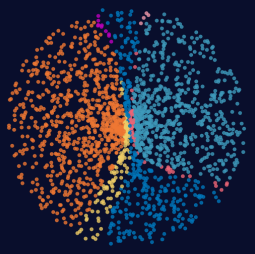
Alexander Luis Mitchell

PhD Candidate *(Thesis Submitted)*
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

Gazebo, and Raisim simulators

Solidworks -- design and manufacture of medical devices

Academic Achievements

Solving robot manipulation and locomotion using brain-like signals in structured latent-spaces -- a vastly different approach from reinforcement learning and optimal control

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

Amazon Robotics
Algorithm Development and Deployment 2022

Planning for manipulation in cluttered and constrained environments

Creating novel machine learning and optimal control based solutions

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

Cambridge Consultants, Engineering Consultancy
Software and Mechanical Design Intern 2014-2018 (Summer)

Software and Hardware engineer for medical devices

Exposure to medical design practice and certification procedures

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 For Continuous Gait Transition And Terrain Traversal For Quadruped Robots
Submitted to ICRL, 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 ICRA, 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