MARWAN MOUSA

email | phone number | address

EDUCATION

Imperial College London - MSc Artificial Intelligence — Oct 2020 - Oct 2021

Distinction

- **Relevant Modules:** Reinforcement Learning, Natural Language Processing, Deep Learning, Probabilistic Programming.
- **Thesis:** Distributed Optimisation in Supply Chains using Multi-agent Reinforcement Learning.

Imperial College London - MEng Aeronautical Engineering — Oct 2015 - Jun 2020

First Class Honours

- **Relevant Modules:** Mathematics, Optimisation, High Performance Computing, Control Systems.
- **Thesis:** Nonlinear Model Predictive Control of Aeroelastic system.

WORK EXPERIENCE

causaLens - Data Scientist — Mar 2022 - present

- Data scientist in the *solution incubation* team which is responsible for building MVPs utilising causal AI.
- Designed web apps and dashboards that allow non-technical business users to interact with trained causal models showcasing features such as model explainability, fairness and counterfactual analysis.
- Built causal models for different business use cases, including a financial product recommender system POC utilising causal inference methods targeting advisors in wealth management.
- Deployed these apps with their models to a production environment using *Docker* and maintained them for internal use.
- Helped the research team in the development of internal optimisation libraries used to generate data-driven and causality-aware decisions that are actionable for businesses.

Equideum Health - Research Engineer — Jun 2021 - Mar 2022

- Investigated different federated learning frameworks and tested their use with healthcare data.
- Researched fair attribution methods for decentralised privacy-preserving machine learning using game-theoretic methods.
- Developed a python package that calculates the value of different datasets to a trained model in federated learning using Shapley Values as well as computationally efficient approximations for them.
- Research done helped lay the groundwork for creating an incentive mechanism for a decentralised private data marketplace.

University of Oxford - Research Assistant — Jun 2019 - Aug 2019

- Worked in a research team designing a state-of-the-art Personal Air Vehicle.
- Investigated different control systems for a model aircraft and practical solutions for testing it.
- Modelled the transition dynamics of the aircraft from vertical to horizontal flight and explored the corresponding trajectory optimisation of that phase.
- Integrated the controller on a scale model of the aircraft using a Pixhawk. The testing on the physical model was used to improve both the mathematical model and the controller algorithm and resulted in a successful flight test.

Rolls-Royce - Engineering Intern — Jun 2018 - Jun 2019

- Engineering Intern in the Whole Engine Systems Department.
- Managed different project priorities while working with more than one team simultaneously.
- Presented regular project updates to technical and non-technical project stakeholders.
- Performed Finite Element Analysis on civil engine components to assess their structural integrity as well as to test new FE code routines using standard analyses.
- Modelled the system dynamics for Rolls Royce's electrical Vertical Takeoff and Landing (eVTOL) concept with a team in the research department.

COURSES

Software Engineering Project — Dec 2020 - May 2021

MSc Artificial Intelligence

- Worked in a team of 6 to design a trust-less data marketplace in the form of a decentralised app that allows data owners to collaboratively train machine learning models using federated learning.
- Designed an incentive mechanism of rewards and penalties to incentivise participants in the marketplace to provide high-quality data and to act truthfully given their self-interest.
- Wrote and deployed *Ethereum* smart contracts for the app's blockchain-based backend and set up APIs to allow it to communicate with the rest of the app's components.
- Helped design the app's frontend using *react* to allow users to interact with the decentralised framework.
- Our team was awarded the Corporate Partnership Programme MSc Group Project Prize for demonstrating successful decentralised model training using healthcare data.

Bloomberg LP - Insight Week — Aug 2020

- Learned to use the Bloomberg Terminal and completed the Bloomberg Market Concepts course.
- Completed a project on "European Banking Trends Over the next 5 Years" with 6 other interns.

Data Analysis for Social Scientists (MITx) — Jun 2020 - Aug 2020

- Learned the fundamentals of data science including probability distributions, statistics and regression and their applications in the social sciences.
- Applied data manipulation, analysis and visualisation techniques in R with real economic data sets including the use of IV and multivariate linear regression.

Introduction to Quantitative Finance (IMC) — Jun 2019

- Learned how to price options including using Black-Scholes and the binomial model.
- Won second place in creating option pricing code in Python amongst 15 other groups of two.

SKILLS

IT Skills

- **Programming:** *Proficient* with MATLAB and Python *Intermediate* C++ and JS, *Basic* R and SQL.
- **Other:** *Proficient* with Unix, Microsoft Office and LaTeX.

Languages

- Arabic (*Native*), English, German (*Fluent*).

EXTRA-CURRICULAR EXPERIENCE

Undergraduate Teaching Assistant (Computing) — Oct 2019 - Jun 2020

Imperial Lacrosse — Oct 2019 - Jun 2020

Imperial Boat Club (Novice Rowing Team) — Oct 2016 - Jun 2017

Duke of Edinburgh Silver Award — Sep 2014 - Jun 2015