

Nick Ioannidis

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nickioan.github.io

Education

Sep. 2023 - Present
Vancouver, Canada

University of British Columbia

Master of Science, Computer Science

Supervisor: Professor Michiel van de Panne

Thesis Topic: Environment Aware Planning using Diffusion Models for Humanoid Characters

Sep. 2017 - Apr. 2023
Vancouver, Canada

University of British Columbia

Bachelor of Applied Science, Engineering Physics (with distinction)

Research Experience

May 2024 - Present

Planning and Control for Humanoid Characters

UBC · Motion Control and Character Animation Group (MOCCA)

Supervised by Professor Michiel van de Panne

- Ongoing project on how to leverage diffusion models for footstep planning of humanoid characters while satisfying constraints [**In Submission**]
- Ongoing project on how to learn walking controllers for humanoid characters using reinforcement learning in imitation-free settings [**In Submission**]

May 2022 - Aug. 2022

Exploring New Sampling Methods for Off-Policy RL

UBC · Department of Computer Science

Supervised by Professor Mark Schmidt

- Developed new non-uniform sampling methods for off-policy reinforcement learning in continuous control environments
- Implemented newly proposed sampling algorithms in PyTorch, designed and developed visualizations for experimental setup

Sep. 2021 - Apr. 2022

Alzheimer's Disease Classification with Transformer-Based Methods

UBC · Canary Cognition Research Group

Supervised by Professor Hyeju Jang

- Explored transfer-learning methods for Language Models in small target dataset settings
- Implemented fine-tuning techniques for Language Models and improved baseline performance on AD classification

May 2021 - Aug. 2021

Non-Uniform Sampling in Off-Policy RL

UBC · Department of Computer Science

Supervised by Professor Mark Schmidt

- Explored different sampling methods for off-policy reinforcement learning in continuous control
- Trained multiple agents on Mujoco benchmarks using DeepMind Control Suite on high performance computing
- Co-wrote paper published in NeurIPS 2021 Deep RL Workshop

Publications

1. Nicholas Ioannidis, Jonathan Wilder Lavington, and Mark Schmidt. An empirical study of non-uniform sampling in off-policy reinforcement learning for continuous control. In *Deep RL Workshop NeurIPS 2021*, 2021

Other Work Experience

Jun. 2020 - Apr. 2021

Machine Learning Engineer

UBC-MRI Research Centre

- Implemented and trained on different architectures for volumetric segmentation such as 3D U-nets and V-nets in PyTorch
- Studied physical properties of microstructures in order to generate synthetic ones
- Augmented sparse dataset by populating scans with synthetic microstructures using Matlab and Julia

Jan. 2019 - Apr. 2019

Software Engineer

Craft Metrics

- Implemented backend system for customer provisioning using Go
- Further developed and integrated data pre-processing system from real-time data with main pipeline in Python

Jun. 2018 - Sep. 2018

R&D Electrical Engineer

Recycling Alternative

- Reconfigured a series of compost reactors and designed a data collection system in Python
- Established a Master-Slave communication between a main Raspberry Pi and various Arduino's
- Designed and implemented a control loop for each reactor to measure temperature, humidity levels, carbon dioxide, and ammonia concentrations in various initial conditions

Projects

Jan. 2024 - May 2024

Grounding LLM Plans via Simulation Context

UBC · CPSC 532V: Commonsense Reasoning in Natural Language Processing

- Investigated a potential solution on improving the planning capabilities of LLMs by providing feedback to generated plans through environment interaction

Sep. 2023 - Dec. 2023

Robot-to-Robot Transfer for Quadruped Locomotion

UBC · CPSC 554X: Machine Learning and Signals

- Used motion-imitation objectives with RL on reference motions from the Open-X Embodiment dataset to learn a policy for quadruped robots with different morphologies

Sep. 2022 - May 2023

State Estimation and Quadruped Locomotion

UBC · CPSC 448A: Directed Studies supervised by Professor Michiel van de Panne

- Implemented state estimator for the Solo8 quadruped robot, following the work of MIT's Biomimetic Robotics Lab
- Designed URDF model of the Stella quadruped robot for RaiSim physics engine
- Built RL environment using the gym framework for the Stella quadruped robot to train on simulation

- Sep. 2022 - Dec. 2022 **Automatic Curriculum Generation for Hard Exploration Tasks in Minecraft**
UBC · CPSC 532S: Multimodal Learning with Vision, Language and Sound
- Generated task traversal curriculum for Minecraft agent using GPT-3
 - Implemented PPO with Self-Imitation Learning and integrated it with Minecraft gym environment
- Sep. 2022 - Dec. 2022 **Survey on Domain Adaptation for Sim-to-Real Transfer in Robotics**
UBC · CPSC 532M: Machine Learning and Data Mining
- Conducted literature review on methods for Domain Adaptation in vision control robotics for Sim-to-Real transfer
- Sept. 2021 - Apr. 2022 **Open Sim2Real: a cost-effective robotic platform for RL research**
UBC · ENPH 479: Engineering Capstone II
- Built a monopod robot inspired by the design from the Open Dynamic Robot Initiative
 - Implemented a simulated model and designed a training environment using the gym framework
 - Trained on popular reinforcement learning algorithms (PPO, SAC) and successfully performed standing and balancing tasks in both simulation and the physical robot
- Sep. 2019 - May 2021 **Open Robotics Software Lead**
UBC Engineering Design Team
- Implemented control algorithms for the Turtlebot robot to perform household tasks using ROS and Python
 - Utilized multimodal inputs (audio and video) for navigation tasks
 - Ranked second place and won the people's choice award in Robocup@Home International Challenge
- Jan. 2020 - Apr. 2020 **Artifact Removal and Biomarker Segmentation**
UBC · EECE 571T: Advanced Machine Learning
- Performed artifact removal and biomarker segmentation for follicular lymphoma TMA cores using UNets
- Sept. 2019 - Dec. 2019 **Automated License Plate Detection Vehicle**
UBC · ENPH 353: Engineering Physics Project I
- Designed simulated robot in Gazebo integrated with ROS
 - Performed automated vision-controlled navigation
 - Trained neural network model for license plate detection

Teaching

- Sep. 2024 - Dec. 2024 **Graduate Teaching Assistant**
UBC · CPSC 533V: Learning to Move
- Jan. 2024 - Apr. 2024 **Graduate Teaching Assistant**
UBC · CPSC 340: Machine Learning and Data Mining

Sep. 2023 - Dec. 2023

Graduate Teaching Assistant
UBC · CPSC 314: Computer Graphics

Sep. 2022 - Apr. 2023

Undergraduate Teaching Assistant
UBC · ENPH 353: Engineering Physics Project I

Scholarships and Awards

2022

NSERC Undergraduate Student Research Award, \$6000

- Awarded to students demonstrating exemplary qualities for research in natural sciences

2019

UBC BAsC Dean's Honour List Designation

- Awarded to students in the Bachelor of Applied Science Program at UBC in any Winter Session with a sessional average of at least 80% while taking 30 or more credits.

2019

NSERC Experience Award, \$4500

- Awarded to companies for access to talented natural sciences and engineering undergraduate students for a work term.

Skills

Programming Languages

Python, C++, MATLAB, Julia, Go

Machine Learning Libraries

PyTorch, Tensorflow

Robotics Software

ROS package management (Colcon, CMake), Git, Ubuntu Linux

Embedded Systems

NVIDIA Jetson, Raspberry Pi, Arduino, STM32

Mechatronics

Machine shop, Electrical prototyping, CAD (Onshape, Solidworks)

Spoken Languages

English, Greek