Michael Nguyen

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SKILLS

Programming Languages: Java, Python, JavaScript (JS/Node.js), C, C++, Shell
Databases: MongoDB, MySQL, PostgreSQL, NoSQL
DevOps & Tools: Jenkins, Bamboo, Artifactory, Docker, Kubernetes, Terraform, Helm
Frameworks & Libraries: Spring Boot, Hibernate, React, PyTorch, Hugging Face Transformers
Event-Driven Architecture: Apache Kafka
Data & Notebook Environments: Jupyter Notebooks, Google Colab

EXPERIENCE

UnitedHealth Group — *Backend Software Developer*

June 2022 - December 2023

Leading contributions to the Medicare Claims Processing (MRCP) Delegated Encounters project, assisting in the migration from mainframe to a Java Spring-based microservices architecture within Kubernetes and Apache Kafka to support scalable, event-driven next-gen claims processing.

Microservices Development: Built scalable backend microservices with Java, Spring Boot, Hibernate, and Gradle, enhancing modularity and performance.

Database Management: Leveraged MySQL, PostgreSQL, and MongoDB to support diverse data models, optimizing data retrieval and storage.

Event-Driven Architecture (EDA): Integrated Apache Kafka to enable asynchronous messaging and resilient event handling within microservices.

Performance Testing: Conducted system-wide performance tests using Apache JMeter, performing both microservices-specific and end-to-end evaluations to ensure stability.

Regression & Documentation: Enhanced regression suite for broader test coverage; documented APIs with Spring Docs and OpenAPI to standardize microservices communication.

Kubernetes & CI/CD Tools: Managed Kubernetes resources with Helm, utilized Artifactory and Docker for artifact storage and deployment, and performed static code analysis with SonarQube and CodeQL in the CI/CD pipeline.

Monitoring & Logging: Employed Splunk for centralized logging and configured Prometheus and Grafana to monitor system health, Kubernetes pods, and Kafka event flows.

Baycao LLC — *Full-Stack Software Developer*

June 2019 - June 2022

Contributed to the KServer project, an application enabling streamlined Kubernetes provisioning within a virtual private cloud and managing client applications within the provisioned cluster.

Frontend Development: Built a responsive administration dashboard with JavaScript, ReactJS, and NextJS, providing clients with real-time system visibility.

Real-Time Updates: Enabled real-time feedback for Kubernetes provisioning using WebSocket functionality within Node.js microservices.

Backend Microservices: Developed CRUD microservices with Mongoose for MongoDB and Hibernate for relational databases, ensuring data integrity and efficient management.

CI/CD Pipeline Automation: Established a Jenkins-based CI/CD pipeline for deploying npm and Maven artifacts to Kubernetes, streamlining development-to-deployment processes.

Payment Integration: Integrated Stripe for secure transactional and subscription-based payments, enhancing the platform's payment capabilities.

Browser-Based Shell Access: Implemented a browser-based shell to facilitate client interaction with provisioned clusters, simplifying cluster management.

AWS & Terraform: Utilized Terraform for AWS infrastructure automation and gained proficiency with AWS console, CLI, SDK, and serverless Lambda functions.

Graduate School Projects

Georgia Institute of Technology – August 2023 – Present

Disease Detection with Chest X-rays

Explored the impact of state-of-the-art (SOTA) model architectures, both pre-trained on ImageNet and trained from scratch, for disease detection in chest X-rays. Used Grad-CAM and Guided Backpropagation to visualize model decision-making processes, enhancing interpretability of classification results.

2D Transformer-Based Model Adaptation

Explored adapting 2D Transformer models pre-trained on ImageNet for 3D image segmentation tasks using weight inflation to retain depth information. Implemented various weight inflation strategies, including center, average, and random inflation, enabling effective transfer learning while preserving spatial depth cues.

