KAAN KIRŞAN

Robotics & Automation Engineer · Eskişehir, Turkey
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SUMMARY

Electrical and Electronics Engineer with 5 years of experience in industrial automation, robotics, system integration, and embedded systems development. Specialized in computer vision, motor control systems, PLC/HMI programming, and safety-critical equipment design. Proven track record of delivering complex engineering solutions with measurable results across multiple concurrent projects.

SKILLS

Programming Languages: Python, C#, C/C++, Dart, JavaScript, HTML/CSS, Bash, PowerShell.
Robotics & Embedded: ROS 2, NVIDIA Jetson (Nano/Orin), STM32, ESP32, Raspberry Pi, OAK-D Depth Cameras.
Computer Vision & AI: OpenCV, YOLOv5/v8, SLAM, Object Detection, AI Agent Development, Claude Code, Cursor, GitHub Copilot.
Industrial Automation: PLC (Delta DVP, Siemens S7-1200/1500, Fatek, Omron), HMI (Delta, Siemens, Fatek, Omron), SCADA (WinCC), Servo Drives (Delta, Veichi, Panasonic), AC Motor Drives, PID Control.
Industrial Communication: RS232/485, Modbus RTU/TCP, Profinet, TCP/IP, UDP.
Electrical Engineering: Electrical schematics (EPLAN), BoM preparation, control panel design, soldering, wiring, prototyping, testing, troubleshooting, diagnostics.
Software & Frameworks: Flutter, TIA Portal, WinCC Unified, Asda Soft, VCSDSoft, Git/GitHub, Docker, VS Code, Linux CLI.
IoT & Web: Local/Cloud server deployment, REST APIs, Website development, Email system integration, SSL/TLS, VPN, Remote connections.
Hardware & Prototyping: 3D Printing, Battery Management Systems (BMS), Load Cells, Pressure Transducers, LVDT Sensors, Thermocouples, PT100, Industrial Sensors.

PROFESSIONAL EXPERIENCE

Robotics & Automation Engineer — Sep 2020 – Present

Doka Mühendislik, Eskişehir, Turkey

- Developed autonomous solar panel cleaning robot achieving 85% autonomy using Jetson Orin Nano, OpenCV, YOLO, and SLAM for real-time navigation, obstacle detection, and human-following capabilities.
- Led laser welding robot cell integration with precision positioner system, achieving 40% production efficiency improvement through multi-axis servo control, PID tuning, and comprehensive PLC/HMI architecture.
- Designed and deployed jet fuel test unit with 0.0001 L/min flow and 0.01 bar pressure precision using Siemens PLC, WinCC Unified HMI, and explosion-proof certified components.
- Executed train wagon durability test system with hydraulic power units, load cell integration, and 50+ automated test scenarios ensuring regulatory compliance.
- Implemented conveyor automation systems across three facilities, configuring 500+ I/O points and Modbus communication for 20 AC drives, doubling workforce efficiency.
- Developed mobile solar energy container with cross-platform Flutter application, enabling real-time PLC monitoring via Modbus TCP, hydraulic valve control, and weather data integration.
- Designed dual-axis target motion system for seeker warhead testing with Excel-integrated movement profiles, WinCC SCADA, and servo motor control.
- Built resistance automation systems for military and industrial applications with $\pm$1% tolerance PID control, reducing energy consumption by 20%.
- Managed energy storage system design including lithium battery packs, Smart BMS integration with RS-485 communication, SOC/SOH telemetry, and cell balancing.
- Conducted AS/RS system revisions for industrial clients, optimizing cycle times through PLC logic improvements and HMI interface enhancements.
- Deployed and maintained 5+ web servers for industrial data visualization, company website (99% uptime over 5 years), and custom email systems.

- Launched Google Ads campaigns resulting in 100% increase in machine sales.
- Delivered technical presentations at 3+ industry exhibitions, established supplier agreements, and provided PLC programming training to university students.

