

# Erkam Kavak

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## EDUCATION

### Boğaziçi University

Bachelor's of Science, Computer Engineering

Istanbul, TR

Oct 2020 — Jul 2024

- Undergraduate GPA: 3.1
- Recent coursework: Probability & Statistics, Parallel Processing, Database Systems, Software Engineering, Operating Systems, Computer Networks, Blockchain Programming, Robotics, Computer Vision

## WORK EXPERIENCE

### Chief Engineer

Solace Technology - AI Voice Assistant Startup

Jun 2024 — Aug 2025

Istanbul, TR

- Developed custom *Home Assistant* components and proxy server architecture enabling seamless mobile app and embedded device integration
- Built and optimized a mobile app in *Flutter* for smart home control
- Designed and implemented AI pipelines for voice assistants, training multiple *BERT* models for intent recognition and action execution
- Trained wake-word detection models from scratch with synthetic data, using *ElevenLabs*, *EdgeImpulse*, and *Microwakeword*
- Worked extensively on embedded development, integrating wake-word and voice assistant capabilities on resource-constrained devices with *ESPHome*
- Designed and implemented an interactive agentic voice assistant with the *Pipecat* framework and voice services, optimizing *WebSocket* and *WebRTC* for low-latency performance
- Researched real-time avatar generation and integrated open-source models with *LiveKit*

### Undergraduate Researcher

DeepMIA Research Lab

Aug 2022 — Jan 2024

Remote

- Built a foundation in deep learning by implementing neural networks from scratch, including forward/backward propagation and key architectural concepts
- Reviewed state-of-the-art research on *semantic segmentation*, focusing on *multimodal sensor fusion* and its *applications on autonomous systems*
- Gained hands-on experience in *PyTorch* by studying and rewriting open source implementations of research works with customizations
- Designed and implemented a novel semantic segmentation model in *PyTorch* combining insights from leading works for camera-lidar multimodal data
- Collected datasets and carried out training and testing of the model within the *CARLA simulation environment*

### Artificial Intelligence Intern

Turkish Aerospace

Aug 2023 — Sep 2023

Ankara, TR

- Analyzed the architecture of *YOLOv5* in detail, studying each model block and its role in object detection
- Reviewed research papers and models on small-object detection
- Enhanced detection accuracy of model by adding a custom layer and retraining on small object detection datasets
- Designed and implemented a new YOLO-based architecture with a *cross-attention* module in *PyTorch*
- Achieved a measurable +2% accuracy improvement in small-object detection benchmarks

### Mobile Backend Developer (Part-Time)

THY Technology

Dec 2022 — Mar 2024

Istanbul, TR

- Contributed to the backend of the Turkish Airlines mobile app, used by millions of passengers worldwide
- Developed and maintained backend services in *Java Spring* and *Maven*, with REST API integrations
- Worked with Amazon logging systems (*Opensearch*, *Graylog*) to monitor and troubleshoot production issues
- Fixed numerous bugs and critical errors impacting the mobile application in live environments

## EXTRACURRICULAR ACTIVITIES

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### Airbenders UAV Team - Software Team Member

Oct 2021 — Jun 2023

- Served as a core member of the software team, participating twice in the international SUAS UAV competition
- Designed and trained object detection models (*YOLOv5*), creating a synthetic dataset of 15,000 aerial images and achieving 95% detection accuracy
- Developed obstacle avoidance, mapping, and communication modules with *ROS* and *C++*
- Deployed algorithms in real-time UAV systems, contributing to the team's 7 international ranking among 70 teams

## ACCOMPLISHMENTS

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- Ranked 224th among 2.5 million students in the university exam of Turkey
- Ranked 7th among 70 teams at SUAS International Drone Competition with Airbenders UAV Team

## SKILLS

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- **Programming Languages:** Python, Java, C/C++, JavaScript, Dart
- **AI/ML:** Deep Learning, Computer Vision, Semantic Segmentation, Multimodal Sensor Fusion, Object Detection (*YOLO*), LLMs, Wake-Word Detection
- **Frameworks & Tools:** PyTorch, ROS, EspHome, Pipecat, Flutter, ESPHome, REST APIs, Maven, Git, JIRA
- **Cloud & Systems:** Linux/Unix, Home Assistant, Amazon Opensearch, Graylog, WebSocket/WebRTC