Traffic Sign Recognition

Implemented a real-time pipeline for traffic sign recognition using traditional computer vision techniques. The pipeline includes segmentation with normalized RGB thresholding for extracting regions of interest, detection using a Viola-Jones classifier with Haar-like features and AdaBoost, and classification via a Support Vector Machine (SVM) trained on HOG features. This multi-stage approach enables accurate and efficient traffic sign labeling in images.

Distributed Fault-Tolerant Key/Value Store

Implemented the Multi-Paxos algorithm with role collapsing, adapted from "Paxos Made Moderately Complex," to ensure robust fault tolerance in distributed systems. Key sharding, managed by a Shard Master, was employed to maximize parallelism and throughput, supporting dynamic shard allocations for join, leave, and migration requests. Paxos consensus ensures system reliability even during network partitions and replica failures, while multi-key operations like multi-get, multi-put, and swaps enhance flexibility in distributed transactions.

EDUCATION

Master of Science in Computer Science – May 2025

Georgia Institute of Technology- Atlanta, GA

Bachelor of Science in Computer Science – May 2023

California State University East Bay - Hayward, CA

Work Permit

US Citizen

My initial intrigue with computers began when I discovered the command line on my Mac and encountered the raw power of Unix commands for the first time. Unlike the familiar world of user interfaces and drag-and-drop controls, this experience felt uniquely hands-on, opening up a new dimension of computing that went beyond what I thought computers were capable of—it felt both empowering and cool. As I delved deeper, I found that many of the applications I was beginning to rely on were supported by a vibrant, global community dedicated to open-source projects like GNU and the Apache Software Foundation. Witnessing such passionate collaboration aimed at creating resources for the greater good inspired me to explore computing more deeply and to build a greater appreciation for the principles and practices behind it.

Building on this initial intrigue, I pursued an undergraduate degree in Computer Science. Despite the turbulence and uncertainty brought on by COVID-19, I maintained connections with my professors through emails, virtual office hours, and labs. These interactions provided a strong foundation in the material and gave me the confidence to accelerate my studies, ultimately enabling me to graduate a year early.

Alongside my undergraduate studies, I worked full-time as a software developer at a startup, where my role evolved from supporting smaller projects to developing interactive web applications and backend microservices. This hands-on experience allowed me to bridge theory and practice, applying classroom concepts to real-world solutions. When remote work became necessary, the time I previously spent commuting was redirected into focused efforts on skill-building and balancing my academic and professional commitments. This experience honed my time management skills, enhanced my productivity, and prepared me for the demanding pace of graduate studies.

In my final undergraduate year, I joined UnitedHealth Group (UHG), where I contributed to the development of a modern Medicare Claims Processing System as part of a large, multidisciplinary team. Working within a larger organization allowed me to explore the healthcare sector firsthand and understand how technological solutions are tailored to meet its dynamic needs. Collaborating closely with developers, managers, architects, and business stakeholders gave me insight into how each role contributes to a project's success and helped me identify where my own contributions fit within this structure. For the first time, I saw my work implemented in production, directly impacting millions of real-world users—a rewarding experience that underscored the impact of clear communication, effective teamwork, and proactive learning.

Pursuing a Master's in Computer Science with a specialization in Machine Learning provided me with a thorough grounding in the field's evolution—from early models reliant on hand-engineered features to

deep learning neural networks, and now to the increasingly popular attention-based models. Through this program's coursework and projects, I developed a strong understanding of how each generation of models builds on prior advancements, expanding the capabilities of machine learning. The experience also introduced me to the process of research itself, where I learned to critically engage with academic papers, design experiments, and appreciate the rigor required to advance knowledge in the field.

Reflecting on my journey, I am deeply grateful to the professors and colleagues who have supported my growth along the way. Thanks to their guidance, I am now building applications and models that I could have only dreamed of back when I first explored the terminal's potential. I look forward to continuing this passion in my PhD studies and ultimately contributing to the global community through impactful research and innovation.