

MUHAMMET EMİN AYHAN

AI & Robotics Engineer · Perception, Navigation & Robot Learning

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SUMMARY

Computer engineer (Selçuk University, 2026) building perception, navigation and learning systems for robots and UAVs: vision-language-action fine-tuning (SmolVLA / LeRobot), GPS-denied localization (neural dead reckoning, visual odometry, Kalman / EKF), real-time detection and ROS 2 autonomy on NVIDIA Jetson, measured on held-out data and shipped as Docker / CUDA services, ROS 2 nodes and REST APIs. **TEKNOFEST 2026 AI in Aviation finalist**; available immediately.

CORE SKILLS

Languages: Python, C++, Java, Dart, Swift, C#, SQL

Robotics & Autonomy: ROS 2 Humble, Nav2, SLAM (slam_toolbox), robot_localization, Gazebo, MuJoCo, Jetson Orin, STM32

Navigation & Estimation: Kalman / EKF, sensor fusion, visual odometry (RAFT optical flow, homography), neural dead reckoning

Machine Learning: PyTorch, VLA fine-tuning (SmolVLA, LoRA), imitation learning, LSTM / GRU / TCN, scikit-learn, XGBoost

Computer Vision: YOLO11 / YOLOv8, pose estimation, ByteTrack, EasyOCR / ALPR, SAHI, DINOv3, OpenCV

Engineering & Tools: Docker (CUDA), TorchScript, Flask REST, Git, Linux; Spring Boot, PostgreSQL, Flutter

EXPERIENCE

Backend Developer Intern (Java Spring Boot)

Summer 2026

Enoca Bilişim — Konya, Türkiye

- Built Spring Boot REST APIs (Controller–Service–Repository, PostgreSQL / JPA) with Keycloak role-based access control.

AI / ML Engineer Intern

Jan 2026 – May 2026

AAD Bilişim ve Danışmanlık — İstanbul, Türkiye

- Developed Kalman / EKF state estimation on IMU data for position and velocity in GPS-denied conditions; validated in simulation.
- Built Python data-processing and ML prototyping pipelines for decision-support systems.

KEY PROJECTS

Teaching Cost Curve — Robot Learning with Vision-Language-Action Models

Independent research · 2026

- LoRA fine-tuned SmolVLA (450M, 0.66% of weights trained) on unseen LIBERO manipulation tasks on a single 8 GB GPU: success rose from **0% to 66.7% with only 5 demonstrations** (76.3% with 40; 300 episodes per point, Wilson 95% CIs).
- Showed that teaching a new task erases the old one (38% → 0%); fully reproducible pipeline guarded by invariant tests.

Aerial AI — GPS-Free Visual Odometry from UAV Imagery

TEKNOFEST 2026 AI in Aviation · Finalist

- Owned the GPS-free positioning task (40% of the score): RAFT optical flow + homography with a keyframe ladder; **3.54 m mean error** over a full 2,256-frame rehearsal, 14× below the hold-position baseline.
- Built a three-flight acceptance gate (incl. thermal) against overfitting; a quality-gate fix cut thermal error by 31%.

GPS-Denied UAV Localization — Neural Dead Reckoning

Independent project · 2026

- LSTM on 19 GPS-free sensor channels predicts per-second displacement: **44.4 m mean error after 4.5 min without GPS**, ~38× better than classical dead reckoning, ≈1 ms CPU inference (TorchScript).
- Found and removed a hidden GPS leak (GPS-fused yaw) in the inputs; barometer fusion cut vertical error by 45%.

Roadside Driver-Behaviour Analytics

TEKNOFEST 2026 5G & Smart Road Safety

- YOLO11 detection & tracking, license-plate recognition (EasyOCR + voting) and pose-geometry driver-action detection from night-time windshield video; **precision 1.00 with zero false positives**; offline Docker / CUDA 12.1 service.

PATHIKA — Autonomous Ground Vehicle

TEKNOFEST 2026 Unmanned Ground Vehicle

- ROS 2 Humble on Jetson Orin NX: owned SLAM, slalom planner, control and FSM mission manager; Nav2, EKF, Gazebo, STM32 e-stop.

MACHINOVA — ML-Based CFRP Surface-Roughness Prediction

TUSAŞ Lift Up · Graduation project

- Five regressors on a Taguchi L9 design + ANOVA; RSM model **CV R² = 0.978** (RMSE 0.012 µm); desktop app, .exe and REST API.

EDUCATION & TRAINING

B.Sc. in Computer Engineering — Selçuk University, Konya

2022 – 2026 · GPA 3.56 / 4.00

Artificial Intelligence Specialization Program — National Technology Academy

Dec 2025 – Present

Autonomous Driving Technologies Specialization — National Technology Academy

Sep 2024 – May 2025

HONORS & COMPETITIONS

TEKNOFEST AI in Aviation

Finalist · 2026

BTK Academy Hackathon

Finalist · 2026

TEKNOFEST Air Defense Systems

Finalist · 2025

TEKNOFEST × Hepsiburada AI Hackathon

Finalist · 2025

INGHub Churn Prediction Datathon

Finalist · 2025

TEKNOFEST Flying Car Simulation

6th place · 2024

CERTIFICATIONS & LANGUAGES

Certifications: Deep Learning for Image Processing; Deep Learning for Natural Language Processing (BTK Academy)

Languages: Turkish (Native) · English (B2)