

ABDELSALAM ALI ABDELSALAM MOHAMED

AI & Robotics Engineer | Machine Learning, ROS 2, Industrial Automation, Autonomous Systems

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Work Authorization: [SPECIFY - e.g. Finnish residence permit holder, eligible to work in the EU]

PROFESSIONAL SUMMARY

AI and Robotics Engineer with 8+ years delivering industrial robotics, automation and control systems, completing an M.Sc. in Robotics and Automation (JAMK University of Applied Sciences, Finland) specialized in artificial intelligence for robotics. Commissioned automation, robotic inspection and I&C systems on the 14.4 GW Egypt Megaproject - three 4,800 MW combined-cycle stations, the largest combined-cycle programme ever built - then deployed AI-driven industrial robots, collaborative robots and autonomous mobile robots across manufacturing and logistics operations in Egypt and the Netherlands, reducing client operating costs by 30% and raising throughput by 25%.

M.Sc. thesis engineered a hybrid adaptive Brain-Computer Interface that decodes real-time EEG with deep learning to control industrial manipulators and medical assistive devices (Python, PyTorch, BrainFlow, MNE-Python, ROS 2). Trilingual: Arabic (native), English (C2), Finnish (B2).

CORE COMPETENCIES

Artificial Intelligence, Machine Learning, Deep Learning, Neural Networks, CNN, LSTM, Transformers, Reinforcement Learning, Computer Vision, Object Detection

Robotics, ROS 2, Industrial Robotics, Collaborative Robots, Autonomous Mobile Robots, Robot Control, Motion Planning, Navigation, SLAM, Robot Perception, Autonomous Systems

Brain-Computer Interface, EEG, Signal Processing, Human-Robot Interaction, Medical Robotics, Industrial Automation, PLC, SCADA, Predictive Maintenance, Industrial Digitalization

Python, Linux, Docker, Git, Real-Time Systems, Systems Integration, Functional Safety, Research & Development, Innovation

TECHNICAL SKILLS

Programming: Python (primary), C++, MATLAB, Bash, SQL (basic)

Machine Learning & Deep Learning: PyTorch, TensorFlow, Keras, Scikit-learn, NumPy, Pandas, Neural Networks, CNN, LSTM/RNN, Transformers, Reinforcement Learning, Feature Engineering, Model Evaluation, Online/Adaptive Learning

Robotics: ROS 2 & ROS, Gazebo, Isaac Sim, MuJoCo, CoppeliaSim/V-REP, Robot Control, Motion Planning, Trajectory Generation, Navigation, SLAM, Forward & Inverse Kinematics, Dynamics, PID & Adaptive Control, Industrial Robotic Arms, Collaborative Robots (Universal Robots), Autonomous Mobile Robots

Computer Vision: OpenCV, Image Processing, Object Detection, Image Classification, Camera Calibration, Visual Inspection

BCI & Signal Processing: EEG Acquisition & Decoding, BrainFlow, MNE-Python, Digital Signal Processing, Filtering & Artifact Rejection, Time-Frequency Analysis, Feature Extraction, Real-Time Streaming

Industrial Automation & Control: PLC (Siemens SIMATIC, Allen-Bradley), SCADA, HMI, Instrumentation & Control (I&C), Process Control, Predictive Maintenance, IIoT, Commissioning & Testing, Machine Safety & Risk Assessment, Embedded Systems, Arduino, Raspberry Pi, RTOS

Artificial Intelligence & LLMs: Large Language Models (LLMs), AI Agents, Prompt Engineering, Retrieval-Augmented Generation, n8n workflow automation

Tools & Practices: Linux, Docker, Git, GitHub, VS Code, Jupyter, LabVIEW, Agile & Scrum

KEY PROJECTS & MASTER'S THESIS

Hybrid Adaptive Brain-Computer Interface Using Artificial Intelligence for Controlling Industrial Robots and Medical Assistive Devices
M.Sc. Thesis | JAMK University of Applied Sciences, Jyväskylä, Finland | Completed 2026

Technologies: Python, PyTorch, TensorFlow, Scikit-learn, BrainFlow, MNE-Python, ROS 2, Gazebo, NumPy/SciPy, Linux, Docker, Git

- Engineered a hybrid adaptive Brain-Computer Interface enabling hands-free, non-invasive EEG control of industrial robotic manipulators and medical assistive devices - targeting users with severe motor impairment and industrial settings where manual control is impractical.
- Built an end-to-end real-time EEG acquisition and decoding pipeline in Python using BrainFlow for hardware-agnostic streaming and MNE-Python for filtering, ICA artifact rejection, epoching and spatial feature extraction.
- Designed, trained and evaluated deep learning classifiers (CNN and LSTM in PyTorch/TensorFlow) for motor-imagery intent decoding, benchmarked against classical CSP + LDA/SVM baselines in Scikit-learn, achieving [XX]% cross-validated accuracy across [N] subjects.
- Implemented the adaptive layer defining the system: online learning that continuously recalibrates the decoder against inter- and intra-session EEG non-stationarity, cutting per-session recalibration time by [XX]% without full retraining.
- Architected the robot-side control stack as a modular ROS 2 node graph translating decoded neural intent into validated velocity and pose commands, with simulation-first verification in Gazebo before hardware deployment.
- Engineered a shared-control arbitration layer blending decoded human intent with autonomous motion planning and collision avoidance, so low-confidence neural commands degrade safely rather than producing unintended motion.
- Enforced human-robot interaction safety via workspace limits, velocity clamping, confidence thresholding and a watchdog-driven emergency-stop path, keeping the system fail-safe under signal dropout or decoder uncertainty.
- Demonstrated a transferable architecture spanning two normally separate domains - industrial and medical assistive robotics - showing a single adaptive AI decoding core can drive both a factory manipulator and a patient-facing device.

