Maria Kapros
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EDUCATION

MEng Computer Science, Advanced Mathematics Minor Oct 2018 - Jun 2023
University College London

Dissertation Project Oct 2021 - May 2022
Supervisor: Marc Deisenroth

- Studied the relationship between inference and optimisation algorithms in model-based RL, in particular the PILCO framework. The goal was to derive a set of algorithm design guidelines s.t. given a specific problem setting, we would have a good intuition about what state propagation and policy optimisation algorithms to use.
- Wrote a comparative analysis of various inference and optimisation algorithms.
- Based on preliminary experiments, we hypothesise the future of PILCO lies in pairing MC-based state propagation with either stochastic gradient descent backed by robust gradient estimators or with optimisers able to handle rough loss landscapes s.a. CMA-ES and its variants.

Relevant Coursework: Data analysis, Computer Security, Reinforcement Learning, Multi-agent AI, Distributed systems, Privacy-enhancing Technology, Computer Systems, Cryptography, Algorithm design and complexity theory, Stochastic calculus and uncertainty analysis, Deep Learning

Programming: Python, Java, C/C++, PyTorch, JAX, TensorFlow

EXPERIENCE

Independent researcher, AI safety Nov 2023 - Present
lesswrong/maria-kapros

- Exploring multiple approaches including weak-to-strong generalisation, model evaluation, formal verification.
- Up-skilling and developing inside views.

Sabbatical Nov 2022 - Nov 2023

- Developed broad understanding of the AI research landscape and solidified fundamentals.
- Explored different interests to identify a domain to specialise in i.e AI safety, Cognitive AI.
- Developed tools for thought and systems for being a more effective researcher and engineer.

Research Engineer Oct 2021 - Nov 2022
University College London
Design doc link

- Responsible for designing and implementing a proof of concept for the CBDC architecture presented in A Scalable Architecture for Electronic Payments
- Explored various system designs, cryptographic protocls, PETs and blockchain platforms to integrate with.
- Designed the APIs to support the payment protocol described in the paper, based on blind signatures and a simplified version of the TODA system and algorithmic primitives.
- Implemented five RESTful Spring services to provide the functionality corresponding to the different stakeholders in the payment system.
- Supervised a team of later joining PhD students.
- Presented the work in front of an audience of engineers, policy makes, and government actors from prestigious institutions. Received positive feedback and suggestions for further collaboration.

Software Engineer Intern Jun 2021 – Sept 2021
Amazon Prime Video

- Worked on the service side for Prime Video's personalised recommendation system.
- Implemented an API to revoke customer's consent and added corresponding unit and integration tests.
- Added service metrics to monitor successful/failed API invocations across deployment zones.
- Implemented a Java client to interface with the service's DynamoDB instance.
- Languages and technologies used: Java, Google Guice, CDK, Coral, Lombok, mockito, CloudWatch. Got introduced to CI/CD, learned the principles of designing, implementing and monitoring large-scale systems, became experienced with design patterns s.a dependency injection.

Research Engineer Intern May 2019 – Aug 2019
UCL Bioinformatics Lab

- Responsible for designing and implementing an image-segmentation pipeline based on a U-net neural network architecture to identify tumour lesions in the paip dataset of liver whole-slide images.
- Achieved an accuracy of 85
- Got introduced to academic research and applied Deep Learning.