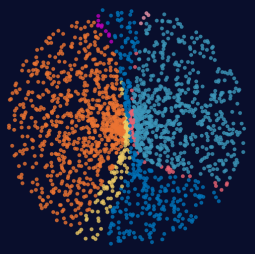
Alexander Luis Mitchell

Post Doctoral Research Assistant
University of Oxford



Details

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Research Interests

Robot manipulation and locomotion in confined and cluttered environments

Generative modelling for robotic planning

Brain-inspired research for robotics

Robust control and planning under uncertainty

Skills

Hands-on deployment for robots in the field

C++, Python, Pytorch, CMake3, Docker, ROS

Gazebo, and Raisim simulators

Solidworks -- design and manufacture of medical devices

Academic Achievements

Solving robot manipulation and locomotion using novel brain-like signals in structured latent-spaces

Creating a unified latent-space for continuous and natural-looking gait transitions

Deploying novel latent-space planners as robust real-time controllers on real quadrupeds

Professional Experience

Post Doctoral Research Assistant A2I Oxford
Research Scientist and Deployment Specialist 2024 -- present

Systems integration for robust and repeatable deployment of novel algorithms on a bespoke dual arm manipulator robot

Management experience of a medium sized team of research scientists and research engineers

Amazon Robotics
Algorithm Development and Deployment 2022

Tangibly improved pinch-only grasp success for manipulation in cluttered and constrained environments

Created novel machine learning and optimal control based solutions

Deployed novel algorithms in real-world warehouses with code written to product level standards in C++ and Python

Education

University of Oxford, 2018-2023
PhD Machine Learning for Control of Dynamic Robots
Thesis title: *Learning and Planning in Structured Latent-Spaces for Legged Robot Locomotion*

University of Oxford, 2014-2018
MEng. Engineering Science
Model Predictive and Adaptive Control under Uncertainty

Publications and Submitted Work

Gaitor: Learning a Unified Representation Across Gaits for Real-World Quadruped Locomotion
Submitted to RSS, 2024
A. Mitchell, W. Merkt, A. Papatheodorou, I. Havoutis, I. Posner

Towards Agility: A Momentum Aware Trajectory Optimisation Framework using Full-Centroidal Dynamics Implicit Inverse Kinematics
Submitted to IROS, 2024
A. Papatheodorou, W. Merkt, **A. Mitchell**, I. Havoutis

VAE-Loco: Versatile Quadruped Locomotion by Learning a Disentangled Gait Representation
IEEE Transactions on Robotics (T-RO), 2023
A. Mitchell, W. Merkt, M. Geisert, S. Ganagapurwala, M. Engelcke, O. Parker Jones, I. Havoutis, I. Posner

From Primates to Robots: Emerging Oscillatory Latent-Space Dynamics for Sensorimotor Control
Conference on Cognitive Computational Neuroscience, (CCN) 2023
A. Mitchell, O. Parker Jones, J. Yamada, W. Merkt, I. Havoutis, I. Posner

Brain-like latent dynamics emerge in robot systems during walking and reaching
Submitted to Nature: Science Reports, 2022
O. Parker Jones*, **A. Mitchell***, J. Yamada*, W. Merkt, M. Geisert, I. Havoutis, I. Posner

Next Steps: Learning a Disentangled Gait Representation for Versatile Quadruped Locomotion
ICRA International Conference on Robotics and Automation, 2022
A. Mitchell, W. Merkt, M. Geisert, S. Ganagapurwala, M. Engelcke, O. Parker Jones, I. Havoutis, I. Posner

First Steps: Latent-Space Control with Semantic Constraints for Quadruped Locomotion
IEEE Intelligent Robots and Systems (IROS), 2020
A. Mitchell, M. Engelcke, O. Parker Jones, S. Ganagapurwala, O. Melon, D. Surovik, I. Havoutis, I. Posner

Guided Constrained Policy Optimization for Dynamic Quadrupedal Robot Locomotion
IEEE Robotics and Automation Letters (RA-L), 2020
S Gangapurwala, **A Mitchell**, I. Havoutis

* Joint first authors