

JESSICA NICHOLSON

PH.D. CANDIDATE

CONTACT

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🌐 <https://jessicanicholson1.github.io/>

📍 Bath, UK

SKILLS

- Python
- PyTorch
- Keras
- Pandas
- Scikit-Learn
- SQL
- MS Office Suite
- Cloud Computing

MACHINE LEARNING TECHNIQUES

- Reinforcement Learning
- Deep Reinforcement Learning
- Neural Networks (CNN, RNN, LSTM)
- Generative Models (VAE, GAN, DDPM)
- Transformers
- Bayesian Methods
- Clustering Methods
- Decision Trees

LANGUAGES

English	◆◆◆◆◆
Greek	◆◆◆◆◆
Python	◆◆◆◆◆

PROFILE

Proactive, research-oriented Machine Learning Ph.D. student with a focus in Reinforcement Learning. Over 4 years of experience in the software & technology industry. Proficient in various platforms and machine learning techniques. Able to effectively self-manage during independent projects, as well as collaborate as part of a productive team.

WORK EXPERIENCE

AI Lecturer

University of Bath

Feb 2023 - July 2023

- Created course materials, delivered lessons, and provided hands-on assistance during tutorials.
- Supervised four undergraduate dissertations, offering guidance and feedback for successful completion. Supervision projects included:
 - Solving a Cooperative-competitive Multi-agent Reinforcement Learning Task via Stabilised PPO Training and Self-play.
 - Exploration by Random Network Distillation in Sparse Reward MiniGrid Environments.
 - Deep Reinforcement Learning for Cross Asset Tactical Asset Allocation under a recessionary regime.
 - Relational Transfer Learning for Conditional Modelling of Guitar Amplifiers.

Senior Business & Data Analyst

The Hydrogen Technology Corporation

June 2018 - Sep 2019

- Utilized MS SQL, AWS, Tableau, and other visualization toolsets for data intelligence and analysis.
- Managed a team of five engineers to develop and maintain the platform's core set of 100+ API endpoints as part of the Agile process.
- Developed functional requirements for Python REST API endpoints, optimizing machine learning models like Monte Carlo simulations for hypothetical investment accounts.
- Defined functional requirement specifications to ensure core API cross-compatibility with Hydrogen's alpha-stage blockchain dashboard.

Senior Implementation Specialist Consultant

Thomson Reuters

Mar 2015 - June 2018

- Determined operational feasibility by evaluating client requirements, problem definitions, solution development, and proposing solutions for Fortune 100 Companies.
- Managed, coordinated, and directed a group of Pentaho Kettle Script developers while simultaneously testing and reviewing Python scripts for quality assurance.
- Formulated management techniques for quality data collection to ensure adequacy, accuracy, and legitimacy of data, with attention to all technical aspects.
- Managed integration of systems with external third-party systems such as PeopleSoft, Infosys, Flexmonster, Pentaho and Salesforce.

EDUCATION

Sep 2011
June 2015

**B.A. Major in Economics, Minor in Women & Gender Studies
(High 2:1)**

Rutgers University | *New Jersey*

Sep 2020
Sep 2021

MSc Data Science (First)

University of Bath | *Bath, UK*

Sep 2021
Sep 2022

**MRes in Accountable, Responsible and Transparent Artificial Intelligence
(First)**

University of Bath | *Bath, UK*

Sep 2022
Present

PhD in Accountable, Responsible and Transparent Artificial Intelligence

University of Bath | *Bath, UK*

PROJECTS

MSc Dissertation

The Laplacian Framework in Skill Acquisition: A Survey on Useful Option Discovery Techniques in Reinforcement Learning

- Critically analysed, reviewed, and successfully implemented the **Laplacian Framework** in both discrete and continuous OpenAI environments using Python.
- Implemented both model-based and model-free Reinforcement Learning algorithms to compare the performance of the option discovery skills acquired in each agent. Proved that although the Laplacian framework is successful in discrete, symmetrical environments, without the use of function approximation there is little progress to be made in continuous, non-symmetrical environments.

Reinforcement Learning

- Implemented and compared **9 different intrinsic motivation** methods with a DDPG learning algorithm on several MuJoCo simulations.
- Implemented a **Deep Q-Network** to solve OpenAI's Cartpole problem.
- Used various approaches including Epsilon Annealing, Double Deep Q-Networks, Duelling Networks, and Prioritised Experience Replay to improve results.

Machine Learning

- Implemented various neural network models such as **CNNs, RNNs, AEs, VAEs, GANS, Transformers, and DDPMs** using MNIST digit and fashion datasets.
- Implemented **Simple Linear Regression, KNN, Random Forest, and a Gaussian Process** using SARCOS robotics company's dataset of 45k 22-dimensional entries of robot arm measurements to predict a missing 23rd dimension.

Bayesian Machine Learning

- Implemented Bayesian Linear Regression, Monte Carlo Methods, Gaussian Process and Hamiltonian Monte Carlo Methods.

Applied Data Science

- Built a **Movie Recommendation System using a K-Nearest Neighbours** algorithm. The program recommends movies based on 100k entries of movie ratings from different users.
- Built a linear model for predicting e-vehicle numbers until 2030 using data from the British Government concerning electrical transport. Performed data wrangling and presented my findings on whether electrical generation in the UK will meet the demand for these vehicles through infographics.