MUSTAFA ALTUNTAS

Robotics Software Engineer · ROS2 | Embedded Systems | Computer Vision
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SUMMARY

Robotics software engineer (M.Sc. in progress, GPA 3.50/4.00) who builds the full vertical slice: ROS2/MoveIt2 motion stacks on top of bare-metal STM32 CAN firmware. Currently developing an autonomous modular robotic arm with hot-swappable joints and runtime kinematic reconfiguration. Under contract to a cobot welding integrator I own a CAD-to-robot weld path system running on a real Dobot CR10A — own IK solver, clearance model, ICP part alignment and operator HMI — and co-built a grounded-AI engineering platform in a two-person team. Fluent English, fully remote-ready, European time zone.

CORE SKILLS

Robotics: ROS2 (Humble), MoveIt2, Gazebo, RViz, URDF/xacro, TF2, forward & inverse kinematics, trajectory planning, FANUC

Embedded: STM32, bare-metal C, CAN bus, UART/SPI/I2C, real-time firmware, PID control, IMU sensor fusion, BLDC motor control

Vision & AI: Python, OpenCV, image preprocessing & feature extraction, LLM tool-calling, RAG, hybrid retrieval, vector search (pgvector)

Backend: FastAPI, REST APIs, PostgreSQL, Docker, Redis, C# / .NET Core Web API, React / Next.js, Firebase, Supabase

Control & V&V: State-space, LQR, Luenberger observers, root-locus, MATLAB/Simulink; V-model, requirements-based testing, HIL test design, MC/DC coverage

Tools: Git, Linux/Ubuntu, WSL2, SolidWorks, Ansys FEA, Jira, Agile

EXPERIENCE

Robotics Software Engineer (Contract) | Klug Robotics / Sumato Endüstri Mühendislik A.Ş., Istanbul | *Jul 2026 – Present*

- Built a CAD-driven weld path generation system for a Dobot CR10A cobot from a one-line brief and no reference implementation — STEP parsing, concave-edge seam detection, joint-type classification (fillet/butt/lap), oriented 3D waypoint generation, and execution on the real arm. 36k lines of source across 13 planned phases; phases 1-6 complete.
- Wrote a closed-form inverse kinematics solver for the CR10A and a body-clearance model whose link capsules are measured off the robot's own mesh rather than estimated — correcting a driver constant that was demonstrably wrong and a prior model that drew the upper arm 613 mm oversized.
- Recovered true part pose from a depth camera via ICP registration and corrected the CAD-derived weld path to the part as actually placed; added a placement sweep that answers where a part can stand as a band of valid positions, not a single verdict.
- First real-robot run Jul 2026: connected, enabled and drove a full path under motion. A mid-run singularity stop became a pre-flight singularity check. 1,724 tests pass against a fake controller written so the driver could be developed without hardware; weld current, voltage and travel speed ship explicitly flagged unverified with welding disabled by default until a certified welder signs them off.
- In a two-person team, co-built a retrieval-grounded engineering feasibility platform: FastAPI + PostgreSQL/pgvector hybrid retrieval, 46-table schema, 7-stage pipeline, LLM tool-calling into deterministic Python functions so figures are computed not generated — mypy --strict clean, 2,351 tests at 88% coverage, and a blind eval harness published with the criteria it failed.

Mechanical & Automation Engineer | BYRSAN Makina San. ve Tic. Ltd. Şti., Istanbul | *Aug 2025 – Apr 2026*

- Developed the PLC/HMI control interface for a packaging machine, from I/O mapping through operator screen design.
- Performed DIN-compliant structural calculations and SolidWorks FEA for overhead crane systems; identified failure modes and closed them through iterative root-cause analysis.
- Built the company's digital infrastructure end to end: corporate website, automated lead pipelines and a deployed React + Firebase quote-management system.

Engineering Intern — Robotics & .NET | Tezmaksan Makina San. ve Tic. A.Ş., Istanbul | *Feb 2025 – May 2025*

- Programmed FANUC industrial robots and supported robotic cell integration, bring-up and validation on a production floor.
- Built .NET Core Web API dashboards for real-time machine monitoring and industrial IoT data pipelines.

SELECTED PROJECTS

Autonomous Modular Robotic Arm — M.Sc. Thesis. Hot-swappable joint modules with dynamic URDF and kinematic reconfiguration at runtime; ROS2 + MoveIt2 pipeline operational in RViz, distributed control over bare-metal STM32 CAN.

EDUCATION

M.Sc. Mechatronics Engineering (in progress) — Yıldız Technical University, Istanbul · GPA 3.50 / 4.00 · Feb 2026 – Present

B.Sc. Mechatronics Engineering — Pamukkale University, Denizli · GPA 3.11 / 4.00 · 2021 – 2025

LANGUAGES & CERTIFICATIONS

Languages: Turkish (Native) · English (C1 — full professional working proficiency) · German (A2 — basic)

Certifications: UAV Pilot Licence İHA-1, SHGM (TR-IHA1H7554223) · ASP.NET Core Web API (.NET 8), Udemy 2025