Al-Hussein Abutaleb

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Summary

AI engineer and educator with a deep learning research background (knowledge distillation, computer vision, and retrieval) and current, hands-on command of LLM, RAG, and agentic systems developed through intensive teaching and research. First-author **AAMAS** publication on conversational agents, and end-to-end delivery of an evaluated AI system (Chameleon) from research and user studies through deployment. Combines rigorous ML foundations with a proven ability to translate frontier methods into working systems for technical and non-specialist audiences alike, across the UK and Gulf.

Skills

Languages: English (Native/Fluent), Arabic (Native/Fluent)

Programming: Python, JavaScript/React, SQL

ML/DL Frameworks: PyTorch, TensorFlow/Keras, Scikit-learn, XGBoost, Pandas

LLM & Agentic Tools: LangChain, LangSmith, OpenAI API, Hugging Face Transformers, Pinecone, ChromaDB

Techniques: Retrieval-Augmented Generation (RAG), AI Agents, Fine-tuning (LoRA/QLoRA/PEFT), Reranking, Advanced Chunking, Semantic Search, Model Evaluation, Knowledge Distillation, Quantization

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

Experience

AI Engineering Instructor (Freelance), IronHack — Feb 2025 – Present

- Design and deliver production-focused AI Engineering curricula covering LLMs, RAG, AI agents (LangChain), computer vision, and NLP; 1,200+ class hours across in-person and remote cohorts
- **Lead Instructor, Saudi Digital Academy** *(Feb 2025 – May 2025, Riyadh – in person)*: led 23 students through an intensive full-stack AI programme; three students were invited by Saudi Arabia's Ministry of Communications and Information Technology to present their projects
- Translate frontier ML concepts into hands-on, working systems for both technical and non-specialist audiences (the core communication skill of a forward-deployed engineer)
- Supported learners into roles at organisations including Oracle, Lucidya, and government institutions; managed a team of two teaching assistants across concurrent cohorts

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

- Taught and supervised 400+ class hours in AI and Machine Learning across the online and in-person MSc AI programme; led delivery of the *Fundamentals of Machine Learning* module including supervision, assessment, and moderation
- Designed and delivered a week-long AI bootcamp for incoming Centre for Doctoral Training PhD students on modern ML methods and research-oriented implementation

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

- Built knowledge distillation pipelines training compact student networks as efficient feature extractors, benchmarked against PCA, kPCA, and LDA baselines on a ResNet50 backbone
- Compressed image retrieval embeddings from 2048 to 8 dimensions with only a **1.39% mAP drop** on a fine-grained retrieval task, a **256× reduction** in embedding storage memory
- Co-authored research (Journalism in AI group) on public perception of ChatGPT-like tools using large-scale Twitter/X data (topic modelling and sentiment analysis); revised and resubmitted

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

- Built an ML pipeline to identify profitable medium- and long-term equities on the Saudi stock exchange (Tadawul) from fundamental company data
- Engineered a synthetic-data method expanding four quarterly data points into ∼10 years of simulated quarterly data (including the COVID-19 downturn) to overcome sparse financial history
- Developed a weighted ensemble (Linear Regression, Random Forest, XGBoost) in Scikit-learn to predict an-

nual returns across the index

Systems Biology Researcher, University of Sheffield – Sheffield, UK May 2011 – June 2020

- Built and validated a 2,300-reaction genome-scale metabolic model of recombinant CHO cell metabolism (SBML, Flux Balance Analysis) from wet lab HPLC data, benchmarked against published models and open gene/protein databases
- Identified significant discrepancies in widely-used published metabolic models, producing a set of guidelines toward standardising flux-based metabolic modelling

Education

University of Aberdeen, MSc in Artificial Intelligence with *Distinction* Sept 2020 – Oct 2021

- **Chameleon**: an AI-driven conversational agent for clinical history-taking training, **built in 2021, before the ChatGPT era** (React.js, Django, Docker, Dialogflow/GCP). Published at **AAMAS 2022**; developed with Aberdeen Medical School and evaluated with 10+ physicians and 50+ UK medical students, 74% of whom said they would use it again. End-to-end delivery across user research, stakeholder collaboration, deployment, and impact evaluation

University of Sheffield, MSc in Cognitive and Computational Neuroscience Sept 2008 – Oct 2009

- Built a computational basal ganglia model using a modified Izhikevich spiking neuron model, simulating 2M+ neurons with ODE-based dopamine receptor dynamics and receptor-specific affinity differences

Jordan University of Science and Technology, BSc in Biomedical Engineering Sept 1999 – Dec 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 (first author), Bruno Yun

The Impact of ChatGPT on Employment: Topic Modeling and Sentiment Analysis. Computers in Human Behavior Reports, 2026 (revised and resubmitted).

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, University of Sheffield (2013/2014)