MAURICE RAHME

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EXPERIENCE

Staff Robotics Engineer

Boston Dynamics Detroit, MI Jan 2022 – Present

- Lead developer for Stretch Trajectory Generation.
- Sped up Stretch truck unloading motions by >2x.
- Enabled highly dextrous motion generation as seen at MODEX.
- Created novel methods for extracting payloads from constrained scenes.
- Increased Stretch's payload capacity from 15kg to 23kg using Wrench Minimization.
- Enhanced handling or poorly supported cargo through sag-predictive collision avoidance.
- Wrote Task-Space Controller for Stretch Base Driving.
- Above code essential to >6 million customer boxes moved with Stretch.
- Technical mentor for 5 other colleagues.

Senior Robotics Engineer

Boston Dynamics Waltham, MA Nov 2020 – Jan 2022

- Implemented generic Directed Graph search library.
- Designed robot MFG SW, enabling the production of >100 Stretch robots in 3 years.
- Created an actuator characterisation suite for BLDC motors.

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 Reinforcement Learning method for Terrain Adaptation.
- Designed custom quadruped that can be built for under $600.
- Published for IROS 2021.

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 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

SKILLS

Robot Dynamics
Manipulation
Motion Planning
Debugging HW-rich systems
Convex Optimization
State Estimation
System Identification
ROS
Gazebo, Pybullet
URDF/Xacro
Unit Testing
Git

AWARDS

Peak Power Award (4x)
Boston Dynamics

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