Nicholas Hoffs

(949)-280-2672 | nicthoffs@gmail.com | nichoffs.com | github.com/nichoffs

EDUCATION

UNIVERSITY OF VIRGINIA August 2022 - Present

Computer Science B.S / Mathematics B.A. - 3.9 GPA

- Coursework: Data Structures & Algorithms, Computer Architecture, Math for Data Science, Software Development, Discrete Mathematics, Physics, Chemistry, Linear Algebra
- Clubs & Activities: Assistant-Coach/Player UVA Men's Club Water Polo, Gracie Jiu-Jitsu

EXPERIENCE

University of Virginia August 2024 - Present, Charlottesville, VA

PhD Research Assistant

- Integrating knowledge graphs with **large language models** (LLMs) for improved Multiple Choice Question Answering (MCQA), utilizing **graph neural network** aggregation and attention for answer option relationships.
- Collaborating closely with PhD peers and faculty to advance research goals, contribute to academic publications, and present findings at conferences.

Cavalier Autonomous Racing May 2024 - Present, Charlottesville, VA

Perception Team Member

- Researching and implementing computer vision algorithms to enhance robustness and generalization in opponent detection and path prediction, leveraging **RADAR, LIDAR, and camera sensors**.
- Optimizing latency (<100ms) and reliability across perception stack with **ROS2**.

Caju AI May 2024 - August 2024

Staff AI Engineer

- Designed and implemented comprehensive evaluation suite for AI software, including RAG (Retrieval-Augmented Generation) pipelines, classification models, and entity extraction systems.

Unbox June 2020 - February 2021

Website Developer and Designer

- Created and hosted website using **HTML/CSS/JS** to provide critical information on public food infrastructure to families in need; thousands of active users.
- Led front-end development initiatives in collaboration with a team of 15+ members.

PROJECTS

Implemented deep learning library from scratch in Python/NumPy and pure C

- Created custom tensor automatic differentiation library from scratch in pure C and Python/NumPy.
- Executed training runs on MNIST image data, achieving **95% accuracy** for C and Python implementations.

Reproduced Mechanistic Interpretability paper in TinyGrad

- Reproduced "Progress measures for grokking via mechanistic interpretability" paper using TinyGrad.
- Confirmed reproduction using signal processing techniques to validate against the original paper.
- Implemented toy transformer model and built training/test dataset in TinyGrad.

Trained custom LLM from scratch

- Implemented and trained **125M-parameter GPT model** on TinyStories dataset using **TinyGrad** library.
- Generated ~coherent English stories using trained model.

TECHNICAL SKILLS

- Machine Learning: PyTorch, TinyGrad, Pandas, LangChain, OpenAI API, FastAPI, postgreSQL, pgVector
- DevOps: Git, GitHub, GitLab, Docker, Jira, AWS Lambda, AWS Step Functions, AWS EC2
- Programming Languages: Python, C/C++, Javascript, TypeScript, Java, MATLAB, SQL, HTML, CSS
- Robotics Software/Hardware: ROS2, rclpy, rclcpp, LIDAR, RADAR, Camera