Ahmed Fathy Abdelkhalek

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Experience

The German University in Cairo *Sep 2024 - Present*
Design and Production Teaching Assistant *Cairo, Egypt*

- Instructed several courses in the design and production technology department, including Advanced CNC, Industrial Automation, CAD/CAM, and Production Technology.
- Prepared course content, quizzes, midterms and final exams for the aforementioned courses.

University of Stuttgart *Nov 2024 - Nov 2024*
GUC-IAS Workshop: Cooperation of Heterogenous Agents in Industrial Application *Stuttgart, Germany*

- Worked on integrating three robots—a TurtleBot, a Unitree Go1, and a Franka Emika Panda—for seamless collaborative operations when performing sequential object handovers.
- Lead the Unitree Go1 team throughout the workshop, guiding, coaching, and directing team members to help achieve impressive results and boost team morale.

Smart Systems *Jul 2024 - Sep 2024*
Mechatronics Technical Engineer, KUKA Department *Cairo, Egypt*

- Created smart and automated solutions for clients to perform a wide variety of applications using KUKA robots and their simulation platform, KUKA.Sim.
- Implemented several designs for various projects related to the company, including robotic cells, calibration tools, and robot welding tables.
- Instructed several engineers on how to assemble, disassemble, operate, and maintain an industrial-grade 3D printer.

JetSolar *Oct 2023 - Apr 2024*
Design and Manufacturing Engineer *Giza, Egypt*

- Engineered and produced Egypt's first solar-powered PWRPOD, enhancing public workspaces with dedicated features for remote work and charging stations for e-scooters and e-bikes, boosting urban mobility efficiency.

Education

The German University in Cairo *Feb 2024 - Present*
MSc in Engineering and Material Science, Mechatronics Department *Cairo, Egypt*

The German University in Cairo *Sep 2018 - Jun 2023*
BSc in Engineering and Material Science, Mechatronics Department

- **Thesis:** "Trajectory Tracking Control of a 3 Degree of Freedom Magnetic Robotic System" | Grade: A (Excellent)

Skills

Engineering Simulation: Simulink, Simscape Multibody, KUKA.Sim, ANSYS, Gazebo, StateFlow, SimEvents
CAD: SolidWorks, AutoCAD
Programming: MATLAB, Python, ROS, C++, KUKA Robot Language (KRL)
Professional: Documentation, data-driven decision making
Operating Systems: Windows, Linux (Ubuntu & Debian), Raspberry Pi OS
Languages: Arabic (Native), English (Fluent), German (Basic)

Projects

Smart Home Product Line *Dec 2023 - Jan 2024*

- Designed a product line for Photon Smart, including smart light switches, water and gas leak sensors, and shutter controllers.

ROS Autonomous Vehicle | *Python, ROS, Gazebo, Linux, SolidWorks, Embedded C* *Feb 2023 - Jun 2023*

- Simulated a 1:18 scale vehicle using ROS and Gazebo to perform lane-keeping and lane-switching manoeuvres.
- Modified an off-the-shelf 1:18 scale car with multiple sensors, filters, and communication protocols for precise control and localisation to track a desired trajectory with 2.5% error.

Humanoid Arm | *MATLAB, Simscape Multibody, SolidWorks, Embedded C* *Sep 2022 - Jan 2023*

- Developed a comprehensive Simscape Multibody model to simulate and control an enhanced Poppy humanoid arm reducing development time by 30%.
- Manufactured and assembled the arm to improve the lives of individuals with tremors to carry out precise tasks with 98% accuracy.

Hand Gesture Drone | *Python, SolidWorks, Image Processing, Embedded C* *Sep 2022 - Jan 2023*

- Developed a small-scale helicopter with gesture-based control capabilities and 3 modes of flight using image processing algorithms and showcased the technology at the sensors course exhibition.

Delta Robot 3D Printer | *SolidWorks, Electronics, Marlin Firmware, Embedded C* *Jul 2022 - Sep 2022*

- Designed a novel Delta robot 3D printer in SolidWorks, employing several principles in robotics and parallel manipulators.
- Manufactured, assembled, and tuned the printer to reach a competitive dimensional accuracy of 0.05 mm with over 2500 printing hours.
- Showcased the printer at the 3rd Annual Mechatronics Robotics Exhibition to introduce and highlight the unique advantages of parallel robotics to students .

Certifications

SOLIDWORKS CAD Design Professional | **Dassault Systèmes** *Apr 2025*
Computer Vision for Engineering and Science Specialization | **Mathworks** *Jun 2024*
Object Tracking and Motion Detection with Computer Vision | **Mathworks** *Jun 2024*
Machine Learning for Computer Vision | **Mathworks** *Jun 2024*
State Estimation and Localization for Self-Driving Cars | **University of Toronto** *Nov 2023*
Introduction to Self-Driving Cars | **University of Toronto** *Oct 2023*

Publications

A. Fathy, M. Ashraf and A. El-Badawy, "Computed torque control of a prismatic-input delta parallel robot," 2022 4th Novel Intelligent and Leading Emerging Sciences Conference (NILES), Giza, Egypt, 2022

Received the 3rd Best Paper Award at the conference.