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Oruç Çakır

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ABOUT ME

I am a fourth-year Computer Engineering student at TOBB Economics and Technology University.
I am passionate about unveiling hidden structures, transforming challenges into opportunities, and creating pathways where once there was uncertainty.

WORK EXPERIENCE

BARCELONA SUPERCOMPUTING CENTER – BARCELONA, SPAIN

AI PERFORMANCE INTERN – 08/01/2025 – 07/04/2025

Developed Lumina, a modular full-stack profiling framework for LLMs integrating VLMEvalKit, llama.cpp, perf, PAPI, nsys, and ncu. Performed detailed performance analysis on Intel Xeon 8480+ CPUs and NVIDIA H100 GPUs to identify bottlenecks in inference efficiency. Benchmarked models on datasets including MMLU, MMBench, and OCRBench. First-author paper accepted at SAMOS 2025, titled *"Beyond the Shadows: A Deep Dive into Profiling Modern Mixed-Modal and Multi-Modal Transformer Models."*

GT-ARC – BERLIN, GERMANY

IOT & AI INTERN – 12/06/2024 – 03/09/2024

Integrated the OPACA Framework with Node-RED by developing custom nodes to enable seamless agent communication and task automation. Developed a ChatGPT-powered Smart Application ChatBot with voice and image processing capabilities for smart home control. Designed a modular architecture; implemented the backend independently and integrated it with OPACA for real-time, user-friendly interactions.

KASIRGA MICROPROCESSORS LABORATORY – ANKARA, TÜRKIYE

UNDERGRADUATE RESEARCHER – 08/01/2024 – CURRENT

Led the team in designing a custom pipelined processor using Verilog, focusing on architectural and functional optimization. Worked on-site in Kasırga Lab, then supported the team remotely during my internship, ensuring steady progress and high standards. Contributed to both technical implementation and team coordination, resolving challenges and aligning the project with design goals. Conducted research on transformer architecture optimization for LLMs, and developed transformers.cpp, a C++ library.

SPECSON INSTRUMENTS – ANKARA, TÜRKIYE

FULL STACK DEVELOPER – 01/01/2024 – 05/05/2025

Developed the Specson CO_2 Capture System, a software solution for optimizing carbon dioxide capture processes. Designed modular components, built intuitive user interfaces, implemented backend logic for multi-flow controllers (MFCs).

TOBB UNIVERSITY OF ECONOMICS AND TECHNOLOGY – ANKARA, TÜRKIYE

TEACHING ASSISTANT – 15/09/2023 – 06/06/2024

My responsibilities included supporting students during lab sessions, clarifying core programming concepts and assisting them in understanding and applying object-oriented design principles through hands-on coding exercises.

PROJECTS

08/04/2025 – CURRENT

EVANGELINE Transformers.cpp

Developed transformers.cpp, a C++ library for modern transformer architectures without Python dependencies. Implemented models (LLaMA, LLaVA, Mistral, etc.) with LibTorch, supporting hybrid CPU–GPU inference for multi-modal generation. Integrated multiple tokenization methods and optimized attention layers (MQA, GQA, KV caching) for speed and memory efficiency.

08/01/2025 – 07/04/2025

LUMINA Beyond the Shadows

Developed Lumina, a modular framework for profiling multi-modal LLMs at functional and hardware levels.Integrated VLMEvalKit with a C++ backend (llama.cpp) and tools like perf, PAPI, nsys, ncu.Benchmarked models (e.g., LLaVA-Mistral-7B, Chameleon-7B) on Intel Xeon 8480+ and NVIDIA H100. Results published as first author at SAMOS 2025: *"Beyond the Shadows..."*.

07/07/2023 – 01/12/2024

TinyML

Researched execution and optimization of AI models on resource-constrained devices, focusing on energy efficiency and TinyML scalability.
Supported by TÜBİTAK 2209-A, the project offers novel solutions for real-world deployment on low-power hardware.

12/06/2024 – 03/09/2024

ZEKI Chatbot

Developed a smart home chatbot with a modular architecture combining GPT-4 fine-tuning, dialogue management, and real-time IoT control.
Improved smart device interaction via natural language, enhancing skills in Python, NLP, and AI-IoT integration.

HONOURS AND AWARDS

05/09/2024

Second place in Turkey in the Digital Processor Design

As the team captain of Kasırga ATEŞ, we achieved second place in Turkey in the 2024 Teknofest Digital Processor Design category.

Best Team Spirit in Turkey in the Digital Processor Design

In addition to our technical success, we were honored with the Best Team Spirit Award, which holds special meaning for us, in the 2024 Teknofest Digital Processor Design category.

LANGUAGE SKILLS

Mother tongue(s): **TURKISH**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	C1	C1	B2	B2	C1
GERMAN	A1	A2	A1	A1	A2

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user