

Arınç Demir

Istanbul, Turkey

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Education

Boğaziçi University

B.S. IN COMPUTER ENGINEERING

- GPA: **3.64**/4.00

Istanbul, Turkey

Sep. 2020 - June 2026

Technical University of Denmark

EXCHANGE (COMPUTER SCIENCE)

Copenhagen, Denmark

Sep. 2023 - Jan. 2024

Skills

Programming C/C++, Python, C#, Java, Rust, SQL, PHP, JavaScript, PowerShell, Assembly (ARM/RISCV)

Frameworks & Tools .NET (Roslyn API), CMake, Unity, Unreal, PyTorch, NumPy, Pandas, Docker, Git, React Native, LaTeX, Django, Laravel

Systems & Concepts Embedded Systems (STM32), Active Directory, Windows Services

Languages English (IELTS: 8.0, C1), Turkish (Native), German (Beginner)

Experience

Databin

SOFTWARE ENGINEERING INTERN

Istanbul, Turkey

Aug. 2025 - Sep. 2025

- Developed and deployed a Windows Service application to audit **Group Policy** software installations and user activity.
- Built a robust backend using **Python (ldap3)** and **MariaDB**, implementing object-oriented wrappers for **Active Directory** management.
- Implemented a **Python-PowerShell** hybrid architecture, using subprocess to execute remote administrative tasks via WinRM and structured JSON for data interchange.
- Converted Python scripts into standalone executables using **PyInstaller**.
- Implemented native **Windows Service** hooks using **pywin32** for background execution and automatic restart capabilities.
- Packaged the final solution as an **MSI installer** deployable via Group Policy, handling installation logic, file permissioning, and uninstallation cleanup.
- Deployed and administered **SAP NetWeaver AS ABAP** on a remote server, inside a **Linux/VirtualBox** environment; investigated ABAP programming, OData migrations, and RFC protocols to determine the limitations of field-level masking in SAP GUI.

Boğaziçi University - COLORSLAB

UNDERGRAD RESEARCH ASSISTANT

Istanbul, Turkey

Sep. 2024 - Mar. 2025

- Co-authored **"Learning Social Navigation in Mobile Robots"**, accepted at IEEE SIU 2025 (33rd Signal Processing and Communications Applications Conference).
- Designed and implemented a hybrid **deep learning** framework combining **Graph Attention Networks (GAT)** to model spatial social interactions and **Conditional Neural Processes (CNP)** for temporal trajectory prediction.
- Modeled the environment as a dynamic social graph, enabling the robot to learn socially compliant maneuvers (e.g., passing behind pedestrians rather than cutting them off) directly from expert demonstrations.
- Reverse-engineered** and extended the **Unity-Based SEAN 2.0 simulation environment**; modified the core **C#** codebase to enable custom data collection pipelines and generate dynamic multi-agent scenarios for training.
- Validated the model in dynamic social environments, achieving a reduction in social norm violations compared to linear baselines.

TaleWorlds Entertainment

SOFTWARE ENGINEERING INTERN

Ankara, Turkey

Aug. 2024 - Sep. 2024

- Engineered a custom **Roslyn Analyzer** to enforce strict architectural conventions across the company's codebase, utilizing the **.NET Compiler Platform** to perform **syntactic and semantic analysis**.
- Developed and integrated CodeFix Providers that manipulate the Abstract Syntax Tree (AST) to automatically resolve naming violations and encapsulation breaches, significantly reducing manual code review overhead.
- Architected a modular **VSIX extension** ecosystem, implementing advanced features like project-level blacklisting and context-aware suppression commands (**"ReSharper-like" functionality**) to improve developer experience.
- Designed a robust **unit testing** suite to validate **regex-based** symbol matching and complex syntax node traversals, ensuring stability across diverse code scenarios.
- Conducted feasibility research on Dataflow Analysis for enforcing list encapsulation, applying finite state machine concepts to prototype solutions for memory safety challenges.

