Nathan Nakkapalli

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EDUCATION

The University of Michigan - Ann Arbor **August 2024**

- **Bachelor of Science & Engineering (B.S.E), Computer Engineering + Physics (minor)**
- UM Regents Merit Scholarship, MHousing Honored Instructor Award; 3.5/4.0 GPA
- Co-Founder and Former VP, Michigan Forensics Speech and Debate
- **Won 2nd place** in **P&G (Proctor and Gamble)** Employer Challenge **(Consulting Case Competition)**
  - Produced actionable recommendations to **increase** P&G's Hispanic shopper growth **with $12M budget**
- Courses: **Machine Learning,** Data Structures & Algorithms, Embedded Systems, Quantum Mechanics, **Computer Vision,** Compiler Construction, Logic Design, **Systems and Signals**, Operating Systems

WORK EXPERIENCE

The University of Michigan - Ann Arbor **August 2023 – December 2023**

Instructional Aide, College of Engineering Course Staff *Ann Arbor, MI*

- Co-taught a course (Engineering 110: Design Your Engineering Experience) to 40 first-year students
- Led engaging activities to foster student discussion & helped students navigate engineering opportunities

Intrepid Control Systems Inc. **June 2023 – August 2023**

Embedded Systems Intern, Performance Hardware Applications Team *Troy, MI*

- Intrepid Control Systems makes hardware for analyzing/testing onboard computer networks in vehicles
- I worked on firmware validation, product data collection, and custom-developed connector cables
- **Automated firmware release validation** process by developing a C++ **internal tool** (with GUI) for parsing and error-checking **gigabytes** of patterned **Automotive Ethernet data**
  - Created documentation including User Guide, design choices, flow chart of execution, etc

COOL PROJECTS

Mad Money Summaries Website | Python, AI, LLM, Cloud, Interactive Insights **Present**

- AI-generated bulleted summaries for each new episode of the popular weekday investing show "Mad Money"
- Architected data pipeline to preprocess transcripts & generate insightful summaries using Llama3 LLM API
- Experimented with RAG (Retrieval-Augmented Generation) using LlamaIndex to enhance summary quality
- Currently mitigating hallucination by adding verbatim transcript evidence & timestamp for each summary claim

Remote Multi-threaded File System Server | C++, Network Sockets, TCP **August 2024**

- Resilient TCP file server that concurrently handles thousands of client requests to store files on disk
- Maximized throughput using threads & readers/writer locks, minimized disk I/O, maintained crash consistency

Wearable for Hand Gesture Recognition | Research, Real Time Machine Learning **April 2024**

- Wrist wearable that detects 3 static hand gestures in real time with **~75%+ mean accuracy** in user study
- Configured ESP32 microcontroller to continuously read/send data from sensor to a laptop for machine learning
- **Fine tuned** real time ML parameters to optimize trade off between inference speed and prediction accuracy

Famous Landmark Detection (using Deep Learning) | Pytorch, CNNs **November 2023**

- 4-layer multi-class model classifies images of famous landmarks with **87.1% accuracy** in validation
- Experimented and visualized combinations of ML techniques including Dropout (regularization technique), image rotation (data augmentation), and transfer learning in order to obtain robust model

SQL-like Database Management System | C++, OOPs, 1000+ lines of code **December 2022**

- A SQL-like database to CREATE, PRINT, INSERT, DELETE, JOIN data tables via command-line API
- Implemented SQL indexes with hash tables and binary search trees to retrieve data more quickly than otherwise

SKILLS & INTERESTS

- **Languages/Frameworks:** PyTorch, TensorFlow, Python, C/C++, SQL, HTML, CSS, Bash, MATLAB, Verilog
- **Concepts:** Deep Neural Networks, Recommender Systems, Image Processing, Gaussian Splatting, Transformers, Storage, Networking, Cloud, Data Analysis, Drivers, Git, Profilers, Load-Balancing, Regression Testing, NLP
- **Interests**: basketball; football; hiking; reading, teaching, inventing