Doğaç Eldenk

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I am currently doing my **Master's in Computer Science at Northwestern University**, working on simulating, running and optimizing AI models on distributed edge devices. I have past research experience on software engineering, machine learning and generative AI.

Previously, I worked over 4 years of expertise in building, designing and optimizing **distributed systems**, **cloud infrastructure**, scalable **high-performance web applications** and developer tooling. I am passionate about system internals, **networking**, and **open-source** projects. Contributed to over 40+ open-source projects.

Technical Skills

Languages	Python, Kotlin, Java, Scala, TypeScript, JavaScript, Go, C++
Technologies	SQL, REST, gRPC, Protobuf, Terraform, PostgreSQL, GitHub Actions, Envoy, Apache Airflow
Frameworks	PyTorch, Spring Boot, Armeria, React, Koin, Exposed
Tools	AWS, Git, Gradle, Grafana, Linux

Experience

Northwestern University
Graduate Researcher

Evanston, IL
June 2025 - Current

Intelligent Mobile and Embedded Computing (IMEC) Lab

- **Conducting research on AI systems** with a focus on accelerating distributed AI inference across multiple devices.
- **Built a discrete-event simulation suite** to allow running multiple AI models in a simulation to profile performance of distributed algorithms. Conducted large-scale experiments and numerical analysis to derive scaling laws.
- **Extended state-of-the-art AI models**, such as Llama 3, CLIP ViT, with support for parallelization techniques such as Tensor Parallelism, Model Parallelism, and other state-of-the art methods based on recent research papers.
- **Developing and prototyping distributed inference techniques**, including communication–computation overlap, speculative decoding, and early exiting, aimed at accelerating transformer inference.

Carbon Health (U.S.)
Software Engineer - Senior

Remote - Chicago, IL
November 2023 - August 2025

- **Re-designed and implemented** a new generic distributed fine-grained authorization solution compatible with the microservice architecture and also migrated over 1000+ endpoints with **zero down-time**.
- **Lead architecture and management** of the service infrastructure, including **observability**, monitoring, tracing, **scaling**, **networking**, security, and deployment pipelines, ensuring **high reliability and efficiency**.
- **Architected** the pipeline for an **LLM-based AI** to automatically respond to patient messages, schedule appointments, assign tasks and later implemented together with the Data Science team.

Software Engineer - Mid Level
January 2022 - November 2023

- Migrated **50+ tables** and **100+ gRPC** endpoints with **0 downtime** from monolith to microservices, remodelled top 3 biggest tables in the company with over **200M+ rows** with challenges such as **query performance optimizations**.
- Developed developer tools, such as **job schedulers**, remote **load testing** pipelines, **protobuf code generators**.
- **Full-stack development** with React-Native with Redux, GraphQL with Apollo and Netflix DGS.

Software Engineer - Junior
December 2020 - January 2022

Redgate Software (U.K.)
Software Engineer - Intern

July 2019 - September 2019
Cambridge, UK

Education

Northwestern University
M.Sc in Computer Science

Evanston, IL
September 2025 - September 2026 (Est.)

Bilkent University
B.Sc. in Computer Science, GPA 3.75 / 4.0 - Summa Cum Laude

Ankara, Turkey
Sep 2017 - Jan 2022

Comprehensive scholarship

Research and Publications

Incidents During Microservice Decomposition: A Case Study
Eldenk, D. and Cetin A.

EASE 2025

Best Paper Award – Presented a case study analyzing 107 incidents during Carbon Health's microservice decomposition over five years. The experiences, challenges, and incident management workflow is shared, highlighting the importance of modularization for preventing incidents and improving system resilience.

Learning Portrait Drawing with Unsupervised Parts
Tasdemir, B., Gudukbay, M.G., Eldenk, D. et al.

International Journal of Computer Vision

Introduced an image translation architecture combining high-level semantic understanding with unsupervised parts and identity preservation. Proposed a novel asymmetric pose-based cycle consistency loss that mitigates reconstruction constraints.

Key Projects and Contributions

Armeria - microservice framework
Contributor

 line/armeria

- Armeria is a versatile **open-source microservice framework** built on Netty that supports building any type of service using your favorite technologies, including gRPC, Thrift, Kotlin, Retrofit, Reactive Streams, and Spring Boot.
- Contributed over 25+ issues and 15+ Pull Requests with over **12,000+ lines of code**. Mainly worked on **gRPC HTTP/ JSON transcoding**, custom API development platform, and Kotlin support.

Kotlinx Protobuf Gen
Author

 Dogacel/kotlinx-protobuf-gen

- An open-source project for generating Kotlin data classes that use **kotlinx.serialization** by parsing protobuf files.
- Released to Maven Central, used by several other open-source projects in production.

Defenchess, UCI Chess Engine
Co-author

 cetincan0/Defenchess

- Modern chess engine, **ranked top 10 in the world** with 3285 ELO among other chess engines on CCRL.
- **Low level optimizations** with **C++** for performance & tree search algorithm.

Other Achievements and Participation

- 680th out of 2 million in National University Placement Exam
- Speaker - PgDay Chicago 2025: Integration testing with PostgreSQL
- Technical blogging - https://blog.dogac.dev
- Author - Dockerfile Kotlin DSL
- Author - PostgreSQL Test Table Track Extension
- Contributor - Kotlin/kotlinx.serialization