Rajeev B. Botadra

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Education

University of Washington, MS in Electrical Engineering — Sep 2023 – Jun 2025

- **Coursework:** Computer Vision, LLM Systems, Models of Robots, Machine Learning Theory, Parallel Architectures

New Jersey Institute of Technology, Dual BS in Computer Engineering & Mathematics — Sep 2019 – May 2023

- **Coursework:** Data Mining, Statistical Learning, Intensive Programming in C++, Operating Systems, Applied Math

Technical Skills

Languages: C/C++, Python, MATLAB, RISC-V Assembly, SystemVerilog, Bash

Tools: LangChain, LangGraph, CUDA, ROS 2 Humble, Ardupilot, HLS4ML, Docker, GCP, Git, Vitis HLS, ns3

Experience

University of Washington, Adaptive Computing Machines & Emulators Lab — *Seattle, WA*

Research Assistant — Jun 2023 – Present

- Accelerated DNN architectures on FPGAs enabling microsecond processing of neural data for in-vivo experiments
- Constructed & trained VAE, LSTM, and Transformer based architectures to model neural population dynamics
- Optimized and deployed models on Alevo FPGAs, achieving a 31x reduction in inference latency compared to a GPU

L3Harris — *Camden, NJ*

Embedded Software Engineer Intern — Jun 2022 – Sep 2022

- Developed an identification tree algorithm for strategized feature extraction and classification of radio data
- Wrote a signal processing pipeline (with FFT) in ANSI C, optimized assembly for low-power RISC-V target SoCs
- Created Python bindings for decision algorithms to interact with emulated network testbed using gRPC

R&D Software Engineer Intern — Jun 2021 – May 2022

- Created a Whitebox Machine Learning network driver with Fuzzy Logic to reprioritize mission-critical packet traffic
- Built a Genetic Learning algorithm to train agents, added policy mutations and clipping to promote convergence
- Trained policies outperformed baseline network policy by >72% in emulated saturated network tests

Projects

Multi-Agent LLM Task Completion System — Oct 2024 - Dec 2024

- Implemented iterative refinement and task coordination systems using LangChain and LangGraph with Llama 3.2
- Equipped agents with tools including web searching (Tavily) and code execution (Python REPL) for role specialization

Email Chatbot App using LLAMA 3.2 — Oct 2024 - Nov 2024

- Integrated an LLM agent with an inbox to summarize email chains and highlight useful marketing promotions to user
- Filtered 4000+ promotional emails, identified top k relevant results with 87% average accuracy across user queries

Wildfire Prevention & Response Drone (Capstone Project) — Sep 2022 – May 2023

- Dockerized and deployed tuned Mask-RCNN, YOLOv5 on an Nvidia Jetson SoC for segmentation of live camera data
- Integrated airspeed, GPS, and gyroscopic sensors with a PX4 controller using MAVLink to communicate with Jetson

Tweets Toxicity Analyzer using a LLM (App Landing Page) — Mar 2023 - Apr 2023

- Developed a toxicity classification pipeline for Tweets using Meta's RoBERTa LLM model hosted on Hugging Face
- Built an app interface for the Deep Learning pipeline using Streamlit and hosted on Hugging Face spaces

Modeling Pyramidal Neurons Excitability — Jan 2022 - Jun 2022

- Developed a UKF to estimate brain state in Matlab using the Hodgkin-Huxley model, tested on data collected in-vitro
- Implemented a 4D-Var model, achieving 92% accuracy on signal reconstruction of Layer II neurons in Visual Cortex

Awards & Activities

Active Secret Security Clearance — Feb 2022 - Present

Student Scholar – NAE Grand Challenges Scholars Program — Jan 2021 – Jun 2023