Mahmoud Shanan

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Portfolio: https://mshanan.github.io/mahmoudshanan.github.io/

EDUCATION

2023 - 2024 **University of Manchester**
MSc Robotics

Path Planning for Drone Autonomous Landing on Mobile Station – MSc Dissertation

- Implemented a 3D path planning algorithm (RRT*) with camera-based obstacle avoidance using python, OpenCV, Neural Networks, and Kalman filter
- Executed real flight tests using the DJI Tello drone, and equipped it with a novel positioning system relying on sensor fusion between IMU, infrared cameras, and Ultra-wideband (UWB) technology
- Optimised landing times and power efficiency using trajectory smoothing techniques

Autonomous Object Retrieval – Robotic System Design Project (2 semesters)

- Led a team of 4 students to develop and upgrade an autonomous mobile robot (Leo Rover), which can navigate an unknown environment, and retrieve an object
- Developed the software using ROS 2, Gazebo simulation, python, and C++. It includes path planning (SLAM, Kalman filter), computer vision (object detection), and manipulator control (grasping) algorithms.
- Modified the design of the Leo Rover to attach a LiDAR, robotic manipulator, and depth camera using Fusion360 and 3D printing (more details in portfolio)

2020 - 2023 **University of Manchester**
BEng Mechatronic Engineering – First Class Honours

2-DOF Drone Control – Quanser Aero 2 (Final Year Individual Project) – Grade: 80%

- Used MATLAB/Simulink and hardware-in-loop simulation to evaluate the performance of PID control in UAVs: 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)

Embedded Systems Project (Second Year) – Grade: 92%

- Led a team of 5 students to develop a microcontroller-based buggy (STM32), which can autonomously follow a line around a track using infrared sensors (more details in portfolio)
- Designed the chassis of the buggy using SolidWorks, the sensors' PCB using Altium, and a PID controller using C++. Created Gantt Charts, risk assessments, and coordinated between the team and supervisor.

2018 – 2020 **Lycée International Balzac, Cairo Egypt**
French Baccalauréat Série S – Mention Très bien (17.6/20)

WORK EXPERIENCE

August 2023 **ElSewedy Electric – Special Cables Plant**
Engineering Summer Intern (3 months)

- Explored different types of cables and their manufacturing processes (materials used, product assembly, machines, and quality control)
- Discovered the production planning process: interpreting stakeholders' requirements, analysing material and machine availability, allocating machines efficiently, and issuing daily reports

August 2022 **Amir & Joseph Service Centre**
Mechatronics Engineer Intern - Technical Service (2 months)

- Applied diagnosis and fault-finding methods, while analysing different sensors and actuators inside automotive engines and gearboxes, using wiring diagrams and software

August 2018 **Hamleys**
Sales intern (1 month)

- Entertained and guided walk-in customers through their shopping experience in 4 different isles of the store, and learned how to adapt in a fast-paced atmosphere

EXTRACURRICULAR ACTIVITIES

March 2023 **University of Manchester**
24-hour Robotics-based Hackathon – Extraterrestrial Rover Challenge

- Led a team of 4 students 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
- Implemented a controlled shovel mechanism to pick up objects, and a 360° camera for inspection, achieving 2nd place among 20 teams

July 2022 **Dale Carnegie**
How to win Friends and Influence People (3-day course)

- Applied Dale Carnegie's methods of communication during group activities: demonstrated leadership principles, explored strategies for expressing ideas, persuading people, and practiced public speaking

2021 – 2022 **University of Manchester**
Peer Assisted Study Sessions (PASS) Leader

- Guided first year students through their studies and university experience in 1-hour sessions every week

SKILLS

Software:

- MS Office, Linux (Ubuntu), Python, C/C++ programming, assembly, VHDL
- ROS 2, Gazebo Simulator, Rviz, URDF, MATLAB/Simulink, SolidWorks, Altium, LabVIEW, and Multisim

Languages:

- Fluent in spoken and written English, French, and Arabic
- Intermediate level in Spanish (B2)