

Abdullah Elsayed

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Research interests: Neurosymbolic AI and code-based world models, with applications in robotics.

EDUCATION

MEng in Computer Science and Software Engineering Sep 2019 - Jun 2023

University of Birmingham, Birmingham, UK — **First-Class Honours** | GPA: 4.25 (overall weighted mark: 75)

Master's Dissertation: Thoth: DSL for Multitier Web Development (78%) | **Supervisor:** Dr. Vincent Rahli

Selected Modules: Functional Programming (96) | Computer Vision and Imaging (84) | Evolutionary Computation (84) | Human-Computer Interaction (Extended) (80) | Programming Language Principles, Design, and Implementation (Extended) (79) | Intelligent Robotics (76) | Machine Learning and Intelligent Data Analysis (71) | Neural Computation (68)

RESEARCH PROJECTS

Specification Discovery Benchmark [abdufelsayed/specification-discovery-benchmark](#) Sep 2026 - Oct 2026

Text-based environments testing whether language models understand a problem before committing to a solution, with executable Quint specifications to check their stated understanding.

- Designed three environments with four configurations each, and automatic scoring that executes each submitted specification against the environment beyond the model's observations.
- Evaluated K2-Horizon-3.7B over 120 attempts: 64 established what the task needed, but only 24 were correct.
- 18 of 45 voluntary submissions came before the task was understood, and no specification described every action correctly.

Thoth: Multitier Web DSL & Compiler [abdufelsayed/thoth](#) Sep 2022 - Mar 2023

A multitier DSL built with OCaml for writing full-stack web applications in one language, compiling to React, Node.js, and Prisma. MEng dissertation.

- Designed a multitier DSL for database models, typed server queries, client interfaces, authentication, and permissions.
- Implemented cross-tier type checks that catch impedance-mismatch errors at compile time.
- Todo and Chatroom needed about 15% of the reference Node/React source lines.
- In a comprehension study, five of nine participants explained every snippet.

INDUSTRY EXPERIENCE

Founding Engineer, Aim AI Jan 2024 - Apr 2026

United States (Remote)

- Designed and implemented the Python/FastAPI runtime for live SIP/WebSocket calls, with streaming STT, LLM, and TTS integration, interruption handling, and call transfers.
- Built an automated evaluation system using LLM judges, annotated datasets, and simulated caller personas, so customers could catch regressions before deploying a change.
- Recruited, onboarded, and mentored the next two engineers.
- Led development of Aim's Next.js dashboard for configuring agents and reviewing calls.
- Helped scale the platform to about 1M daily phone calls, with 99% uptime and 1-2s response latency.

Full-Stack Engineer, Fusion XYZ Jul 2022 - Sep 2022

Melbourne, Australia (Remote)

- Built HiddenGem's Next.js NFT analytics dashboard for real-time floor prices, trading volume, trending collections, and wallet insights.
- Helped build HiddenGem's backend for tracking NFT sales, transfers, and marketplace activity on Ethereum.
- Defined coding standards and wrote project documentation for a remote early-stage team.

OTHER PROJECTS

Weldr [weldr-ai/weldr-old](#)

May 2024 - Jan 2026

AI coding workspace for building full-stack apps through chat, with an interactive architecture canvas and a queryable code graph for agents. Part of UoB Elevate, the University of Birmingham's startup incubator.

- Built an incremental TypeScript/JavaScript code analyzer that extracts declarations and dependencies into a queryable semantic graph for each snapshot.
- Built agent tools that search and query the graph, and a React Flow canvas that displays pages, endpoints, and models from each snapshot.

U-Net for Cardiac MRI Segmentation [abdufelsayed/unet-cardiac-segmentation](#)

Nov 2021

Neural Computation coursework on four-class cardiac MRI semantic segmentation using the ACDC dataset.

- Implemented and tuned a four-level U-Net in PyTorch, using batch normalisation, transposed convolutions, and skip connections.
- Outperformed an FCN-8 baseline (Dice 0.87-0.90 vs 0.44-0.50); the submitted model scored 0.888 on the private leaderboard.

Coverage Planning Comparison [abdufelsayed/ros-coverage-planning-comparison](#)

Dec 2021

Group coursework comparing zigzag, reactive spiral, and depth-first backtracking coverage in ROS Stage.

- Started the ROS planning package and helped implement odometry-based motion control and laser obstacle detection.
- Co-authored a comparison across four maps. Backtracking averaged 65.9% coverage; spiral covered the most area per unit of reported travel distance.

Monte Carlo Localisation [abdufelsayed/ros-particle-filter-localisation](#)

Oct 2021

Group coursework using a ROS particle filter to locate a robot within a known map.

- Helped implement systematic resampling, random-particle injection for recovery, and pose estimation from the largest K-means cluster.
- Co-authored a qualitative comparison with AMCL on recovery from poor initial poses and stability as the robot moved.

AWARDS

- **University of Birmingham International Outstanding Achievement Scholarship.**
- **Computer Science School International Excellence Scholarship** (awarded annually for 4 years).

SERVICE & OUTREACH

Co-organizer, Hackathons for Schools

Aug 2020

University of Birmingham (Remote)

- Co-organized a remote COVID-19 hackathon with organizers from multiple UK universities, introducing high school students to programming, and taught a web development workshop to about 20 students.

TECHNICAL SKILLS

Languages: Python, TypeScript, JavaScript, OCaml, Haskell, C, Java, Quint

AI / Robotics: PyTorch, NumPy, Pandas, ROS, LLM agents, LLM-as-judge evaluation

Web & Infrastructure: React, Next.js, Node.js, FastAPI, PostgreSQL, GCP, AWS, Docker

Spoken: Arabic (Native), English (Fluent)

REFERENCES

Dr Vincent Rahli, Senior Lecturer, University of Birmingham (dissertation supervisor) | v.rahli@bham.ac.uk

Albert Kim, CEO & Co-founder, Aim AI (direct manager) | albert@aimnow.ai