



Osman Yılmaz

Computer Engineering
Student

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About Me

Final-year Computer Engineering student focused on IoT, embedded AI, and backend systems. I build end-to-end solutions connecting sensors, Raspberry Pi edge devices, and Spring Boot backends with real-time data and AI models.

My work includes autonomous drones with on-board dangerous person detection, object-following vehicles, smart agriculture & humidity prediction, seed classification with CNNs, and ESL (Electronic Shelf Label) systems. I am seeking a 4-month long-term internship (February-June) in IoT, embedded systems, backend development, or R&D.

Education

Bachelor of Computer Engineering

Bartın Üniversitesi , Bartın/Türkiye

2022 - Present

Focus areas: Backend Development, Embedded Systems, Computer Networks, Artificial Intelligence, Software Engineering

Language

- English – Intermediate (B1-B2)
- Turkish – Native

Technical Skills

Backend & Systems

- Languages & Frameworks: Java, Spring Boot, RESTful API Design, JDBC
- Security & Communication: JWT Authentication, SSL/TLS, WebSocket, basic WebRTC, STUN/TURN
- Databases: MySQL, MongoDB, multi-datasource architectures (local + remote DB)
- Architecture & Practices: 3-tier architecture (Controller–Service–Repository), clean layering, microservice-oriented thinking
- APIs & Integration: Real-time APIs, model-serving endpoints, Android/JS clients via Retrofit and HTTP

IoT & Edge AI

- Embedded Platforms: Raspberry Pi (Python, GPIO, PWM), basic hardware–software integration
- Computer Vision & AI: YOLOv8, OpenCV, CNN-based image classification, TensorFlow/TensorFlow Lite (basic), LSTM & ConvLSTM (basic)
- Data & Analytics: NumPy, Pandas, scikit-learn (basic), spatial interpolation (IDW, RBF), Leaflet heatmaps
- Use Cases:
 - Real-time dangerous person detection on Raspberry Pi with Pi Camera
 - Humidity prediction, sensor networks, obstacle detection, seed classification, autonomous navigation

DevOps & Cloud

- Tools & Platforms: Docker (basic), introductory AWS concepts (EC2, Lambda, API Gateway, IoT Core)
- Deployment & CI/CD (learning focus): Packaging and deploying Spring Boot & Python services
- Version Control: Git, GitHub, feature-branch workflow

Current Development Focus

- Java & Spring Boot Microservices
- AWS deployment and management (intro level)
- Advanced RESTful API development
- Integrating Artificial Intelligence into Real-world Applications and System
- Python for Edge and AI Applications
- AWS IoT Core & Lambda Automation
- IoT Systems & Edge Computing
- Autonomous Drones & Robotics
- Computer Vision & CNN-based Classification
- Smart Agriculture & Environmental Sensing
- Workflow Automation (n8n, Slack)
- Basic Docker and Kubernetes (microservice)

Selected Projects

- **Autonomous Drone for Dangerous Person Detection**

Technologies: Raspberry Pi, YOLOv8/Roboflow, Pixhawk, MAVSDK, ArduCopter, OpenCV, Webots

1. Developed a prototype autonomous drone system performing real-time dangerous person detection on Raspberry Pi using the Pi Camera.
2. Integrated a YOLOv8/Roboflow model into the onboard vision pipeline and tested autonomous behaviors in simulation and on real hardware via MAVSDK + Pixhawk.

- **Object-Following Autonomous Vehicle**

Technologies: Raspberry Pi, Python, OpenCV, YOLOv8, H-Bridge, GPIO

1. Built a ground robot capable of detecting and following a person using YOLOv8 and OpenCV.
2. Controlled DC motors through an H-Bridge and GPIO pins, mapping detection outputs to steering and speed commands.

- **WhatsApp-like Real-time Chat Application (iChat)**

Technologies: Java, Spring Boot, WebSocket, WebRTC, MongoDB, MySQL, JWT, STUN/TURN, SSL/TLS

1. Implemented a WhatsApp-like messaging platform with 1-1 and group chats using WebSocket and MongoDB.
2. Experimented with WebRTC-based voice calls over STUN/TURN and secured all endpoints with JWT and SSL/TLS.

- **Brassicaceae Seed Classification – TÜBİTAK 1002-A (Undergraduate Researcher)**

Technologies: Python, CNN, OpenCV, image processing

1. Contributed to a TÜBİTAK 1002-A project on geometric modeling and CNN-based classification of Brassicaceae seeds.
2. Implemented Python pipelines for image preprocessing (cropping, normalization, augmentation) and experimented with CNN models for taxon/location-level classification.
3. Supported the design of a web-based interface to upload seed images and obtain automatic classification and geometric similarity scores.

- **Sensor Management and Mapping System**

Technologies: Android, Java, Retrofit, Google Maps API, MySQL, JWT

1. Developed an Android application to list, manage and visualize sensors on Google Maps.
2. Consumed JWT-secured Spring Boot APIs via Retrofit and implemented role-based behavior for admin / manager / personnel users.

- **AI-powered Smart Agriculture and Humidity Forecast System (In Progress)**

Technologies: Raspberry Pi, Spring Boot, TensorFlow Lite, LSTM, ConvLSTM, AWS IoT Core, IDW, RBF, MySQL, Leaflet.js, Python

1. Designed an IoT + ML platform to predict soil/surface humidity using time-series models (LSTM/ConvLSTM) and sensor data collected from distributed nodes.
2. Implemented a Spring Boot backend exposing secure REST APIs for historical data and humidity forecasts.
3. Visualized predictions on interactive Leaflet-based humidity maps.
4. Used n8n to automate data workflows and send scheduled forecast & system-status reports to Slack, improving project monitoring.

- **ESL (Electronic Shelf Label) Template Editor & Renderer (Roltek Intern)**

Technologies: React, Next.js, Node.js, Konva/Canvas, JSON/SVG, SSR

1. Built a web-based ESL template editor to design price labels using a React + Konva canvas interface.
2. Implemented a server-side renderer that converts JSON templates and product data into SVG/PNG labels for electronic shelf devices.

Scholarships, Grants & Achievements

- TÜBİTAK 1002-A – Undergraduate Researcher
 - Seed classification project on geometric modeling and CNN-based image analysis.
- BARÜ AR-GE Pazarı – Participant
 - Presented IoT and AI-based projects (smart agriculture, autonomous systems) to academic and industry stakeholders.
- BAKKA Artificial Intelligence Training
 - Completed regional AI training on ML fundamentals, Python workflows, and applied AI projects.

References

Assoc. Prof. Dr. Evrim Güler

- Head of Computer Engineering Department, Bartın University
- Role: Academic advisor and main supervisor for all my major projects, including the autonomous drone system, object-following vehicle, smart agriculture & humidity forecasting platform, IoT sensor management systems and TÜBİTAK-supported research.

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Research Assistant Furkan Ayaz

- Computer Engineering Department, Bartın University
- Role: Co-advisor and project supervisor for all my major projects, especially TÜBİTAK 1002-A seed classification studies, IoT/back-end development, and AI/ML components of my autonomous and smart agriculture systems.

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