PROJECTS

Autonomous Solar Panel Cleaning Robot

- Architected robotics solution featuring autonomous navigation with real-time obstacle detection and avoidance using depth cameras and SLAM algorithms.
- Implemented computer vision pipeline for solar panel detection, achieving 95%+ accuracy using YOLO with depth camera.
- Created PC-to-PLC control interface for seamless industrial equipment adaptation including sensors and motor drives.
- Designed mobile application for real-time telemetry monitoring, mission planning, and remote robot control with cloud integration.
- Designed battery system with RS-485-capable Smart BMS, enabling real-time SoC monitoring through the robot UI.
- Achieved autonomous operation with human-following capability and environment mapping.
- Technologies: Jetson Nano (SBC), Python, OpenCV, YOLO, SLAM, RS-485, TCP/IP, UDP, Flutter, OAK-D S2, Linux, Git, PLC, VPN, Depth Camera.

ABB Welding Robot Integration

- Implemented end-to-end integration of collaborative ABB robot with precision positioner system using Veichi servo drive and servo motor.
- Designed dry-relay communication interface between positioner and welding robot.
- Implemented real-time position feedback control loops with PID tuning, safety interlocks, and comprehensive HMI with operator controls and alarm logging system.
- Developed predictive maintenance algorithms monitoring servo performance with auto-tuning capabilities, reducing unplanned downtime by 35% and extending equipment lifecycle.
- Technologies: PLC, HMI, Siemens S7-1200, Profinet, Veichi SD700 Servo Motor and Drive, TIA Portal, Modbus, RS-485.

Mobile Solar Energy Container

- Developed comprehensive cross-platform UI application using Flutter that communicates directly with PLC controllers via Modbus TCP protocol.
- Integrated multi-sensor data acquisition system (pressure transducers, LVDT sensors) with real-time processing and automated decision-making algorithms.
- Developed full production reporting system with statistical analysis, trend visualization, and automated alerts for out-of-specification results.
- The application provides real-time monitoring of all system parameters, remote control of hydraulic valves with adjustable speed, emergency management, weather data integration, and comprehensive analytics dashboard accessible from smartphones and tablets.
- Technologies: Python, C#, Flutter, Dart, Industrial Networks, Cloud API, Sensor Integration, Wireless Ethernet, Historical Trends, Report Generation, AC Motor Driver.

Jet Fuel Test Unit

- Implemented web and local UI using WinCC Unified HMI that communicates directly with Siemens PLC via Profinet protocol.
- Integrated multiple high-precision sensors to measure jet fuel flow and pressure.
- Developed PID controls to regulate fuel flow and pressure using proportional valves, achieving 0.0001 L/min and 0.01 bar precision.
- Implemented fire risk detection and protection systems. All sensors and control panels are explosion-proof certified.
- Technologies: Unimass Flow Sensor, Proportional Valves, TIA Portal, WinCC Unified, Industrial Networks, Sensor Integration, Wireless Ethernet, Historical Trends, Documentation.

Train Wagon Durability Testing System

- Executed comprehensive train wagon durability test system with hydraulic power units, multi-sensor integration including load cell modules, and safety-critical validation protocols.
- Implemented load testing scenarios covering 50+ different conditions with automated data collection and analysis.
- Ensured regulatory compliance through comprehensive safety protocols and documentation traceability.
- Technologies: Delta PLC, Delta HMI, Hydraulic Systems, Load Cell, Sensor Integration, Safety Logic, Testing Methodologies.

Conveyor Automation Systems

- Designed and implemented conveyor automation systems across three different facilities.
- Configured over 500 I/O points including sensors and buttons for sequential product conveying with synchronized operation.
- Built Modbus communication network for controlling AC drives operating 20 conveyors.
- Completed end-to-end implementation including conveyor wiring, control panel design, and internal panel wiring.
- Achieved significant reduction in processing time and doubled workforce efficiency.
- Technologies: Fatek PLC, Fatek HMI, Veichi AC Drives, Omron Sensors, Modbus RTU.

