

# ABHINAV AVASARALA

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## Education

### North Carolina State University (NCSU)

May 2027 (Expected)

*B.S. Computer Engineering*

*Raleigh, NC*

- **GPA:** 4.00/4.00
- **Courses:** Fundamentals of Logic Design, Operating Systems, Signals & Circuits, Software Development Fundamentals, Data Structures & Algorithms, C & Software Tools, Statistics for Engineers, Multivariate Calculus, Machine Learning

## Technical Skills

**Languages:** C, C++, Verilog, Python, Java, MATLAB

**Hardware:** LC-3 & x86 Assembly, CUDA, PyTorch(low-level kernels), Digital Logic, Circuit Analysis

**Cloud & DevOps:** Google Cloud Platform (GKE, Cloud Run, VMs, Cloud SQL, Load Balancing, IAM, Functions), Docker, Terraform

**Databases & Tools:** PostgreSQL, Pandas, NumPy, Scikit-learn, Git, Axios, REST APIs

## Experience

### North Carolina State University | *CUDA, PyTorch, Python, C++*

Jan 2025 - May 2025

*Research Intern*

*Raleigh, NC*

- Developed a GPU-accelerated linear regression pipeline using **PyTorch, CUDA, and C++**, incorporating dynamic **low-bit quantization (2–8 bits)** to reduce memory footprint and improve runtime.
- Engineered **3 custom CUDA kernels** for combined min/max reduction, fused subtract-quantize, and quantize-aware matrix-vector operations, eliminating redundant host-device transfers.
- Strengthened understanding of parallelism, **memory hierarchy** (registers, shared, global), and **GPU hardware optimization**
- Achieved a **3× speedup and 60% GPU memory reduction** on a 10M-sample dataset

### iQuadra Information Services | *ReactJS, Axios, REST, Figma*

May 2025 – August 2025

*Software Engineer Intern*

*Remote*

- Developed a bug-tracking system using ReactJS front-end, Node + Express back-end, PostgreSQL database, and Axios integration
- Designed **12+ RESTful API endpoints** using Node + Express with PostgreSQL for persistence
- Improved bug resolution time by **20%** through priority-tagging and streamlined workflow
- Led a team of 3 front-end devs to build responsive UIs from Figma designs using React

## Projects

### Stock Sentiment Analyzer | *Python, FastAPI, FinBERT, HuggingFace*

- Built an **end-to-end ML pipeline** where users input portfolios and receive real-time news sentiment on stocks
- Combined relevant news from Reddit, Yahoo Finance, NewsAPI and applied **NLP sentiment classification**
- Compared FinBERT and Vader, selecting FinBERT for **92% test accuracy**

### LC-3 Assembly CPU Simulator Project | *LC-3 Assembly, Computer Systems*

- Implemented **assembly-level programs** on the LC-3 instruction set to perform arithmetic, string operations, and stack-based subroutines
- Designed and debugged code that directly interacted with trap routines and I/O operations, reinforcing knowledge of **instruction execution, memory addressing, and control flow**.
- Strengthened understanding of **CPU datapath, instruction cycles, and computer architecture fundamentals**.

### Mood-Based Music Recommendation App | *ReactJS, Node.js, Express, NLP Libraries, OpenAI API*

- Implemented a **full-stack web application** to recommend songs based on user input's sentiment analysis
- Integrated **Spotify API** to deliver 5 real-time personalized songs per query
- Utilized React for the frontend and Node.js with Express for the backend to handle **RESTful API integration**, and implemented secure user authentication and session management using **PostgreSQL** and **bcrypt hashing**
- Achieved **90%+ mood detection accuracy** using custom NLP logic

## Leadership / Extracurricular

- **IBM-NCSU Pathfinder program:** Learned about various IBM & Red Hat technologies like Ansible & watsonx
- **180 Degrees Consulting:** Led a team of 4 student consultants to improve a non-profit client's marketing strategy