MAURICE RAHME

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EXPERIENCE

Robotics Engineer - Stretch
Boston Dynamics Waltham, MA Nov 2020 – Present

- Wrote on-board arm joint and vacuum pump calibration routine.
- Implemented Directed Graph search library for Atlas.
- Co-authored CAN-interfacing high-rate motor controller code.
- Built bringup software to increase robot assembly rate by 4x.
- Developed actuator characterisation suite for BLDC motors.

Electrical Engineering Intern - Body Control Module (BCM)
Jaguar Land Rover Gaydon, UK Jun 2017 – Sep 2017

- Produced BCM code for the 2017 Frankfurt Autoshow in StateFlow.
- Built a line and wall following RC-car module coupled with a digital strain gauge to supplement JLR's "4x4 in Schools" competition.

Aerodynamics '17 & Suspension '18 Team Manager
Edinburgh Univ. Formula Student Edinburgh, UK Jul 2016 – Jul 2018

- Designed and manufactured Aerodynamic and Suspension components.
- Managed teams of 8-10 people and led training workshops.
- Calculated wheel braking and cornering forces using SIMULINK.
- Built a MATLAB design tool for Parallel/Ackermann steering design.
- Taught CAD in SolidWorks and raised £9,000 in sponsorship.

PROJECTS

Quadruped Locomotion from Scratch
Northwestern University Apr 2020 - Aug 2020

- Crafted 12-point Bezier Curve Gait and Leg/Body Inverse Kinematics.
- Simulated custom quadruped in Pybullet with sim2real ROS framework.
- Architected novel Rinforcement Learning method for Terrain Adaptation.
- Designed custom quadruped that can be built for under $600.

Motion Planning Library in C++ and ROS
Northwestern University Apr 2020 - Jun 2020

- Implemented scalable Probabilisitc Roadmap and Grid Map.
- Developed Library containing A*, Theta*, D*Lite, Potential Fields, MPPI.
- Co-created and taught course for 1 credit at Northwestern.

EKF SLAM on Turtlebot3
Northwestern University Jan 2020 – Mar 2020

- Developed 2D Kinematics library in C++ for Differential Drive robots.
- Wrote feature detection algorithm for LiDAR scanner.
- Performed EKF SLAM with Unknown Data Association.

Baxter Plays Checkers
Northwestern University Nov 2019 – Dec 2019

- Led 3 teammates to program a Baxter robot to play checkers.
- Utilized ROS, MoveIt, OpenCV, and a custom AI move generator based on the minimax algorithm with alpha-beta pruning.
- Won 1^{st} Place out of 6 teams.

EDUCATION

Northwestern University
Master of Science in Robotics Aug 2020

- GPA: 3.95/4.0

The University of Edinburgh
B.Eng (Honors) in Electrical & Mechanical Engineering Jun 2019

- GPA: 4.0/4.0; equivalent of First Class

</> LANGUAGES

C++	●●●●●
Python	●●●●●
C	●●●●○
Bash	●●●○○
MATLAB	●●●○○

SKILLS

Robot Manipulation	●●●●●
Motion Planning	●●●●●
Bayesian Filters	●●●●○
ROS	●●●●●
Gazebo, Pybullet	●●●●●
URDF/Xacro	●●●●●
Optimal Control	●●●●○
Linux (Ubuntu)	●●●●●
Version Control (Git)	●●●●●
Unit Testing	●●●●○
Altium	●●●●○
Analogue Electronics	●●●●○
3D Printing	●●●●○
SolidWORKS	●●●○○

AWARDS

IMechE - Best BEng Project
The University of Edinburgh
The Institution of Mechanical Engineers

The Edinburgh Award
The University of Edinburgh

The Spirit of Formula Student
Formula Student UK

LANGUAGES

English	●●●●●
French	●●●●●
Arabic	●●●●●