

MUSTAFA YİĞİTBAŞI

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SUMMARY

Software Development Engineer and Computer Engineering student specializing in industrial backend architecture, full-stack web development, and Explainable AI (XAI). Experienced in engineering robust data access layers with .NET/C# and architecting scalable RESTful APIs using ASP.NET Core and FastAPI. Adept at designing end-to-end computer vision pipelines and integrating LLM-based solutions into production environments. Committed to Agile methodologies, modular clean code practices, and CI/CD processes to deliver high-performance, maintainable software systems.

WORK EXPERIENCE

Siemens

January 2026 – Present

Software Development Engineer (Working Student) Siemens , Istanbul, Türkiye

- **Engineered and maintained** robust backend and data access layer architecture using **.NET / C#** for industrial software applications.
- **Integrated** software automation workflows and data exchange interfaces within the **TIA Portal** environment.
- Authored comprehensive unit tests using NUnit and contributed to legacy application modernization by migrating core modules from **.NET Framework 4.8** to **.NET 8**.
- **Practiced Scrum** agile methodology throughout the entire software development lifecycle, writing modular clean code, and supporting continuous integration/delivery (CI/CD) processes.

Full Stack Developer-AI Researcher

September 2024 - Present

Kocaeli University Embedded Systems Laboratory , Kocaeli, Türkiye

- Developed 3+ full-stack web applications using **ASP.NET Core**, currently deployed and actively used within the university.
- Working on TÜBİTAK-funded structural analysis project developing **YOLOv8** and **CNN-based models**.
- Trained machine learning models on 10,000+ images using **OpenCV, TensorFlow, PyTorch**.
- Designed and optimized databases using **Entity Framework Core** and **SQL Server**.
- Managed API testing with **Postman** and version control processes with **Git**

Software Intern

August 2025 - September 2025

Sabancı Dx, Istanbul, Turkey

- Developed web applications using **Blazor** and implemented **CI/CD pipelines with Azure DevOps**.
- Built **RAG (Retrieval-Augmented Generation)** systems and **ElasticSearch-based search infrastructures**.
- Implemented **LLM API integrations** and **Hugging Face embedding models** for AI-powered solutions.
- Developed **custom MCP Server for Gemini integration** and implemented LLM-based actions in web applications.
- Created production-ready systems using **Azure AI Foundry** and **Docker containerization**.

Full Stack Developer (Freelance) Various Projects

2023 - Present

- Completed 5+ **LLM integration** projects utilizing **RAG systems** and **vector databases**.
- Developed **REST APIs** with **FastAPI** and managed 50K+ records using **PostgreSQL, MongoDB**
- Built NLP solutions using **Langchain, Transformers, FAISS** libraries
- Developed 3+ full-stack projects with **React.js frontend, FastAPI/Django backend** integrations using **RESTful APIs, JWT authentication**, and **PostgreSQL/MongoDB** databases.

R&D Team Member

IEEE KOU TECHNIC (UAV) | R&D TEAM MEMBER

August 2023 - December 2023

- Developed object detection and image classification projects using OpenCV and Python.
- Contributed to autonomous decision-making processes for UAV systems.

PROJECTS

MEDİKO HEALTH CENTER MANAGEMENT SYSTEM

<https://medikorandevu.kocaeli.edu.tr>

- **Developed and deployed** a full-stack appointment management system using **ASP.NET Core** and **React.js**, currently in active production and serving **2,000+** students at Kocaeli University Health Center.
- **Architected** RESTful APIs and optimized database operations using **Entity Framework Core** and **SQL Server** to manage and scale over 2,000 patient records efficiently.
- **Implemented** secure access controls utilizing **LDAP authentication**, **JWT** token management, and **role-based authorization**.
- **Engineered automated background services** for daily appointment slot management and integrated SMTP email notifications for instant confirmations.
- Ensured system reliability and maintainability by establishing global exception handling and robust logging mechanisms.

BUILDING EARTHQUAKE RISK ASSESSMENT SYSTEM (TÜBİTAK PROJECT)

- **Architected** an end-to-end, **Explainable AI (XAI)** computer vision pipeline to automate building earthquake risk scoring by extracting structural risk factors (e.g., soft story, short column, plan irregularity) from street-level and satellite imagery.
- **Trained and fine-tuned YOLO11** (object detection) and **YOLO11 seg** (polygon segmentation) models for multi-domain computer vision tasks across facade perspectives and aerial satellite views.
- **Engineered a 2-stage inference** architecture featuring target cropping, **Test-Time Augmentation (TTA)**, and rare-class **oversampling** to resolve severe class imbalance and eliminate small-object recall bottlenecks.
- **Developed** a deterministic **geometric rule engine** to translate raw predictions into structural risk signals, implementing **extent-based** roof shape analysis and vertical alignment algorithms for building expansion joints.
- **Implemented** a bit-accurate deterministic scoring engine matching domain-expert formulas with 100% logic alignment, achieving **94% recall** on critical risk parameters while generating automated visual evidence and text rationales for human-in-the-loop triage.
- Built a full-stack geospatial web application utilizing a **FastAPI** backend, **React.js** frontend, **PostgreSQL / PostGIS** database, and **OpenStreetMap API** for interactive location-based risk visualization.

HAVELSAN SUIT - NAVALSIGHT

- **Engineered** a marine simulation environment **in collaboration with HAVELSAN** using **Gazebo Harmonic** and **ROS 2** to model realistic hydrodynamic behaviors and autonomous situational awareness scenarios.
- **Developed** an end-to-end target detection, tracking, and lock-on pipeline utilizing 360° **GPU-LiDAR / Radar** point clouds and multi-target clustering algorithms (**DBSCAN**).
- **Architected** an adaptive dual-channel sensor fusion framework combining geometric feature extraction (**PCA**, Voxel) with advanced kinematic trajectory tracking (**KalmanNet**, **TCN**).
- Achieved up to **94.6% classification accuracy** across diverse vessel classes with deterministic real-time processing performance (4.2ms inference time at 10 FPS).

TECHNICAL SKILLS

- **Languages:** Python, C#, JavaScript, TypeScript
- **Frameworks:** ASP.NET Core, Blazor, Django, FastAPI, Flask, React.js, Next.js
- **AI/ML:** TensorFlow, PyTorch, scikit-learn, OpenCV, YOLOv8, Hugging Face, Langchain
- **Databases:** PostgreSQL, MongoDB, SQL Server, ElasticSearch
- **Cloud & DevOps:** Azure AI Foundry, Azure DevOps, Google Cloud Platform, Docker, Git
- **Data Science:** Pandas, Matplotlib, Seaborn, NumPy, FAISS
- **Tools:** Postman, Entity Framework Core, JWT, RESTful APIs, CI/CD

EDUCATION

Bachelor's Degree in Computer Engineering,

2022 September - Present

- Kocaeli University, Turkey
- GPA 3.38

High School

- Hatay Sınav Koleji , Turkey

2017 September -2021 September