

OMAR ADALAT

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📍 London, England

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🌙 /nightly

🎓 Scholar

EDUCATION

PhD in Computing

Imperial College London

📅 January 2025 – to date

Supervisor: Dr.Francesco Belardinelli

Thesis: Verifiable and safe *multi-agent reinforcement learning*.

Also an aligned student with the *Safe and Trusted AI* Centre for Doctoral Training partnership between *Imperial College London* and *Kings College London*; additionally undertook teaching assistant duties at the Department of Computing.

BSc (Hons) in Computer Science

University of Bradford

📅 August 2019 – June 2022

Graduated with First Class classification. Dissertation led to conference publication.

📄 Bachelor's Project: 88.8%.

PROFESSIONAL EXPERIENCE

Academic Experience

Research and Knowledge Transfer Officer: Data Scientist

University of Bradford & Rakusen's Ltd

📅 November 2022 – September 2024 📍 Bradford & Leeds, UK

Applied ML research role on an Innovate UK project, with a local food manufacturing company actively aiming to modernise and incorporate ML & AI technology in to their process flows to achieve optimum baking quality as well as transitioning to more sustainable processes via less waste and energy savings through Industry 4.0 digital transformation, including integrating with computer vision models.

Developed a bespoke web dashboard for production data collection, integrated with IoT sensors & in-house Linux server. Created real-time predictive ML models (using deep neural networks architectures) currently deployed in production. Currently implementing state-of-the-art AI methods for optimal continuous control, namely offline reinforcement learning algorithms (e.g. conservative Q-learning), enhanced by Transfer Learning methods for products with limited data.

Research Assistant

University of Bradford

📅 March 2022 - September 2022 📍 Bradford, UK

Undergraduate research with the project aim being to investigate and implement methods for automated controller synthesis, applied to manufacturing systems. Explored multiple formalisms with due consideration to expressivity and combinatorial performance, and implemented two open-source software tools that have also been published as papers.

SKILLS & INTERESTS

Research interests

Formal Verification & Synthesis

Reinforcement Learning

Knowledge Representation & Reasoning

Automated Planning and Acting

Safe AI

Explainable AI

Neurosymbolic AI

Process Control

Technologies

C++

Python

LaTeX

Java

Go

JavaScript

TypeScript

Git

SQL

Prolog

Keras

TensorFlow

PyTorch

d3rlpy

Keras

numpy

Svelte

SvelteKit

PostgreSQL

AWARDS

- **Gold Medal + Best-in-Show** (Open Research Bradford)

📅 May 2024

- **Best Final Year Project** (University of Bradford)

📅 July 2022

- **Best Poster** (AIERC 2022)

📅 April 2022

🏆 200 GBP

REFERENCES

Dr. Francesco Belardinelli

@ Imperial College London

✉ f.belardinelli@imperial.ac.uk

PhD Supervisor

Associate Prof. Daniele Scrimieri

@ University of Bradford

✉ d.scrimieri@bradford.ac.uk

Supervisor for undergraduate & RA post

Prof. Savas Konur

@ University of Bradford

✉ s.konur@bradford.ac.uk

Supervisor under Innovate UK RKT project

OPEN SOURCE TOOLS

</> SCS: Situation Calculus Synthesis

Performs automatic optimal controller synthesis where production resources are represented by logical action theories in the **situation calculus** and high-level concurrent programs in **ConGolog**, where production recipes are also formalised as higher-level ConGolog programs, with multiple synthesis strategies (A* and Greedy Best First Search).

git : github.com/nightly/scs/

📦 FEDES: Finite Element Data Exchange System

A complete package that includes parsing Finite Element meshes and mapping between dissimilar meshes. An **Octree** spatial index was implemented, with partial parallelisation of index creation and complete parallelisation of **four** different advanced mapping techniques, with particular techniques applicable on the basis of element types and mesh densities.

git : github.com/nightly/fedes

🔗 PCS: Process Controller Synthesis

Automated synthesis of manufacturing process controllers where recipes are represented by high-level labelled transition systems (LTs) and manufacturing resources and capabilities are represented by low-level LTs, with incremental expansion of state space and uniform cost search for optimal synthesis.

git : github.com/nightly/pcs

MENTORSHIP, TEACHING & SUPERVISION

Enterprise Pro Module – Client Liaison

University of Bradford

📅 2022 – 2025

📍 Bradford, UK

- Acted as a business/professional client for group projects for computing students whom gathered development & testing requirements for allocated projects.
- Provided feedback and assessment at intermittent prototype stage and final solution stage, as well as addressing queries when raised throughout the project, and providing formal feedback/cosigning on requirement documents.
- Worked with 3 teams annually between February – April and offered multiple projects on behalf of Rakusens Ltd (Leeds, UK).

PUBLICATIONS

In order of publication (newest to oldest).

Published

1. Omar Adalat, and Savas Konur.
"Offline deep reinforcement learning within the baking industry".
Proceedings of the 12th International Conference on Control, Mechatronics and Automation (ICCMA).
doi:10.1109/ICCMA63715.2024.10843916.
 2. Clement Daah, Amna Qureshi, Irfan Awan, Omar Adalat, Savas Konur.
"Advancing IAM in the Finance Sector by Integrating Zero Trust and Blockchain Technology".
Proceedings of Mobile Web and Intelligent Information Systems. MobiWIS 2024.. Lecture Notes in Computer Science, vol 14792. Springer, 2024. doi:10.1007/978-3-031-68005-2_7.
 3. Omar Adalat, Daniele Scrimieri, and Savas Konur.
"Optimal Manufacturing Controller Synthesis Using Situation Calculus".
Proceedings of the Forty-third SGA International Conference on Artificial Intelligence, Artificial Intelligence XL. Lecture Notes in Computer Science (LNAI), volume 14381, Springer. 2023. doi:10.1007/978-3-031-47994-6_19.
 4. Daniele Scrimieri, Omar Adalat, Shukri Afazov, and Svetan Ratchev.
"An integrated data-and capability-driven approach to the reconfiguration of agent-based production systems".
In: *International Journal of Advanced Manufacturing Technology*. Springer, Vol. 124, 2023.
doi:10.1007/s00170-022-10553-0.
 5. Omar Adalat, Muhammad Talal, Mohammed Ali Cherif, and Daniele Scrimieri.
"Model-based generation of manufacturing process plans through incremental topology formation".
Advances in Computational Intelligence Systems. UKCI 2022. Advances in Intelligent Systems and Computing, vol 1454.
Springer, Cham.. doi:10.1007/978-3-031-55568-8_26.
 6. Omar Adalat and Daniele Scrimieri.
"Efficient Finite Element Mesh Mapping Using Octree Indexing".
Advances in Computational Intelligence Systems. UKCI 2022. Advances in Intelligent Systems and Computing, vol 1454.
Springer, Cham.. doi:10.1007/978-3-031-55568-8_29.
 7. Daniele Scrimieri, Omar Adalat, Shukri Afazov, and Svetan Ratchev.
"Modular reconfiguration of flexible production systems using machine learning and performance estimates".
In: *Manufacturing Modelling, Management and Control (MIM)*. IFAC-PapersOnLine, Vol. 55, Issue 10. 2022. DOI:
doi:10.1016/j.ifacol.2022.09.412.
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