AHMAD HASSANEIN

ROBOTICS ENGINEER

Top Skills:
Quadrotor control, Computer vision, Deep and reinforcement learning, Mobile Robots

CONTACT

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TOP PROJECTS

- Master thesis: A novel approach for visual autonomous navigation in mobile robots.
- Bachelor thesis: Development of a particle filter algorithm for state estimation for a virtual musical conductor
- Development of an MPC (Model Predictive Controller) for a quadrotor to achieve fault tolerance.

EDUCATION

2021-2025
Chemnitz University of Technology, Germany
Master's Degree in Neurorobotics. (German Grade: 1.8)
Course content:

- Reinforcement Learning and Deep Learning
- Computer vision
- Automation
- Mobile and industrial robotics

TECHNISCHE UNIVERSITÄT CHEMNITZ

Master's thesis:

Development of a novel approach for visual autonomous navigation in mobile robots. The aim of this project was to develop a bio-inspired visual navigation method as an alternative to conventional V-SLAM methods. It was inspired by models of the insect brain models of the optical lobe of the fruit fly and the central complex of the sweat bee.

Read my master thesis on my website

Master Grade: 1.3 (German)

Further projects:

- Development of an MPC (Model Predictive Controller) for a CrazyFlie 2.0 quadcopter to achieve fault tolerance. With this controller, the drone was able to stay in the air despite two damaged rotors. Simulation was done in PyBullet.

Read my MPC Quadrotor project report Project grade: 1.0

- Implementation of a vision-based, self-driving end-to-end learning method (like Nvidia's DAVE2), trained with behavioural cloning. Extensive experience with data augmentation was gained to build the training dataset.
- Autonomous grasping on a (Simulated) Kinova Gen2 Robot arm with deep learning in PyBullet

2016-2021
The German University in Cairo, Egypt
Bachelor's degree programme in Mechatronics. (German Grade: 1.7)
Course content:

- Control theory
- Sensors
- Electronics
- Robotics
- Mathematics
- Physics
- Mechanics

Exchange Semester 2020
Hochschule Heilbronn, Germany
Bachelor-Thesis:

Development of a particle filter algorithm for state estimation for a virtual musical conductor using a micro radar sensor.

Read my bachelor thesis on my website Bachelor's Thesis Grade: 1.3 (German)

Robotics Project:

Built a UGV from scratch, with a Raspberry and an Arduino, DC motors, and a 6-axis IMU, encoders and a webcam. The UGV was controlled with ROS and was able to successfully follow a square path. In addition, the robot was able to use the camera and OpenCV on Python to locate a red target in the vicinity, drive towards it autonomously and stop at a predefined distance in front of the red object.

Further Projects:

- Development of a PID-controlled mobile robot that can follow a laser point.
- Development of a bottle sorting machine with an FPGA (Xilinx)
- Collaboration in the development of a rescue robot. Wrote the code for the remote control on Android (Java). The robot was controlled with TCP via WLAN.

LANGUAGES

German: C1 (TestDaf), English: C1 (IELTS), Arabic

PROGRAMMING LANGUAGES

Python, C, C++, Java, MATLAB

AI THEORY

Deep learning, CNNs, YOLO, RNNs, Data augmentation, Object Detection, LLMs, Transformers, Reinforcement learning and Optimal Control, Autonomous Systems

ELECTRONICS AND MECHANICS

FPGA, Fluid Mechanics, Industrial Automation

STATE ESTIMATION AND NAVIGATION

SLAM, Sensor Fusion, Particle Filter, Kalman Filter

CONTROL THEORY

Non-Linear Control, PID Control

SIMULATION

Gazebo, PyBullet, Mujoco

TOOLS

Linux, Docker, Simulink, ROS2, Git, Solidworks, AutoCad, Tensorflow, Keras, OpenCV, Numpy, Pandas

NEUROROBOTICS

Neurocognition, Spiking Neural Networks

ROBOTS

Franka Emika 3, Kinova Gen 2, TurtleBot3

OTHER ACHIEVEMENTS

Since 2022
Renato Germano Sports Club (Brazillian Jiu Jitsu)

- Active Member
- Participated in competitions

2023
Dresden Full Marathon 2023

- Ran a full marathon