Bella Nicholson

San Francisco Bay Area, California | bellanich.github.io | bella-nicholson | bellanich | American

Resourceful Machine Learning Engineer (4+ years) specializing in hardware-software co-design for foundation model research. Expert in hardware-aware optimization, efficient on-device inference, and high-throughput R&D pipelines. Committed to advancing frontier model performance by maximizing distributed training throughput and optimizing low-latency inference at scale.

EXPERIENCE

Machine Learning Engineer // Netflix // May 2025 – Present — Los Gatos, California, USA

For a global streaming service, I led systems-aware architectural innovations for the core recommendation system:

- Evaluated proprietary LLM via **hardware-aware compression** to provide quality-efficiency scaling signals for training and application teams
- Optimized core evaluation pipeline to achieve a **2x throughput increase**, **halving iteration latency** without compromising metric integrity
- Adapted foundation model architectures via feature space expansion to enable variable-resolution, improving representation generalization

Machine Learning Engineer // Brenntag // Nov 2023 – Apr 2025 — Amsterdam, Netherlands

At the world's leading chemical distributor, I deployed and maintained ML products across 70+ countries:

- Migrated **a €30M+ annual revenue AI assistant** to a more cost-effective and secure AWS platform, reducing operational costs by €50k+/month
- Developed a **real-time notification system** to monitor critical ML jobs and **model metrics**, improving system visibility and reliability
- Validated and refined the new company **ML Platform design** in a close collaboration with cross-team data and cloud engineers

Machine Learning Consultant // Deloitte // Sept 2021 – Oct 2023 — Amsterdam, Netherlands

At a global consulting firm, I delivered and optimized production-ready ML solutions for diverse clients. Achievements include:

- Stabilized a Dutch e-classified ads platform's "For You" **recommendation engine** (2000+ lines of code) with a 65% increase in test coverage
- Centralized tracking of **1000+ models** and associated experiments for a German steel conglomerate, improving **model reproducibility**
- Launched a self-paced, ML-focused coding training website to standardize and improve code quality across Deloitte NL

PROJECTS

On-Device Diffusion Models for Low-Latency Image Synthesis

- Deployed **Stable Diffusion 2.1 to the iPhone 16** Neural Engine using CoreML, achieved 50% model compression (FP16) and **sub-30s inference**
- Architected a custom image-to-image pipeline using adaptive denoising to reduce generation steps by 40% while **preserving subject identity**
- Detailed end-to-end implementation, including CoreML interface debugging and optimization kernels, in a 3-part technical blog series

Hardware-Aware Edge Optimization for Multi-Modal LLMs

- Deployed a **custom embedded, vision-text foundation model** and Google's Gemma 2B model on various **edge devices (laptop, phone, tablet)**
- Extended an open source LLM hardware-optimization framework to quantize and optimize a new multi-modal LLaVA foundation model
- Documented the project implementation, including application solution prototyping, in a detailed 4-part blog post series

Advanced Concepts in LLM Deployment and Performance Engineering

- Developed a comprehensive study guide on Large Language Models (LLMs), explaining underlying concepts and modern optimization strategies
- Covered LLM inference **optimization techniques (speculative decoding, flash attention, continuous batching; etc.)** for efficient deployment

EDUCATION

Master of Science, Artificial Intelligence

University of Amsterdam | Cum laude (8.0/10.0) | Sept 2018 – Dec 2020 | Amsterdam, Netherlands

- Courses on AI, including Deep Learning, Computer Vision, Natural Language Processing, Information Retrieval, and Reinforcement Learning
- Thesis on "Interpretable Representation Learning for Relational Data" in collaboration with Crunchr

Bachelor of Science, Biomedical Engineering

The College of New Jersey | Magna cum laude (3.8/4.0) | Sept 2014 – May 2018 | Ewing, New Jersey, USA

SKILLS

Programming Languages & Tooling

Python, Git (2016-present), Bash (2018-present), Terraform (2023-present), SQL (2019-present), Docker (2022-present)

MLOps Platforms

Amazon Web Services (2021-present), Google Cloud Platform (2022-present), Databricks (2022-present)

ML Frameworks

PyTorch (2018-present), PySpark (2022-present), FastAPI (2021-present), Tensorflow (2021-2022), Keras (2022)

English 100% | Spanish 75% | German 60% | Russian 50%