# Branden Kim

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Objective: Senior Software Engineer with 5 years of experience, pursuing a masters degree in ML part-time seeking opportunities to develop data pipelines for ML infrastructure.

## Work Experience

Sonos

**Senior Software Engineer** **Aug 2020 - Feb 2025**

- Designed and implemented a distributed Update Server that aggregates update information from products and delivers firmware and software updates to 50 million products worldwide.
  - Designed and implemented a distributed Content Delivery Network to optimize update times and gathering of product data in data streams using geolocation.
  - Performed performance optimization on latency and CPU utilization by utilizing Jenkins and K8s to spin up millions of requests. Improved latency by 300% and reduced CPU % utilization through orchestrating a Horizontal Pod Autoscaler in kubernetes.
  - Designed and implemented a Redis Caching Layer to reduce read requests on our RDB cluster by 92%.
  - Implemented a static caching layer to re-direct 88% of requests from the origin to edge location servers.
  - Analyzed sql query plans and DB locking mechanisms and indexes to optimize READ performance on the DB Cluster.
  - Implemented an automated CI / CD pipeline utilizing Jenkins and Github Actions to automate blue-green deployments and preventing bugs through automating our testing framework.
  - Analyzed network traffic through our logging pipeline and implemented a data streaming pipeline using S3 and Kinesis to store 3 million users and 50 million product information in a data lake for analysis.
- Designed and implemented a functional style, data-model driven PostgresSQL internal library utilized in a 3-tier service that centralized meta-information about products, firmware, and releases.
  - Implemented an exhaustive type system that allows for composition of custom multiple sql commands across data models in DB transaction-chains in a declarative style.
  - Centralized all meta-information that allowed developers to look-up and create update packages for testing and release.
  - Improved build-to-release times from 6 hours down to 2 hours.
  - Allowed efficient searching of multiple products based on shared query properties that allows for efficient auditing.
- Designed and implemented a virtual pipeline framework in Scala to create a custom, automated CI / CD pipeline tool that utilized Jenkins in its backend to automate the queuing of jobs to build, deliver, and release firmware across all products.
  - Converted a manual release process into an automated release process that allows releases of firmware of all products to Alpha, Beta, Production users.
  - Reduced developer bugs and Jenkins plugin issues by 72% by creating a virtualization of Jenkins jobs that allows developers to declaratively specify their job using Scala classes and config files.

**Software Engineer** **Aug 2020 - Nov 2023**

- Implemented an internal fullstack, microservices app on AWS Lambda, S3, and StepFunctions for CRUD operations on internal user, product, user groups, and update records integrating Okta with SAML authentication to authenticate privileged users.
  - Implemented automated CI / CD pipeline utilizing Jenkins and Github Actions with a Gitflow workflow branching strategy to allow for parallel development and streamline the rollout of features and bug-fixes.
  - Provided distributed load-balancing and SSL termination by deploying a custom NGINX webserver in front of AWS Lambda microservices.
  - Implemented a custom MapReduce framework library utilizing S3 and StepFunctions in order to process updates to batches of millions of users at once.

  - Utilized the Serverless framework to declaratively create infrastructure and DAO design pattern with custom SQL stored procedures to perform DB calls.
  - Implemented an expansion to the app's features by implementing updates to Redis Caches and other service's DBs upon updates to internal data.
- Designed and implemented a metrics and log aggregation stream by utilizing a Prometheus and Loki server hosted on Kubernetes sidecars to aggregate metrics and logs from automation jobs running on Jenkins.
  - Led to aggregation of job metrics and logs that allowed for optimization of build bottlenecks and reduced bugs by 12%.
  - Scaled by deploying these services to a Kubernetes cluster as a sidecar to existing pod services.
- Designed and implemented automation to building and release delivery of product firmware and metadata by creating custom workflow scripts in python and Jenkins for job infrastructure.
  - Optimized the job's completion time from 12 minutes to 1.5 minutes by utilizing multiprocessing.
  - Automated existing manual processes such as utilizing rsync to copy files to file-stores and servers for distribution.

University of Virginia

**Research Assistant** **Aug 2019 - Aug 2020**

**Data Structures and Algorithms Teaching Assistant** **Jan 2019 - Aug 2020**

## Technical Projects

**scwab** **2025**

- Implemented a compiler from scratch for the wabbit programming language using Scala and a data-model driven functional programming style.

**Transformer-Based Electronic Sub-Genre Classifier** **2025**

- Wrote a research paper on implementing a custom Transformer based model architecture for multi-genre music classification specifically in sub-genres in electronic music. Performed transfer learning to utilize an existing BERT model and re-trained on the FMA music dataset and again on a custom dataset with only electronic music. Utilized Fourier Transforms to create embeddings of 30 second music samples which led to a 77% Sensitivity and 78% Specificity rate.

**CG Raytracer** **2025**

- Implemented a 3D RayTracer in Java for fun / learning purposes utilizing the Processing library in Java. Implemented ray-generation, phong lighting models, shape collision algorithms, and BVH Trees for optimization.

## Education

**M.S Computer Science ML Specialization**, Georgia Institute of Technology **2021 - Present**

**B.S Computer Science** *Summa Cum Laude*, University of Virginia **2016 - 2020**

**Bradfield School of Computer Science**, Certifcation of Completion **2022 - 2023**

- Year long private institution program that aimed at breaking software abstractions by understanding low-level software abstractions and building up to implementing distributed consensus algorithms like raft.

## Certifications / Courses

**NVIDIA Deep Learning Fundamentals — Architecting on AWS — Advanced Architecting on AWS**

## Skills

**Python Pytorch Java Go Docker Terraform Kubernetes Redis Scala Typescript JavaScript C C++ AWS Serverless**