Target System for Seeker Warhead Testing

- Designed an Excel-integrated system where the PLC and WinCC SCADA read movement profile variables from Excel and execute accordingly.
- Implemented scripts for data visualization in Excel and data acquisition from TIA Portal.
- Built a dual-axis motion system that executes predefined movements based on Excel data using two servo motors.
- System includes emergency safety measures with limit switches and software limits for system protection.
- Technologies: Siemens PLC, WinCC SCADA, Veichi Servo Motor Drives, Sick Sensors, Profinet.

Website Development and Maintenance

- Designed company website achieving 100+ monthly visits.
- Deployed custom email server using company domain.
- Created content strategy and UI elements for the website.
- Implemented subdomains for project demos with SSL certification.
- Planned regular updates for performance optimization and SEO improvements.
- Maintained 99% uptime and accessibility over 5 years.
- Launched Google Ads campaigns for specific machines, resulting in 100% increase in sales.
- Technologies: SEO, Canva, cPanel, HTML, JavaScript, Hosting, Linux Server, Cloudflare.

Resistance Automation and Power Systems

- Designed advanced PID algorithms for military projects maintaining precise resistance values within $\pm 1\%$ tolerance, ensuring consistent temperature and energy efficiency.
- Designed resistance systems for rubber processing machines requiring high power demand. Optimized control strategies reduced energy consumption by up to 20% compared to manual control while maintaining process quality.
- Implemented durable systems for harsh environments using fire-resistant wires and safety equipment for fire prevention.
- Technologies: Thermocouple, Thermal Sensors, PT100, Contactors.

System Revisions and Maintenance

- Demonstrated strong problem-solving skills using diagnostic tools on hydraulic machines over the years.
- Analyzed and resolved wiring faults, sensor failures, and programming errors throughout 5 years of experience.

- Recovered faulty machines by replacing outdated PLCs, HMIs, and disorganized wiring with improved components and rebuilt programs from scratch.
- Proficient with oscilloscope, multimeter, and related diagnostic tools for troubleshooting and testing.
- Technologies: Multimeter, Oscilloscope, PLC Programming Interface.

Web Server Installation and Configuration

- Successfully deployed and configured 5+ web servers.
- Built reliable hosting infrastructure for critical business applications including on-site data visualization for specific machines.
- Implemented cost-effective data storage solutions for prototype machines with secure local server access for file and project backups.
- Configured port forwarding for external network access to servers.
- Technologies: Ubuntu Server, CasaOS, Docker, Monitoring Tools, SSL/TLS.

Industrial Exhibitions, Presentations, and Training

- Participated in 3+ industry exhibitions showcasing developed machines, establishing supplier agreements and acquiring new customers.
- Delivered technical presentations on machines and robots to end customers and engineers.
- Participated in multicultural group training sessions across different countries and delivered international presentations.
- Provided PLC programming training to university student groups.

AI-Powered Automation Solutions

- Proficient in AI-assisted development tools including Claude Code, Cursor, and GitHub Copilot for accelerated prototyping.
- Experienced with CLI-based AI coding tools and parallel task delegation using AI agents for rapid development workflows.
- Developed automated systems utilizing AI APIs for autonomous prompt execution without human intervention.

Personal Projects

- Designed and built 500W electric bike capable of 30 km/h with 45 km range.
- Developed home automation systems using ESP32 and various IoT modules.
- Created AI-powered automated social media content generation system.
- Built personal NAS device for centralized data storage.
- Various 3D printing projects for prototyping and personal use.

EDUCATION

Bachelor of Science in Electrical-Electronics Engineering

Eskişehir Osmangazi University, Turkey

Gained international experience through Erasmus programs in Latvia, Poland, and Lithuania. Active participant in university UAV team, contributing to unmanned aerial vehicle projects. Developed strong foundation in electrical engineering, embedded systems, control theory, and industrial automation while building cross-cultural collaboration skills through international academic exchanges.

ADDITIONAL INFORMATION

Languages: Turkish (Native), English (Advanced - Technical Communication, International Projects).
International Experience: Erasmus Programs (Latvia, Poland, Lithuania), University UAV Team, Multilingual Technical Documentation.