

Abdullah Erzin

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SUMMARY

Computer Vision Engineer with 5+ years of experience developing and deploying real-time perception systems for autonomous robotics, industrial automation, and edge AI. Specialized in 3D vision, camera calibration, object detection, sensor fusion, and performance optimization on resource-constrained hardware. Experienced in delivering end-to-end vision pipelines in Python and C++, from algorithm development to field deployment across five countries.

EXPERIENCE

Computer Vision Engineer

Pek Automotive

April 2025 - Present, Logatec, Slovenia

- Redesigned and automated robotic camera-to-arm calibration, reducing calibration time by over 80% (90+ to ~15 minutes) and achieving 5 mm maximum positioning error against a 10 mm production tolerance, validated through months of in-house testing and external field trials. Enabled non-engineering operators to independently calibrate and validate the system through automated quality checks and real-time UI feedback.
- Developed a fruit-tracking and cluster-aware picking algorithm for autonomous harvesting robots, enabling robotic arms to harvest tightly grouped fruit previously unsupported by the system. Implemented fruit identification, picking-order optimization, and re-identification to coordinate multi-arm operations and avoid duplicate picking attempts.
- Led computer vision integration, testing, and field validation for autonomous apple and orange harvesting robots deployed across five countries, resolving perception and picking-related issues to support real-world harvesting operations.
- Improved Intel RealSense D435 depth accuracy by replacing peak-based depth with a histogram front-surface search and fruit pixel masking, reducing systematic overestimation from fruit geometry and foliage; also corrected perspective-projection bias in fruit diameter estimation.
- Developed an adaptive camera exposure-control algorithm to address sunlight-induced degradation in outdoor fruit detection and depth sensing, overcoming limitations of the camera's built-in auto-exposure and improving perception reliability under changing illumination.
- Built a semi-automated annotation and model retraining pipeline using 700 GB of field recordings, improving YOLO instance segmentation across different fruit varieties, lighting conditions, and occluded clusters while reducing false-positive detections.
- Improved robotics development and deployment workflows by building remote software update capabilities, simulation and field-log replay tools, and automated Linux system provisioning, enabling hardware-independent testing and easier maintenance of deployed robots.

Computer Vision Engineer

Robsys Robotic Systems

March 2024 - March 2025, Istanbul, Turkey

- Led end-to-end software development of an autonomous solar panel cleaning and inspection robot from concept to a fully functional prototype, successfully demonstrated at industry exhibitions.
- Engineered a custom NumPy-based SLAM system combining IMU, wheel odometry, stereo depth, and AI-detected panel keypoints for real-time localization and grid mapping, using panel-edge landmarks to correct positional drift without preloaded maps.
- Developed an A*-based navigation system classifying humans, physical obstacles, and gaps, enabling automatic safety stops, dynamic obstacle mapping, route recalculation in under 50 ms, and autonomous traversal of panel gaps up to 30 cm.
- Developed a real-time perception pipeline on NVIDIA Jetson Orin, processing stereo and thermal camera streams at 30 FPS each. Applied homography-based alignment and thermal anomaly detection to identify potential solar panel defects and map their locations.
- Designed bidirectional robot communication protocols and integrated live video streaming, real-time map visualization, telemetry, and remote control into a mobile application for operational monitoring and safety.

Computer Vision Engineer

Doğru Holding (DGR Project)

December 2022 - December 2023, Istanbul, Turkey

- Engineered a real-time face recognition system on NVIDIA Jetson Nano, achieving 98% recognition accuracy and a 30% reduction in false positives according to customer-reported testing results, with face embeddings stored in just 4 KB per identity.
- Built a stereo-camera liveness detection module from scratch: extracted per-keypoint facial depth profiles, collected a labeled real vs. spoofed dataset, and trained a lightweight TensorFlow model to reject spoofing attempts.
- Implemented performance-critical components in C++ and exposed them to the Python pipeline as native extensions to run in real time on constrained hardware.
- Optimized a YOLO-based video anonymization pipeline to sustain 30 FPS with under 30 ms per-frame processing latency, enabling real-time privacy-preserving security camera streaming.

Machine Vision Engineer

Gensys Automation & Machine Vision

December 2021 - December 2022, Kocaeli, Turkey

- Developed and deployed industrial machine vision applications using HALCON, C#, and MSSQL, integrating automated inspection workflows into desktop software and commissioning systems on-site.
- Led a TÜBİTAK-funded thermal non-destructive testing (NDT) research project, combining analytical heat diffusion modeling, thermal imaging, and a custom desktop application to estimate subsurface defect depth in PLA components.

Machine Vision Intern

Mavis Machine Vision

July 2020 - March 2021, Kocaeli, Turkey

- Developed proof-of-concept machine vision applications using HALCON, C#, and SQL, including an OpenCV-based implementation to evaluate alternative image processing approaches.
- Participated in 3 industrial site visits, gaining practical exposure to camera, lens, and lighting configurations and production-line inspection systems for defect detection, QR code reading, OK/NG inspection, and automated counting.

PROJECT

Edge AI-Powered AR Photo Booth & Kiosk Management Platform

Side Project

- Developed CPU-based multi-face detection and tracking for up to 8 simultaneous faces, powering 30+ interactive WebGL/Three.js AR effects on GPU-less Raspberry Pi kiosks.
- Architected a distributed kiosk management platform supporting 3 active test devices across multiple locations, using load-balanced Node.js services, Redis coordination, PostgreSQL storage, and centralized device licensing, configuration, and health monitoring.
- Architected an autonomous multi-agent development workflow with automated task delegation and reusable agent skills, coordinating AI-driven implementation across computer vision, backend, and infrastructure.
- Integrated fal.ai generative image services with subscription validation, per-device usage quotas, and distributed rate limiting to control API consumption and operational costs.
- Built automated CI/CD and observability infrastructure using GitHub Actions, multi-architecture Docker, Watchtower, Prometheus, and Grafana, reducing Docker image size by 60% while enabling remote updates and infrastructure monitoring.

EDUCATION

B.Sc. in Mechatronics Engineering

Marmara University • Istanbul, Turkey • 2021

SKILLS

Programming: Python, C++, C#, JavaScript, SQL

Computer Vision & 3D Geometry: OpenCV, YOLO, HALCON, camera calibration, stereo vision, depth estimation, 3D coordinate transformations, quaternions, object detection, instance segmentation, multi-object tracking

Robotics & Perception: SLAM, sensor fusion, autonomous navigation, path planning, obstacle detection and classification, robotic arm calibration

Deep Learning & Optimization: PyTorch, TensorFlow, MediaPipe, NumPy, TensorRT, ONNX Runtime, CUDA, model deployment, inference optimization

Edge AI & Embedded: NVIDIA Jetson, Intel RealSense, Raspberry Pi, Linux, UART

Infrastructure & Deployment: Docker, Git, GitHub Actions, CI/CD, Prometheus, Grafana