Mahmoud Shanan

mahmoudmshanan@gmail.com | +447470413440 | Portfolio | LinkedIn | Manchester, UK

EDUCATION

Sept 2023 – Sept 2024 | **MSc Robotics, University of Manchester** **Manchester, UK**
- Dissertation: Path Planning for Drone Autonomous Navigation, *Distinction*
- Focused on autonomous systems, mobile robots, robotic manipulators, computer vision, and machine learning

Sept 2020 – Jun 2023 | **Beng Mechatronic Engineering, University of Manchester** **Manchester, UK**
- Dissertation: 2-DOF Drone Control, *First Class Honours*
- Focused on mechatronic design, electrical drives, control systems, microcontrollers, and electronic systems

Sept 2018 – Jun 2020 | **French Baccalauréat Série S, Lycée International Balzac** **Cairo, Egypt**
- Scientific Stream - *Mention Très bien* (A* equivalent), 17.6/20

WORK EXPERIENCE

Jul - Aug 2023 | **Engineering Summer Intern, El Sewedy Electric Special Cables Plant** **Cairo, Egypt**
- Assisted in production planning, interpreting stakeholder requirements, analysing material and machine availability, and allocating resources efficiently to fulfil weekly production targets
- Delivered weekly production reports, tracking workflow, identifying bottlenecks, and proposing automation processes to boost production efficiency
- Analysed cable manufacturing processes, including material selection, product assembly, machine operations, and quality control, ensuing high production standards

Jul - Aug 2022 | **Mechatronics Engineer Intern, Citroën After Sales Service Centre** **Cairo, Egypt**
- Executed diagnostics and fault-finding on over 10 automotive engines and gearboxes, using wiring diagrams and specialised software to troubleshoot issues with sensors and actuators
- Collaborated with senior engineers to improve diagnostic techniques, documenting findings in technical reports, decreasing overall repair times
- Engaged with customers to interpret fault description, and communicated repair recommendations, ensuring a customer-focused after-sales experience

Jul - Aug 2018 | **Sales intern, Hamleys of London** **Cairo, Egypt**
- Entertained and guided over 100 walk-in customers through their shopping experience in four different isles of the store, and learned how to adapt in a fast-paced atmosphere

ACADEMIC PROJECTS

Jun 2024 – Sept 2024 | **Path Planning for Drone Autonomous Navigation** **Manchester, UK**
- Developed trajectory planning algorithms for autonomous drones with vision-based obstacle avoidance using python, OpenCV, Neural Networks, and Kalman filters
- Conducted real-world flight tests using the DJI Tello drone, integrating a positioning system using sensor fusion between Ultra-wideband (UWB) technology and infrared cameras
- Created a drone simulation for transmission line inspection and automated recharging, using ROS 2, PX4 autopilot, and Gazebo, to extend flight duration and facilitate overhead power line cables operations

Sept 2023 – Jun 2024 | **Autonomous Robot Object Retrieval (Leo Rover)** **Manchester, UK**
- Led a team of four in developing an autonomous mobile robot, capable of navigating unknown environments and retrieving objects using the ROS 2 framework (Ubuntu), python, and C++
- Built a robot simulation in Gazebo to test autonomous navigation (SLAM, Kalman filter), object detection (OpenCV), and grasping algorithms for manipulator control
- Modified the mechanical design to attach a LiDAR, robotic manipulator, and depth camera using Fusion360 and 3D printing, making our team the only one to collect objects from the ground (more details in portfolio)

March 2024 | **24-hour Robotics-based Hackathon – Extraterrestrial Rover Challenge** **Manchester, UK**

- Led a team of four to build and program a mobile robot equipped with a camera, allowing it to be remotely controlled from a PC without direct line of sight
- Achieved 2nd place among 20 teams by designing a remotely-controlled shovel mechanism to collect objects, and a rotating mechanism for 360° camera coverage

Sept 2022 – Jun 2023 | **2-DOF Drone Control - Quanser Aero 2** **Manchester, UK**

- Evaluated the performance of PID control in UAVs using MATLAB/Simulink and hardware-in-loop simulation
- Designed and tuned cascaded PID controllers to control the helicopter and bi-copter configurations
- Researched a new configuration for the studied platform, and modified the mathematical model of the system, such that it is controlled as a quadcopter (more details in portfolio)

Sept 2021 – Jun 2022 | **Embedded Systems Project - Autonomous Buggy** **Manchester, UK**

- Led a team of five to develop a microcontroller-based autonomous buggy (STM32) capable of following a line on a track using infrared sensors (more details in portfolio)
- Designed the chassis using SolidWorks, the sensors' PCB using Altium, and a PID controller using C++
- Managed project timelines with Gantt charts, conducted risk assessments, and coordinated communication between the team and supervisor

SKILLS AND CERTIFICATIONS

Software: MS Office, Linux (Ubuntu), Python, C/C++, ROS 2, Gazebo Simulator, MATLAB/Simulink, SolidWorks, Fusion360, assembly, VHDL, HTML, CSS, Altium, LabVIEW, Multisim, PLECS, LTspice, Ultimaker
Hardware: STM32, ESP32, Arduino, Raspberry PI, Intel NUC, IMUs, LIDARs, DC/Stepper motors, CAN, I2C, SPI
Languages: English (native), French (native), Arabic (native), Spanish (intermediate B1)
Certifications:

- Engineering the Future Scholarship
- Dale Carnegie Course: How to Win Friends and Influence People
- Peer Assisted Study Sessions (PASS) Leader: Guided first year students through their studies and university experience
- Instituto Cervantes: Diploma of Spanish as a foreign language (DELE)