

Matthew Ernst

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EXPERIENCE

Senior Software Engineer, Machine Learning

May 2022 - Present

Qualcomm, Machine Learning Group - AIMET Team

San Diego, CA

- Actively contributing to the development of the AI Model Efficiency Toolkit (AIMET), an open-source library focused on implementing advanced quantization and compression techniques for trained neural network models, enhancing their efficiency and deployment feasibility.
- Developing scripts and tools to facilitate optimizations with Large Language Models (LLMs) to address customer challenges - large memory footprints vs targeted accuracy, driving adoption of AIMET across diverse, and meeting on-target metrics.
- Cultivated strategic partnerships with Qualcomm's top customers, leveraging AIMET capabilities to address problems such as improved image computation for flagship phones. Solutions include advanced features such as Per Channel Quantization, Keras Model Preparers for easier quantization simulation, and developing optimized pathways across Qualcomm SDK's.

Instructor - Introduction To C++ Programming

June 2021 – August 2021

Front Range Community College, Department of Computer Science

Fort Collins, CO

- Developed new course designs with a focus on hands-on programming through classwork and projects .
- Brought software engineering technologies into the course, introducing Git, GitHub, and testing tools.
- Fostered learning through multi-week project designing a raytracing engine, showing the capabilities of C++ and giving students a meaningful way to connect to the course.

PROJECTS

Mountain UI (Electron App) / Mountain UI Companion App (iOS App)

December 2022 – Present

- Developed an Electron app, Mountain UI, that enhances the skiing experience by providing real-time updates of lifts and trails at ski resorts, including weather forecasts and live cams, resulting in a seamless user experience.
- Developed an iOS app using UIKit, integrating with users ski apps, to offer users a companion experience to the Mountain UI app, showcasing their personal skiing stats and allowing them to analyze their speed, distance, elevation, and more, promoting self-improvement.

Chord - A Peer to Peer System

September 2021 – December 2021

- Successfully created and implemented a distributed system in Python, leveraging the Chord protocol to ensure equal workloads and efficient data partitioning across the network.
- Designed and implemented a hashable 16-bit ID space, enabling the accurate storage and retrieval of up to 64,000 peers and keys within the Chord ring, ensuring scalability and optimal performance.

EDUCATION

Master of Science in Computer Science

December 2021

Colorado State University, GPA: 4.0

Fort Collins, CO

Research: Sparse Reconfigurable Artificial Neural Systems

May 2021 – May 2022

- Researched the underlying structure of ReLU networks and the presence of dead neurons from vanishing gradients.
- Implemented new neural network architecture to mitigate dead neurons named a "Late Residual Neural Network."
- Investigated correlations between learning rates and optimizers to an increased quantity of dead neurons.

TECHNICAL QUALIFICATIONS

Languages: Python, C++, Swift, Java, JavaScript, Objective-C, C, Rust

Frameworks / Libraries: PyTorch, TensorFlow(1/2), ONNX, JAX, MLX (Contributed), UIKit, SwiftUI, GraphQL, OpenCV, PyBind, Node, React, Electron, Apollo, Vite, Webpack, Jest, JUnit, Maven, Gradle, MongoDB

Tools: Linux, Git, Scrum, Docker, Postman, Jenkins, GCP, AWS, Azure, JetBrains, Visual Studio, Serverless

Engineering Principles: Agile Development, Object Oriented Programming, Cloud Computing, Test Driven Development, Unit Testing, Coverage Testing, Continuous Integration/Deployment