James Ritchie

Sedinburgh, UK • Sedinburgh, Sed

Professional Experience

StretchSense

Senior Machine Learning Engineer

- Leading the development of machine learning models for our next-generation motion capture gloves integrating our proprietary sensor technology.
- Built models to perform gesture recognition enabling the gloves to be used as a controller for virtual reality training applications.
- Implementing and experimenting with novel deep learning architectures for real-time hand pose estimation from sensor data.
- Collaborating with software engineers to deploy models that can both train and infer in real-time on the edge.

• Amazon

Applied Science PhD Placement

- Worked on recommender systems in the Amazon Music ML team.
- Implemented and evaluated a new learning-to-rank approach using deep learning.
- Passed placement review with excellent feedback and received an "inclined-to-hire" offer.

University of Edinburgh

Teaching Support Provider

- Tutoring and marking for postgraduate-level machine learning courses alongside PhD studies.
- Nominated for the 'Best Student Who Teaches' award in 2019.
- Student Feedback:
 - $\circ\,$ "James was very approachable and answered questions in a way that you understood the material easily, which I greatly appreciated in a really hard course."
 - "The tutorials were very enjoyable and interesting ... The instructor for my group, James Ritchie, was very helpful and took the time to explain concepts that anyone in the group was struggling with."

• Kriya

Data Scientist

- Created machine learning models using Python/NumPy/scikit-learn for loan pricing and marketing at a financial technology startup specialising in invoice financing.
- Deployed models in production as microservices on AWS and Azure.
- Developed and maintained ETL pipelines to process large datasets from internal and external sources.
- Worked as part of an agile team to identify and solve problems using data, communicating results to a range of stakeholders across the business.

Skin Analytics

Software Engineer

London, UK July 2014 – February 2015

Startup using computer vision and machine learning for skin cancer diagnostics. Worked with the CTO and image processing engineers on infrastructure and apps for the company's products.

Berlin, DE (Remote)

September 2021 - November 2021

Edinburgh, UK

London, UK

September 2018 - August 2022

December 2015 - August 2017

Edinburgh, UK

April 2024 - Present

Education

University of Edinburgh

PhD in Machine Learning

Thesis: Bayesian Inference for Challenging Scientific Models **Supervisor:** Professor Iain Murray

Researched new methods to apply Bayesian inference to complex models of scientific phenomena from a range of fields including physiology and astronomy, using recent advances in probabilistic machine learning, generative AI, deep learning, numerical optimisation and statistics. Designed and ran multiple experiments using the Python scientific stack that successfully validated these methods on large real-world datasets.

• University of Edinburgh MSc(R) Data Science Edinburgh, UK September 2017 - August 2018

Result: Distinction **Thesis:** Bayesian Hyperparameter Optimisation with Progressively Larger Models

• University of Cambridge MEng MA Information and Computer Engineering

Cambridge, UK October 2010 - June 2014

Result: Honours with Merit

Publications

- Density Deconvolution with Normalizing Flows
 July 2020
 Tim Dockhorn*, James A. Ritchie*, Yaoliang Yu, Iain Murray
 *** Equal Contribution
 Invertible Neural Networks, Normalizing Flows, and Explicit Likelihood Models Workshop,
 International Conference on Machine Learning
- Scalable Extreme Deconvolution James A. Ritchie, Iain Murray Machine Learning and the Physical Sciences Workshop, Neural Information Processing Systems

Skills and Technologies

Programming Languages: Python.

- Machine Learning/Statistics: Bayesian inference, deep learning, computer vision, data visualisation, NumPy, SciPy, scikit-learn, Pandas, PyTorch, Jax, Matplotlib, GPU computing, TensorFlow, Keras.
- **Software Engineering:** Version control (Git), unit testing, continuous integration, web application development, cloud computing (AWS), containerisation (Docker), Linux, SQL (PostgreSQL, Amazon Redshift).

December 2019

Edinburgh, UK September 2018 - March 2023