Edward Gunn

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Research Interests

Reasoning, Multi-agent systems, Machine Learning, Reinforcement Learning, Game Theory, Open-endedness, Argumentative Reasoning, Transformer Architectures, Metric Learning

Research Experience

Radio Frequency Data Scientist, The Alan Turing Institute – London, UK   Sept 2023 – Present

- Member of the Electromagnetic Environment Program (EME) in the Defence AI Research (DARe) Centre
- Leading novel research in transformer-based metric learning for radar pulse deinterleaving:
  - Achieved 96.1% accuracy (AMI score) on synthetic dataset
  - Implemented training and inference pipelines in JAX
  - Demonstrated superior performance compared to prior GRU-based approaches
  - Successfully handled complex radar environments including frequency-hopping and variable PRI emitters
- Delivered research presentations at the EMSIG Symposium and Foundation Models Reading Group
- Active engagement with external stakeholders including funders and collaborators
- Mentored research interns and supervised a secondment student
- Organised weekly research discussions through the DARe reading group
- Attended OxML Summer School 2024: MLx Representation Learning and Generative AI
- Nvidia DLI qualified in Fundamentals of Deep Learning
- Organiser of the ATI climbing club

Publications

Radar pulse deinterleaving with transformer based metric learning   Nov 2024

Edward Gunn, Adam Hosford, Daniel Mannion, Victoria Nockles

Accepted Oral at IEEE International Radar Conference 2025

Education

University of Oxford, MEng Engineering Science   Oct 2019 – June 2023

- Classification: Second Class, Division One
- 86% in Machine Learning final examination
- **Fourth Year Project**: Communication efficient distributed reinforcement learning
  - Developed novel Evolution Strategies with Probabilistic Communication (ESPC) algorithm
  - Achieved 50% reduction in communication overhead while improving learning performance
  - Successfully demonstrated superior convergence on CartPole and Ant environments
  - Implemented in JAX for an over $100\times$ speed up
- Research Lead in OxAI's AI band project
- Relevant Modules: Advanced Mathematics, Machine Learning, Control Theory, Reinforcement Learning, Signal Processing

The Leys, Cambridge   Sept 2014 – Jun 2019

- 4 A* at A-Level in Maths, Further Maths, Chemistry, and Physics
- A in extended project: Developed positioning system using WiFi access points
- 12 A*s at GCSE

Industry Experience

Residential Advisor, Lady Margaret Hall – Oxford, UK   June 2023 – Aug 2023
- Assisted the teaching and advised on an advanced artificial intelligence course at the University of Oxford
- Fostered a productive learning environment for students

Software Engineer Intern, Accessia – London, UK   July 2022 – Sept 2022
- Summer Intern at Accessia, an early-stage start-up looking to disrupt the building access and control industry
- Led a team of 3 interns to develop an MVP for the visitor management system, collaborating with founders and investors
- Backend: Python, REST API, PyTest for testing, PyLint for code quality
- Frontend: React, TypeScript, hooks, React Redux
- Database: Designed & implemented PostgreSQL database
- Cloud deployment: Docker for local testing, AWS for cloud deployment

Part-Time Undergrad in Software, Arm – Cambridge, UK   July 2021 – May 2022
- Open Source Software division, Total Compute solutions team
- Developed a reference software stack for the total compute system

Technical Skills

Machine Learning: JAX, PyTorch, Lightning, Deep Learning, Reinforcement Learning, Transformers, Metric Learning

Software Development: Python (Expert), C++, Rust, TypeScript, SQL, REST APIs

Tools & Platforms: Linux, Cloud HPC, AWS, Docker, Git, LaTeX, Scientific Computing