

Al-Hussein Abutaleb

London | alhussein.abutaleb@gmail.com | +44 7976 417014 | LinkedIn | GitHub

Highlights

- Research experience in Machine Learning and Deep Learning, specialising in Knowledge Distillation and Spurious Correlations, complemented by a strong background in Systems and Computational Biology
- Award-winning educator and science communicator, adept at engaging both technical and non-specialist audiences
- Interdisciplinary background spanning engineering, neuroscience, and artificial intelligence

Skills

Languages: Python, JavaScript/React, SQL

Machine Learning/Deep Learning Frameworks: PyTorch, TensorFlow/Keras, Scikit-learn, XGBoost, LightGBM, Pandas

Artificial Intelligence/ Large Language Models (LLM) Tools: LangChain, LangSmith, OpenAI API, HuggingFace Transformers, Pinecone, ChromaDB

MLOps/Tools: Docker, Git, Weights & Biases, MLflow, Jupyter, VSCode

Techniques: Statistics, Differential Calculus, Linear Algebra, Probability Theory, Data Analysis, Semantic Search

Experience

Lead AI Engineering Teacher, IronHack – Riyadh, Saudi Arabia Feb 2025 – May 2025

- Delivered an intensive in-person AI Engineering Bootcamp at the Saudi Digital Academy (SDA), mentoring 23 students through a rigorous full-stack ML curriculum enhanced with custom content
- Three students were invited by Saudi Arabia's Ministry of Communications and Information Technology to present their projects
- Managed a team of two teaching assistants throughout the programme
- Covered foundational topics including Machine Learning, Computer Vision, and introductory NLP; advanced modules included NLP, LangChain, AI Agents, and Retrieval-Augmented Generation (RAG)

AI Teaching Fellow, People-Centred AI Institute (PAI) – Guildford, UK Sept 2024 – Feb 2025

- Supervised and moderated the 'Fundamentals of Machine Learning' module for the online MSc AI programme at the People-Centred AI Institute (PAI), University of Surrey
- Designed week-long AI Bootcamp for PAI's new PhD students at the Centre for Doctoral Training (CDT)

Doctoral AI Researcher, People-Centred AI Institute (PAI), University of Surrey – Guildford, UK Oct 2022 – Sept 2024

- Built knowledge distillation pipelines to train student networks to become more efficient feature extractors. The work used manual modification of the final feature layer in a ResNet50 as a baseline and compared outcomes against PCA, kPCA, LDA, plus knowledge distillation
- This novel approach, when applied to compress feature vectors from size 2048 down to 8, resulted in only a 1.39% decrease in mAP on a unimodal fine-grained image retrieval task. Leading to a 256-fold reduction memory requirements for storing the embeddings
- Conducted additional research with the Journalism in AI group on public perceptions of ChatGPT-like tools on Twitter (X); paper currently under review

Machine Learning Intern, Entropy.AI – Guildford, UK/ Riyadh, Saudi Arabia Sept 2023 – April 2024

- Designed a pipeline to identify most profitable medium and long-term stock investments
- Analysed *fundamental* financial data from companies listed on the Saudi stock exchange (Tadawul)
- Developed a synthetic data generation technique to address limited financial data availability, using four quarterly data points to simulate 10 years of quarterly financial data, including the market downturn due to COVID-19

- Developed an ensemble of three classical ML pipelines (Scikit-Learn). Outputs from Linear Regression, Random Forest Regressor, and XGBoost models were combined using weighted averaging to predict annual returns for the entire Tadawul index

Systems Biology Researcher, University of Sheffield – Sheffield, UK

May 2011 – June 2020

- Generated cell growth data and amino acid flux measurements using mammalian cell culture techniques and High-Performance Liquid Chromatography (HPLC) analysis
- Built and fine-tuned a large genome-scale metabolic network of recombinant CHO cell metabolism using these wet lab experimental data
- Validated the 2300-reaction network against published models and open-source gene and protein databases. Implemented the model using Systems Biology Markup Language (SBML), employing Flux Balance Analysis (FBA) for *in silico* flux predictions
- Integration of HPLC results, literature, and database annotations revealed substantial discrepancies in widely-used published metabolic models in the literature
- The work resulted in a set of guidelines towards standardising flux metabolic models

Education

University of Aberdeen, MSc in Artificial Intelligence with *Distinction*

Sept 2020 – October 2021

- Graduation project: **Chameleon** – An AI-driven pedagogical tool designed to enhance medical students' skills in clinical history-taking. Developed using React.js, Django, Docker, and the Dialogflow API (GCP), with backend deployment on DigitalOcean
 - The work was published in a top tier AI Conference (**AAMAS**) in 2022
 - Chameleon was developed in collaboration with the University of Aberdeen Medical School
 - Evaluation involved interviews with 10+ physicians and usability testing with 50+ UK medical students from over 50 medical schools
 - Over 74% of users indicated they would use the Chameleon system again; this number rose to 91% if improvements were implemented
- **Nutlify**: a rule-based Natural Language Generation (NLG) MVP to generate dietary insights from raw dietary data. The rules were built using the Arria NLG Platform. The product idea was ground-breaking at the time as no existing solutions filled this gap. Pioneered this concept in an unserved market as lead designer

University of Sheffield, MSc in Cognitive and Computational Neuroscience

Sept 2008 – October 2009

- **Summer Project**: Developed a computational model of the basal ganglia with a modified Izhikevich spiking neuron model.
 - Simulated neuronal dynamics of over two million neurons representing D1 and D2/D3 dopamine receptors using Ordinary Differential Equations (ODEs)
 - This was a novel variation over vanilla neuron models of Dopamine receptors in the Basal Ganglia which ordinarily did not take into account the molecular affinity differences between receptors

Jordan University of Science and Technology, BSc in Biomedical Engineering

Sept 1999 – December 2004

Publications

Chameleon-A Framework for Developing Conversational Agents for Medical Training Purposes. 21st International Conference on Autonomous Agents and Multiagent Systems **AAMAS**, 2022.

Al-Hussein Abutaleb, Bruno Yun

Awards

- Best Presentation Award, Annual Research Conference – Department of Chemical and Biological Engineering, University of Sheffield (2015)
- Best Graduate Teaching Assistant (GTA) Award, Department of Chemical and Biological Engineering, Sheffield (2013/2014)
- NUS Black Students' Officer of the Year (2009): Recognised for leadership in multiple student societies, election victories, and significant contributions to the representation of Black students across the UK