Jet Engine Design and Performance Simulation - B.Sc. Graduation Project (Grade: Excellent)

Zagazig University, Faculty of Engineering, Egypt | 2014 | Technologies: ANSYS, MATLAB, CAD, Thermodynamics, Fluid Mechanics

- Designed a complete jet engine assembly - compressor, combustion chamber, turbine and exhaust - applying thermodynamic cycle analysis and fluid mechanics first principles; modelled components in CAD and ran ANSYS and MATLAB simulations to characterize efficiency and fuel consumption across operating conditions, validating the design through virtual prototype testing.

PROFESSIONAL EXPERIENCE

Robotics Engineer

SMART Robotics | Egypt & Netherlands | Aug 2021 - Jul 2023

- Led design and development of industrial robotic systems automating material handling, packaging and quality control for manufacturing, logistics and healthcare clients across two countries.
- Deployed robotic automation that reduced client operating costs by 30% and raised throughput by 25%; delivered an AI-driven logistics robotics project cutting material handling time by 40% while improving order accuracy.
- Integrated machine learning models into robotic decision-making pipelines, enabling perception-driven task selection and adaptive behaviour in unstructured production environments.
- Programmed industrial robotic arms, collaborative robots and autonomous mobile robots (AMRs), commissioning AMR fleets in warehouses across Egypt and the Netherlands.
- Executed rigorous testing, validation and performance benchmarking of robotic cells to certify functionality, precision and safety before production handover.

Automation Engineer

Egyptian Navy - Mediterranean Gas Fields | Egypt | Nov 2018 - Jul 2021

- Designed, programmed and maintained PLC (Siemens, Allen-Bradley) and SCADA systems controlling offshore gas field processes in a safety-critical, regulated environment.
- Implemented predictive maintenance using AI and IIoT sensor telemetry to anticipate equipment failure, reducing operational downtime by 20%.
- Engineered and commissioned a fully automated control system for a high-complexity industrial process, improving productivity by 15%.
- Designed fail-safe mechanisms and integrated real-time monitoring, certifying compliance with industry safety standards and offshore regulations; trained operations staff on new automation technology.

Automation & Robotics Engineer

Egypt Megaproject - Siemens Energy Solutions, with Orascom Construction & El Sewedy Electric | New Administrative Capital, Burullus & Beni Suef, Egypt | Aug 2015 - Oct 2018

- Delivered automation, I&C and robotic engineering across three 4,800 MW combined-cycle power stations totalling 14.4 GW - the largest combined-cycle programme ever built, completed in a record 27.5 months.
- Designed and deployed robotic systems for inspection, maintenance and condition monitoring of turbines, generators and auxiliary equipment, cutting maintenance time by 30%.
- Deployed robotic inspection into hazardous high-temperature zones previously requiring human entry, materially reducing personnel exposure to unsafe environments.
- Programmed and optimized PLC and SCADA systems for automated control of critical plant processes, integrating robotics with Siemens control architecture.
- Executed gas turbine synchronization testing and led planning, execution and documentation of electrical and I&C scope, including vibration diagnosis and GT performance test reporting.

EDUCATION

Master of Science (M.Sc.), Robotics and Automation

JAMK University of Applied Sciences, Jyväskylä, Finland | Expected Jul 2026

- Coursework: AI and Machine Learning for Robotics, Robotics Design and Development, Industrial Robotics and Automation Systems, Embedded Systems and Control Engineering, Robot Perception and Vision Systems, Human-Robot Interaction. Applied robotics research conducted with industry partners in multicultural international engineering teams.

Bachelor of Science (B.Sc.), Mechanical Power Engineering

Faculty of Engineering, Zagazig University, Zagazig, Egypt | May 2014

- Core disciplines: Thermodynamics, Fluid Mechanics, Heat Transfer, Mechanical Design, Energy Systems, Engineering Simulation and Analysis. Graduation project awarded a grade of Excellent.

CERTIFICATIONS

- CB3 e-Learning, Certificate of Completion - Universal Robots Academy (A Teradyne Robotics Company), Nov 2025
- QTM1x: The Quantum Internet and Quantum Computers, Verified Certificate - DelftX, Delft University of Technology (edX), Mar 2025
- Automation & Robotics Engineer, Project Certificate - Siemens Power Plant Energy Solutions, Erlangen, Oct 2019 (Egypt Megaproject)

LANGUAGES

Arabic (Native) | English (C2 - Proficient) | Finnish (B2 - Upper Intermediate)