Osama Altalmas

Robotics & Embedded Systems Engineer · ROS 2 · Navigation · Manipulation · Motion Planning · Perception

Ingolstadt, Germany | osama-altalmas.com | *Available now, open to relocation within Germany* | *Driver's license B (expected Jan 2027)*

PROFILE

Robotics & embedded systems engineer specialized in autonomous mobile robots and manipulators, taking robot behavior from algorithm to a tested, safety-aware system in ROS 2 with C++ and Python. Built a complete warehouse AMR independently: custom C++ Nav2 planner and controller plugins, AI-based docking to 3–7 mm, YOLO obstacle recognition and an ISO 3691-4-oriented safety layer verified by fault injection. Also developed a UR5e sorting cell with own inverse kinematics and published research on improved RRT planning for manipulators. M.Sc. Robotics & AI (ranked 1st); two embedded-systems internships add hands-on experience with firmware, sensors and real hardware.

ROBOTICS PROJECTS

Autonomous Warehouse Tugger AMR

Mar 2026 – present

- Designed an AMR that drives a route network, docks under cargo, lifts and delivers; car-like, crab and turn-in-place steering.
- Wrote custom Nav2 plugins in C++: RRT* planner with Reeds-Shepp curves, bidirectional planner, curvature-tracking controller.
- Reached 3.0–6.6 mm docking error (target 10 mm / 1°) with a YOLO11 floor-marker model (0 wrong stations on 401 held-out synthetic markers).
- Trained YOLO11 models: marker reader on damaged AprilTags (worn, dirty, covered), obstacle detector on Gazebo + real photos.
- Fail-closed safety layer per ISO 3691-4 (protective/warning fields, latching e-stop, stale-sensor stop), fault-injection tested.

Robotic Sorting Cell with Safety Fence

2026

- Built a UR5e conveyor sorting cell with suction pick-and-place.
- OpenCV HSV detection plus camera-ray / conveyor-plane intersection gives world-frame box poses.
- Own numerical IK (least-squares on URDF kinematics) drives the arm.
- Door-sensor safety with pause, reset and e-stop states.

Improved RRT Path Planning – Master's Thesis

2024 – 2025

- RRT variant with goal-biased sampling, optimized parent selection and Bézier smoothing.
- 73.5 % less computation time and 67.9 % fewer iterations than RRT* over 50 runs.
- Simulated on an OpenManipulator-X model.

WORK EXPERIENCE

Embedded Systems & IoT Engineer (Internship)

Jan 2026 – Feb 2026

FreshNow · Dubai, UAE

- Established the company's Embedded/IoT department as its first engineer; presented progress to management and investors.
- Led a four-engineer team (mechanical, software, networking) to a working smart-fridge tray prototype in two months.
- Built the ESP32-S3 sensing system: load cells cross-checked by limit switches, later 5 laser ToF sensors on separate I^2C buses.
- Per-sensor calibration in flash and temperature alerts.
- Defined the device–backend Wi-Fi protocol and heartbeat.
- Did the wiring, soldering, testing and installation; designed the system PCB in EasyEDA.

Embedded Hardware & Firmware Engineer (Internship)

Sep 2025 – Dec 2025

Infinix Innovations · Dubai, UAE

- Developed four interactive exhibition installations with Arduino/ESP32-S3 firmware, sensors, motors and RFID.
- An Arduino master coordinated several MCUs, linked to PCs over Serial and Ethernet UDP.
- Built and commissioned an encoder-tracked rotating wheel that triggers LED video-wall content via Resolume Arena.
- On-site standby engineer for the week-long exhibition.

EDUCATION & PUBLICATION

M.Sc. Robotic Technologies & Artificial Intelligence

Aug 2023 – May 2025

Bahçeşehir University, Istanbul, Türkiye · Ranked 1st, grade 1.1 (German scale)

- Master's thesis publication: Altalmas, O., & Bahceci, B. (2025). Obstacle Avoidance Path Planning for Industrial Robotic Manipulators Using Improved RRT with Bézier and Linear Interpolations. ICENSTED 2025, pp. 523–534.

B.Sc. Mechatronics Engineering

Sep 2019 – Jul 2023

Bahçeşehir University, Istanbul, Türkiye

- Bachelor's thesis: two-wheel self-balancing robot; modeled the inverted pendulum in Simscape and tuned PID control on the real robot.

SKILLS & LANGUAGES

Programming & Tools: C++ (17), Python, MATLAB/Simulink; Linux, Git/GitHub, GitHub Actions, colcon, pytest
ROS 2 & Navigation: ROS 2, Nav2 plugin development, ros2_control, AMCL, SLAM, TF2, RViz, Gazebo Sim
Planning & Control: RRT / RRT*, Reeds-Shepp, path tracking, kinematics and IK, PID
Perception & AI: YOLO11 (Ultralytics) detection and pose, OpenCV, synthetic data generation, GPU training (Kaggle/Colab)
Hardware: ESP32-S3, sensors and encoders, SolidWorks
Languages: Arabic (C2, native), English (C2), Turkish (B2), German (A2, actively learning)