LUKE BRAITHWAITE

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EDUCATION

University of Cambridge   Oct 2023 – Jun 2024
MPhil Advanced Computer Science, Distinction   *Cambridge, UK*
- **Modules taken:** Machine Learning and the Physical World, Principles of Machine Learning Systems, Machine Visual Perception, Theory of Deep Learning and Geometric Deep Learning.
- **Thesis:** 'HyperSheaf: a sheaf hypergraph library for multi-modal data' supervised by Prof. Pietro Liò. **Grade:** 84%.

University of Manchester   Sep 2020 – Jun 2023
BSc. (Hons) Computer Science, 1st (80.4%)   *Manchester, UK*
- **Relevant modules:** Data Science, Machine Learning, Natural Language Processing, Natural Language Understanding and Mathematical Topics in Machine Learning.
- **Dissertation:** 'Bias and Variance in Machine Learning' supervised by Prof. Gavin Brown. **Grade:** 82%.

EXPERIENCE

Casual Project Assistant (Software Engineer)   Aug 2023 – Oct 2023
The University of Manchester (Imago Software)   *Manchester, UK*
- Developed a Class 2 (Software) medical application that used ML to predict hyperglycemia episodes.
- **DevOps:** automated microservice deployment to AWS using Elastic Container Services to reduce deployment time.
- **Python:** converted existing ML codebase to Flask microservices with a REST API.
- **Communication:** documented design and security decisions to comply with regulatory requirements.

Graduate Software Engineer (Intern) — Data and Machine Learning   Aug 2022 – Oct 2022
THG   *Manchester, UK*
- **MLOps:** deployed and developed Kubeflow pipelines on GCP's VertexAI for production models and experiments.
- **Deep learning:** explored transformers for product recommendation tasks across e-commerce divisions.
- **Simulation:** developed a probabilistic simulation of server demand for the cloud services division.
- **Communication:** presented the simulation results back to cloud team to optimise stock-on-hand.

Casual Project Assistant (Software Engineer)   Jan 2022 – Jun 2022
The University of Manchester (Imago Software)   *Manchester, UK*
- Laid the foundations for open sourcing a research application for automating data cleaning produced by the Department of Computer Science.
- **Technical documentation:** documented a large legacy Java codebase from the scratch.

RESEARCH PROJECTS

HyperSheaf: a sheaf hypergraph library for multi-modal data   Dec 2023 – Jun 2024
- Explored how techniques from algebraic topology can be applied to heterogeneous graph data.
- **Geometric Deep Learning:** developed heterogeneous sheaf learners with a 2% increase on the state-of-the-art.
- **PyTorch:** reproduced existing approaches from literature using PyTorch and PyTorch Geometric.
- **Software engineering:** created the HyperSheaf library to make my proposed approaches more accessible.

Bias and Variance in Machine Learning   Sep 2022 – Jun 2023
- **ML reasoning:** explored how to reason about the behaviour of ML models using the bias-variance tradeoff.
- **Python:** designed a series of experiments to explore the effect of the bias-variance tradeoff on model performance.
- **Deep learning:** analysed how the bias-variance tradeoff breaks down for deep learning architectures.

TECHNICAL SKILLS

Languages: Python, PyTorch, JavaScript, TypeScript, ReactJS, Node.js
Software: Git, PyCharm, GitLab, GitHub
Frameworks: PyTorch Geometric, PyTorch, Flask

Voluntary Work

Dev Team Member   Sep 2022 – Jun 2023
UniCS (University of Manchester CS Society)   *Manchester, UK*
- Designed, developed and manage CS society applications and websites.
- Implemented new CMS systems to improve efficiency of page updates.
- Mananged and refactored in-house hackathon management system.

Hackathon Director   Aug 2021 – Aug 2022
UniCS (University of Manchester CS Society)   *Manchester, UK*
- Manged the 15-person hackathon team at UniCS and the overall coordination and planning of two hackathons.
- Great Uni Hack, in November 2021, had over 250 participants.

Additional

Rowing   Oct 2023 – Present
Peterhouse Boat Club   *Cambridge, UK*
- Noviced for the college during Michaelmas 2023 and continue to row for M3.

Area Umpire (Hockey)   Jan 2017 – Present
England Hockey   *UK*
- Level 2 outdoor umpire and on the area premier panel for both genders.
- Regularly umpire the East Men's and Women's Premier Divisions.
- Umpire nationally and internationally as part of the National Young Umpire Promising List.