Joseph Quinn

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Education

Vanderbilt University Nashville, TN

Bachelor of Science in Computer Science & Mathematics, Minor in Data Science *Expected: May 2027*

Relevant Coursework: *Intermediate Software Design, Program Design and Data Structures, Discrete Structures, Calculus, Linear Algebra, Differential Equations, Computer Architecture*

Experience

Machine Learning Research Intern May 2024 – August 2024

Oak Ridge National Laboratory *Oak Ridge, TN*

- Enhanced fluid dynamic simulations by integrating Axial Attention Vision Transformers, leading to a significant improvement in computation time and model robustness.
- Conducted a research study on AViT model hyperparameter sensisty tha reduced training duration by over 40 resulting in signimifcat energy savings and faster model deployment
- Executed over 150 SLURM jobs using Distributed Data Parallel on frontier, recognized as the fastest supercomputer globally.
- Presented research findings at the 2024 Department of Energy Cybersecurity and Technology Innovation Conference.

Developer Sep. 2023 – Present

Vanderbilt University Change ++ *Nashville, TN*

- Enhanced donation tracking, inventory management, and client registration by working on the development and deployment of Mother to Mother, a client interface and admin portal application for a nonprofit organization.
- Improved user registration by transitioning a manual paper-based system to a client-side frontend using React PWA and Firebase, facilitating live session synchronization and a scalable user interface.
- Implemented a NodeJS backend with Prisma and MySQL, resulting in faster warehouse operational efficiency.

Projects

AViT Visualization | *Python, Flask, numPy, Typescript, React,* June 2024 – Present

- Developed a full-stack web application using Flask serving a REST API with React as the frontend.
- Created dynamic visualizations to display performance metrics for different test cases of an Axial Vision Transformer (AViT) model applied to fluid dynamics simulations.
- Integrated NetCDF file support to visualize complex fluid dynamics data, enhancing users' ability to analyze and interpret simulation results.

nnScratch | *Python, NumPy, Matplotlib* May 2024 – June 2024

- Developed a fully connected neural network from scratch in Python and NumPy, without using premade machine learning libraries. Implemented all loss, activation, and propagation algorithms manually, utilizing calculus fundamentals
- Designed a flexible network architecture with customizable training options, supporting various activation functions, initialization methods, and adjustable model parameters. Developed automated scripts providing automatic hyperparameter tuning

Gesture Model | *Python, PyTorch, CV2, NumPy* Feb. 2024 – March 2024

- Designed a multi-architecture neural network framework for recognizing American Sign Language (ASL) hand gestures, including CNN, ANN, and Vision Transformer (ViT) models to process both image and landmark data.
- Created a configurable YAML-based setup for managing hyperparameters and training parameters, enabling flexible experimentation and optimization across various model architectures.

Technical Skills

Languages: Java, Python, MySQL, JavaScript/TypeScript, HTML/CSS, R
Frameworks: React, Node.js, Prisma, Flask, JUnit
Developer Tools: Git, Firebase, MongoDB, AWS EC2/RDS, Docker, SLURM
Libraries: pandas, NumPy, Matplotlib, PyTorch