Mario Tilocca

Mechatronics & Electrical Engineer

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Summary

As a proactive Mechatronics & Electrical Engineer with a proven track record in advanced control systems, IoT solutions, and power electronics, I specialize in control systems, renewable energy, autonomous driving, and industrial automation. My expertise includes Battery Energy Storage Systems (BESS), AI-driven control algorithms, embedded systems, and IoT integration, with hands-on experience in deploying cross-platform solutions using Modbus, CAN, MQTT, and TCP/IP protocols. I have successfully led teams in implementing cutting-edge technologies, including EV systems and autonomous vehicles, and excel in working within fast-paced, multilingual environments.

Technical Skills

Control Systems & Optimization: BESS, SCADA, HIL/SIL Testing, System Integration, Industrial Controllers, PLCs, Energy Management, PID Controllers, Vehicle Dynamics, Power Electronics, Advanced Control Algorithms (Model Predictive Control, State-Space Control, Adaptive Control)

Messaging Systems: Modbus, CAN, MQTT, Profibus

Programming Languages: Python, C++, MATLAB, SQL, Bash, Lua, Docker, Docker-compose

Artificial Intelligence & Machine Learning: TensorFlow, PyTorch, Keras, Neural Networks, CNNs, RNNs, LSTM, Scikit-learn, XGBoost, Regression Analysis, NLP, Deep Learning

Robotics & IoT: IoT Solutions, Embedded Systems, Sensor Fusion, Autonomous Systems, ROS, Microcontrollers, GNSS Positioning, DC-DC Converters, AC-DC Converters

Networking & Messaging Protocols: TCP/IP, SSH, Firewall Configuration, Ethernet, Wireless Networks, CAN J1939

Software Development & Simulation: Embedded Linux, Software Architecture, Software Coding, MATLAB & Simulink

DevOps Tools & Cloud Services: Jenkins, GitHub Actions, Terraform, AWS, Docker Swarm, Kubernetes, CI/CD Pipelines, Infrastructure as Code (IaC)

Version Control: Git, GitHub, Bitbucket

Project Management Tools: Agile, Scrum, Jira, Confluence

Data Science & Analytics: Pandas, NumPy, Matplotlib, Data Visualization, Feature Engineering, Statistical Analysis

Troubleshooting: Machinery, Electronics, Software, API Design and Development

Operating Systems: Linux, Windows, macOS

Experience

Software Engineer Aug 2023 – Aug 2024
Eco-Stor AS *Oslo, Norway*

- Designed IoT-enabled energy management software for BESS systems using EV second-life batteries.
- Developed communication protocols (Modbus, CAN, MQTT) for industrial controllers, ensuring seamless integration.
- Created custom Wi-Fi and TCP/IP networks for secure data transmission in industrial environments.
- Led deployment and validation of solutions in real-world customer pilot projects.

System Integration Engineer & Acting Team Leader Apr 2023 – Nov 2023
Eco-Stor AS *Oslo, Norway*

- Led the System Integration team during a key transition, ensuring smooth collaboration between software and hardware teams.
- Conducted Factory Acceptance Tests (FAT) and deployed BESS systems at customer sites.
- Served as the primary contact for system integration issues, facilitating cross-functional teamwork.

Technical Consultant & Site Lead Oct 2022 – Apr 2023
Combine Control Systems AB *Göteborg, Sweden*

- Sole technical consultant on-site, managing relations with upper management and stakeholders.
- Led testing of cutting-edge embedded systems and integrated them with cloud-based and mobile applications for cross-platform compatibility.
- Used CAN bus troubleshooting tools for advanced diagnostics and system testing.
- Developed control systems for marine industry projects using React and TypeScript for app development.
- Set up HIL systems connected to diving equipment via Bluetooth for real-time testing.

Automation Engineer Nov 2021 – Jul 2022
Kindhelm *Helsinki, Finland*

- Developed control systems for self driving heavy-duty vehicles using GNSS positioning and CAN-J1939 protocol.
- Contributed to Vehicle Dynamics Modeling and implemented HIL & SIL architecture for control system development.

Projects

Professional Projects

IoT-Enabled BESS Software Development 2023
Eco-Stor AS *Oslo, Norway*

- Developed and tested an energy management solution for BESS using second-life EV batteries.
- Led the deployment and integration of these solutions in real-world industrial settings.

HIL & SIL Control Systems for Heavy Duty Vehicles 2022
Kindhelm *Helsinki, Finland*

- Implemented HIL/SIL architecture for control systems using GNSS positioning and CAN protocols.
- Developed and tested autonomous control solutions for heavy-duty vehicles.

Marine Industry Control System Development 2023
Combine Control Systems AB *Göteborg, Sweden*

- Developed control systems for marine projects, integrating embedded systems with cloud-based and cross-platform mobile applications.
- Led on-site technical consulting and managed stakeholder relations for system testing and integration.

Personal Projects

3D AWD Autonomous Vehicle

Developed an AWD autonomous vehicle model for traversing off-road terrain.
Simulated vehicle dynamics and implemented reactive control systems using MATLAB.

Robotic Battery Modeling

Modeled LiFePo battery packs for e-mobility and robotics applications, simulating charge/discharge cycles.
Utilized ECM and data-driven techniques to map the state of charge (SoC).

Solar BESS System

Simulated energy production via solar panels and storage in a Battery Energy Storage System (BESS).
Developed grid management using Frequency Containment Reserve (FCR) to balance energy flow.

Autonomous Mining Vehicle Simulation

Simulated autonomous navigation for mining vehicles using path planning algorithms like A* and RRT*.
Implemented vehicle dynamics and low-level control to handle off-road navigation.

CAN J1939 Communication

Implemented single and multipacket CAN messages based on the J1939 standard.
Used Python to handle real-time data streaming for vehicle communication.

Education

Double M.Sc. in Mechatronics Engineering & Autonomous Systems — Graduated: 2022
EIT Digital Master School, Aalto University & University of Trento — *Helsinki, Finland*
Thesis: 3D Modeling & Control of Vehicle Dynamics at Medium-Low Speed

Bachelor of Electrical Engineering (Automotive) — Graduated: 2019
Eindhoven University of Technology — *Eindhoven, Netherlands*
Thesis: DC-DC Converter for High-Performance Hybrid Battery Applications

Certifications & Courses

API & Web Services Introduction (Udemy, 2024)

Disrupting Finance with Digital Technologies (EIT Digital Summer School, 2021)

Introduction to Big Data (Microsoft & edX, 2020)

Languages

English: Fluent

German: Fluent

Italian: Native

Dutch: Fluent

Personal Information

Date of Birth: 25-02-1998

Nationality: Italian

Marital Status: Unmarried

Driving License: EU Category AM-B