- Developed a tool to transcribe YouTube videos and answer content-related questions, with a summarization feature for quick review and improved navigation.

Autonomous Driving on CARLA | Python, PyTorch, CARLA [Team: 3, Role: Lead] **Oct 2023 - Mar 2024**

- Developed ViTFuser, an efficient model for self-driving in the CARLA simulator, enhancing the base TransFuser architecture for end-to-end autonomous driving.
- Integrated stage-wise fusion between CNN backbones and ViT transformers, along with a Feature Pyramid Neck (FPN), to strengthen feature extraction and object detection, resulting in a 26% higher driving score.
- Optimized the model architecture for efficiency, achieving a 67% reduction in memory usage compared to the baseline, making it more suitable for real-time deployment.

Handwritten Digit Predictor App | Flutter, TensorFlow Lite, Python **Oct 2023 - Nov 2023**

- Built a mobile app for handwritten digit recognition, supporting both image uploads and interactive on-screen drawing for user-friendly digit prediction.

Breast Cancer Detection in Mammograms | Python, TensorFlow [Team: 2] **Sept 2023 - Dec 2023**

- Collaborated with a Ph.D. student to build a system for breast cancer detection and BI-RADS score prediction from digital mammograms, aimed at supporting early diagnosis.
- Experimented with CNN and transformer-based approaches, applying patch-wise ROI training for more precise lesion localization and improving model accuracy from 65% to 75% with transformer-based architectures.

Credit Card-Based Market Segmentation | Python, PySpark, TensorFlow[Team: 2, Role: Lead] **Aug 2023 - Dec 2023**

- Led development of an end-to-end clustering solution for financial data, segmenting credit card users based on spending behavior to support data-driven decision-making.
- Leveraged Apache Spark for scalable data processing to handle large datasets efficiently and performed interpretable cluster analysis, enabling detailed customer profiling for targeted marketing.

Social Engineering and Fake News Ontology | Python, Onto4All [Team: 2, Role: Lead] **Feb 2023 - April 2023**

- Designed a domain ontology to detect social engineering attacks in fake news, providing a semantic framework for misinformation analysis.
- Developed taxonomies, relationships, and detection rules to capture recurring patterns of misinformation and deception.
- Built a structured framework for automated detection, laying the foundation for scalable online security solutions.

Furniture Trial App | Flutter, ARCore [Team: 2, Role: Lead] **Sept 2022 - Dec 2022**

- Developed an Augmented Reality app for visualizing furniture in live environments, enhancing purchase decisions, and implemented a Model-Driven Architecture (MDA) to ensure scalable and structured design.

Operating System Simulator | HTML, CSS, JavaScript [Team: 10] **Mar 2022 - May 2022**

- Built a web-based simulator to visualize operating system concepts, including page replacement algorithms (FIFO, Optimal, LRU, MRU, Random), enhancing interactive learning of OS principles.

Indian Judiciary Management System | HTML, CSS, JavaScript, PHP, MySQL [Team: 3, Role: Lead] **Feb 2022 - May 2022**

- Developed a web platform to digitalize judiciary routines, enabling case filing/scheduling, judge appointments, lawyer requests, and law management, streamlining court administrative processes.

Stuck At Faults Simulator | HTML, CSS, JavaScript [Team: 5] **Sept 2021 - Dec 2021**

- Created a virtual lab for detecting logic gate faults, simulating SA0 and SA1 faults in NAND and NOR gates, supporting hands-on understanding of digital circuit behavior.

CERTIFICATIONS

Coursera: Supervised Machine Learning, Advanced Learning Algorithms, Unsupervised Learning & Recommenders, Mathematics for Machine Learning (Linear Algebra), Computer Vision with TensorFlow, Fraud Detection with ML on Google Cloud, Vertex AutoML Vision, H2O AutoML | Postman API Fundamentals | IoT, Robotics & Embedded Systems (Inmovidu)

POSITIONS OF RESPONSIBILITY

Placement Coordinator | Career Development Center | NITK **Jun 2023 - Apr 2024**

Facilitated communication between prospective employers and students. Managed the end-to-end placement process, coordinating logistics, schedules, and requirements. Arranged special student programs to develop technical skills based on industry feedback.

EXTRACURRICULAR

Volunteer Mentor | Team Everest NGO | Remote **Feb 2024 - Mar 2024**

Provided one-on-one mentorship to a student, focusing on leadership development. Facilitated discussions and activities to enhance leadership skills such as communication, decision-making, conflict resolution, empathy, honesty, and problem-solving.