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 June 2024 – August 2024

Oak Ridge National Laboratory *Oak Ridge, TN*

- Optimized fluid dynamic modeling by integrating Axial Attention Vision Transformers, achieving higher prediction speeds and reducing parameter count by over 60%, facilitating increased utility in engineering applications
- Conducted a research study on hyperparameter sensitivity, reducing training node hours by over 30% resulting in significant energy savings and faster model deployment
- Executed over 150 multi-node Slurm jobs on Frontier, the world's fastest supercomputer, utilizing Distributed Data Parallel (DDP), leveraging over 350 TB of GPU memory to streamline the large-scale model training
- Awarded third place for published research at the 2024 Department of Energy Cybersecurity and Technology Innovation Conference

Full-Stack Developer September 2023 – Present

Vanderbilt University Change ++ *Nashville, TN*

- Developed and deployed "Mother to Mother," a client interface and admin portal for a nonprofit, optimizing operational tasks to enhance organizational efficiency
- Increased 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 Node.js backend utlizing Prisma and MySQL for managing over 2000 inventory items, streamlining warehouse processes and reducing logistical overhead
- Engineered RESTful APIs for scalable data processing and management, incorporating Firebase Authentication middleware for secure JWT validation and user data integration

Projects

Network Visualization | *Typescript, React, Python, Flask, NumPy* June 2024 – Present

- Implemented interactive visualizations using ReCharts to display performance metrics for machine learning models in physics simulations, enabling detailed analysis of model performance
- Utilized NumPy to process multi-dimensional fluid dynamics data from NetCDF files, enabling extraction, manipulation, and animation of data across simulation time steps

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

- Developed a fully connected neural network from scratch in Python and NumPy, manually implementing all loss, activation, and propagation algorithms utilizing calculus fundamentals, bypassing prebuilt network libraries
- Implemented a flexible network architecture with customizable training options, supporting various activation functions, initialization methods, and adjustable model parameters

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

- Designed a multi-architecture neural network framework for recognizing hand gestures, including CNN, ANN, and ViT models to process both image and landmark data
- Utilized Mediapipe to extract landmark data, created preprocessing pipelines for normalization and augmentation, and developed a data conversion class to enhance model robustness and accuracy across network 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: PyTorch, NumPy, Pandas, Matplotlib, MeidaPipe, OpenCV, Scikit-learn