Selected Projects

DO-VERIFY: High-Performance Data-Oriented Runtime Verification (C++)

Istanbul, Turkey

SENIOR PROJECT (ADVISOR: DR. DOĞAN ULUS)

Sep. 2025 - Present

- Developing a **Metric Temporal Logic (MTL)** monitor in **C++**, optimizing the state-of-the-art **reelay** algorithm using **Data-Oriented Design**.
- Engineered a custom **double-buffered** interval set library to replace Boost, eliminating runtime heap allocations.
- Designed a contiguous "Array-of-Structs" memory layout for sequential network nodes to maximize **CPU cache locality**, outperforming OOP.
- Integrated a native grammar **parser** using **cpp-peglib** for complex temporal logic formulas.
- **Eliminated I/O bottlenecks** by replacing previous parsing methods with a high-performance **simdjson** ondemand feeder, significantly reducing processor overhead for parsing (**from %50 to %18**).
- Achieved **massive performance gains** over the baseline (and currently the fastest) Object-Oriented **reelay** library, demonstrating an average **speedup of 5.37x** in dense-time benchmarks.
- **Optimized memory and execution time** by merging the monitors for multiple formulas into a shared Directed Acyclic Graph (DAG), increasing that speedup up to **20x** when the formulas have many shared sub-formulas.

STM32 Backpack Alarm System

Istanbul, Turkey

CMPE 443 - EMBEDDED SYSTEMS PROJECT

Sep. 2025 - Jan 2026

- Built a theft-detection system using an **STM32 Nucleo** board, integrating an accelerometer (**ADC**) and Bluetooth module (**UART**).
- Implemented **bare-metal** drivers in **C** and real-time interrupt handling to process sensor data with minimal latency.
- Collaborated in a 6-person team to implement the full embedded stack: **GPIO, Timers, Interrupts, ADC, and UART**.

Quizzard - Language Learning Mobile Platform

Istanbul, Turkey

SOFTWARE ENGINEERING COURSE PROJECT (REACT NATIVE)

Sep. 2024 - Jan. 2025

- Engineered a **cross-platform mobile application** using **React Native**, taking part in the mobile development sub-team of 3 within a larger 9-person **agile** group.
- Implemented a proficiency-based recommendation engine that dynamically adjusts quiz difficulty based on user performance history.
- Executed the full Software Development Life Cycle (SDLC) adhering to industry standards, including requirement elicitation, comprehensive **UML** architectural design, and **customer presentations**.
- Integrated features such as custom quiz creation and community forums, ensuring a modular codebase for scalability and maintainability.

Multi-threaded TCP Server Competition

Copenhagen, Denmark

OPERATING SYSTEMS COURSE (DTU)

Oct. 2023 - Jan. 2024

- **Awarded 1st Place** among 30+ groups for creating the most efficient TCP server handling prioritized requests under heavy load.
- Implemented in **C** using POSIX threads (pthreads) and **mutex locks** to ensure **thread safety** and optimal resource scheduling.

Chord Transposer (Rust)

Istanbul, Turkey

PERSONAL PROJECT

Jan. 2025

- Developed a cross-platform music utility app using **Rust** and the **egui** framework (immediate mode GUI).
- Compiled to WebAssembly (WASM) for web deployment and distributed as native desktop binaries.

Extracurricular Activity

Swing Dance Community (Lindy Hop)

Istanbul, Turkey

VOLUNTEER INSTRUCTOR & PERFORMER

2021 - Present

- **Volunteer Instructor** at Boğaziçi University Dance Club (BUDANS) (Fall 2024); choreographed and directed the semester showcase performance.
- Active member of the Istanbul Swing community; served on the organization team for Swing Istanbul (2023) and volunteered at the international "Jumpin' at Istanbul" festival.
- Regularly perform in ensemble shows and social dance events, fostering community engagement.

Boğaziçi University Athletics Team

Istanbul, Turkey

TEAM MEMBER & MENTOR

2021 - 2023

- Represented the university at the Inter-University Championship in Bursa (1.5k track) and completed the Istanbul Half-Marathon (21k).
- Mentored incoming athletes on running mechanics, drills, and conditioning techniques during weekly training sessions.

Musical Performance & Theory

Turkey

MUSICIAN (PIANO, GUITAR, VOCALS)

2017 - Present

- Certified Pianist: Acquired Grade 3 in London College of Music Examinations (Credential ID: 35314-1); focus on Jazz and Classical improvisation.
- Guitarist and vocalist for local ensembles; performed in various student concerts and maintain a consistent practice routine.