JESSICA NICHOLSON

Ph.D. Candidate
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Machine Learning Engineer with 9 years of experience specializing in Python, Data Analysis, and Technical Consulting, combining strong analytical expertise with effective communication and business acumen to deliver tailored technical solutions. Experienced in leading end-to-end client projects with Fortune 100 companies. Skilled in building AI models from the ground up, with work culminating in publications and contributions to a Ph.D. thesis focused on cutting-edge advancements in reinforcement learning. Passionate about leveraging technology to create impactful, data-driven applications and advancing the field of AI.

EDUCATION

Ph.D. in Accountable, Responsible and Transparent Artificial Intelligence **Sep 2022 - Present**
University of Bath | *Bath, UK*

- Focus on **Reinforcement Learning**, specifically investigating the use of intrinsic motivation to incentivize exploration in problems with sparse reward environments.
- I specialize in Variational Autoencoders, using the KL divergence as an intrinsic reward signal, and explore learned priors in place of fixed standard Gaussian priors to enhance exploration efficiency in sparse reward scenarios.

MRes in Accountable, Responsible and Transparent Artificial Intelligence (First) **Sep 2021 - Sep 2022**
University of Bath | *Bath, UK*

MSc Data Science (First) **Sep 2020 - Sep 2021**
University of Bath | *Bath, UK*

- MSc Dissertation: The Laplacian Framework in Skill Acquisition: A Survey on Useful Option Discovery Techniques in Reinforcement Learning.
- Critically analyzed, reviewed, and implemented the Laplacian Framework in discrete and continuous OpenAI environments using Python, comparing model-based and model-free reinforcement learning algorithms to evaluate option discovery skills.

BA Major in Economics, Minor in Women & Gender Studies (High 2:1) **Sep 2011 - June 2015**
Rutgers University | *New Jersey*

WORK EXPERIENCE

Senior Business & Data Analyst **June 2018 - Sep 2019**
The Hydrogen Technology Corporation

- 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 **March 2015 - June 2018**
Thomson Reuters

- 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.

TEACHING EXPERIENCE

AI Lecturer & Tutor **Feb 2023 - Present**

University of Bath

- Created course materials, delivered lessons, and provided hands-on assistance during tutorials. Courses included:
  - Machine Learning (Undergraduate and Postgraduate)
  - Reinforcement Learning
  - Statistics
  - Software Technologies
  - Applied Data Science
- Supervised ten undergraduate students through dissertation processes, providing critical feedback and mentorship for successful project completion.

PUBLICATIONS

Nicholson, Jessica, Joseph Goodier, Akshil Patel, and Özgür Şimşek. **"Variational Learned Priors for Intrinsic Motivation."** NeurIPS 2024 Workshop on Intrinsic Motivation and Open-ended Learning (IMOL), 2024.

SKILLS

Programming: Python, PyTorch, Keras, NumPy, OpenAI Gym, Pandas, Matplotlib, Scikit-Learn, SQL, Cloud Computing, Hugging Face Transformers, MS Office Suite

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

Languages: English (Native), Greek (Native)

OUTREACH & COMMUNITY ENGAGEMENT

Sep 2024

Guest Speaker - Hayesfield Girls' School & Mixed Sixth Form

"The Power of Artificial Intelligence: Understanding How AI Works and Its Impact on Our World"

- Delivered an educational talk on AI fundamentals and its applications in healthcare, education, finance, and social media.
- Encouraged young women to engage with AI and technology, promoting diversity and ethical considerations in the field.
- Engaged with over 50 students, providing insights into the importance of diverse voices in AI.
- Discussed personal career journey into engineering and computer science, with a focus on current research in Reinforcement Learning.

July 2024

Volunteer AI and Careers Outreach - Sir Bernard Lovell Academy

- Collaborated with a team of PhD students to present artificial intelligence concepts to students aged 14-15.
- Delivered hands-on demonstrations of AI and Reinforcement Learning, including an interactive activity where students attempted to beat an AI high score on an Atari game.
- Participated in a careers Q&A session, discussing academic and professional experiences in AI and providing advice for students interested in pursuing engineering or AI-related fields.

PROJECTS

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.