Dayyán O'Brien

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Education

University of Edinburgh — Edinburgh, UK
Masters of Informatics [transcript] (**First Class Honours**) — *Sep 2019 - May 2024*

- **Relevant coursework:** Natural Language Understanding, Generation & Machine Translation, Machine Learning & Pattern Recognition, Machine Learning Practical, Knowledge Graphs, Speech Processing, Speech Synthesis, Reinforcement Learning, Reasoning & Agents

Abbey Christian Brothers' Grammar School — Newry, UK
Secondary school (AAA in A-Level Mathematics, Physics and Computer Science) — *Sep 2012 - May 2019*

Publications

Dayyán O'Brien. 2024. *Prompting Numerical Commonsense Reasoning across Languages.* Outstanding Honours Thesis, University of Edinburgh.

Dayyán O'Brien. 2023. *Numerical Commonsense Reasoning across Languages.* Outstanding Honours Thesis, University of Edinburgh

Research Experience

University of Edinburgh — Edinburgh, UK
Junior Research Assistant, Supervisor: Patrick Chen — *May 2024 – July 2024*

- ILCC Institute (**ranked # 1** in NLP by CSRankings.)
- Streamlined language code processing for the OPUS (Open Parallel Corpora) project.

Junior Research Assistant, Supervisor: Mirella Lapata — *Jun 2022 – April 2024*

- Designed interfaces and collected **over 33,000 translations** for a mask-infilling numerical commonsense reasoning dataset (NumerSense). This dataset was translated into Russian, Arabic and Chinese in-house.
- Performed diagnostic experiments on Llama 2, Mistral, XLM-RoBERTa, mBERT, mT5, mBART & mGPT.
- Performed experiments on prompting, transfer learning, plurality across languages and linguistic-specific phenomena. This consisted of Arabic declension, Russian case declension and Chinese word forms.

Teaching Experience

University of Edinburgh — Edinburgh, UK
Demonstrator for Accelerated Natural Language Processing (INFR11125) — *Sep 2023 – Nov 2023, Part-time*

- Demonstrating two labs of 50 students each with a co-demonstrator, guiding students through lab material.

Tutor for Foundations of Natural Language Processing (IINFR10078) — *Jan 2023 – May 2023, Part-time*

- Tutoring two groups of 13 students through questions given out on the previous week.

Tutor for Foundations of Data Science (INFR08030) — *Sep 2022 – May 2023, Part-time*

- Assisting a tutorial group of 40 students with a co-tutor, helping students with problems relating to courseworks and tutorial questions.

Demonstrator for Foundations of Natural Language Processing (INFR10078) — *Jan 2024 – March 2024, Part-time*

- Demonstrating labs and answering questions on Piazza.

Self-employed — Edinburgh, UK
Private tutor — *Sep. 2020 – March 2024, Part-time*

- Tutoring mathematics, physics and computer science up to an undergraduate level.

Awards & Achievements

Outstanding Honour's Project (2024) Awarded to Informatics Honour's Project which score over 80% (equivalent to publishable quality.)

Outstanding Honour's Project (2023): Awarded to Informatics Honour's Project which score over 80% (equivalent to publishable quality.)

Runner-up best coursework for Reasoning and Agents (2021): Awarded for creating Quoridor in Haskell using a minimax and alpha-beta pruning AI.

Exemplary project for Foundations of Data Science (2021): Exemplary material for a data science project on JustEat cycling usage in Edinburgh. Shown to future year groups.

Projects

Human Activity Recognition | PDIOT (INFR11239) Sep 2023 – Jan 2023

- Created a classifier on Android for human activities (walking, running, sitting etc) and respiratory symptoms with a team of three using a Respeck sensor.
- Used a combination of LSTM and multinomial logistic regressions to achieve 95% accuracy

Festival & HTK speech recognition report | SP (LASC10061) Oct 2021 – Dec 2021

- Created a unit-selection voice, and compared to state-of-the-art.
- Investigated The Festival Speech Synthesis Program, exploring for mistakes in each stage of the pipeline and wrote a small Python interface for displaying these.
- Ran experiments on The Hidden Markov Model Toolkit, including the effects of the number of available parameters on single and sequential digit recognition.

Automated Tangram Generation | MLP (INFR11223) Jan 2023 – May 2023

- Worked in a team of three people to generate abstract tangrams based on a given caption with experiments on implement a custom GAN and encoder-decoder model.
- Created a new task, based on a Tangram captioning dataset to train coordinates of Tangram pieces.
- Used BERT, T5, CLIP and SBERT for pre-trained text encoding.

Bayesian optimisation in Gaussian processes | MLPR (INFR11130) Jan 2021 – Mar 2021

- Applied hyper-parameter tuning using Bayesian optimisation in Gaussian processes on the UCI dataset.

WaiterBot | SDP (INFR09032) Jan 2022 – May 2022

- Lead of software on a robot which would move around a restaurant and deliver food back and forth from the kitchen to the table.
- Worked with ROS (Robot Operating System) in order to define vision and pathfinding for the robot.
- Designed a touch-screen interface in Kivy which connected with the ROS and a magnetic door subsystems.

Work Experience

Kainos Belfast, UK

Software Engineer *Mar 2018, Work experience*

- Designed a web-interface with a team of four people.

Bombardier Belfast, UK

Engineer *Sep 2017, Work experience*

- Observed all aspects of an aircraft manufacturing facility, shadowing management, composite manufacturing and tooling.

Computer Hospital Newry, UK

Computer technician *Oct 2017, Work experience*

- Repaired PCs and phone screens. Automated the eBay interface used to sell products.

Skills

Programming: Python, Java, Haskell, LaTeX, SQL

Libraries: PyTorch, Tensorflow, HuggingFace, NLTK, NumPy, Slurm, Kubernetes, Docker, MTurk, pandas, sklearn, statsmodels, Matplotlib, Festival, HTK, Tkinter, Google Cloud VM, Weather & Maps API, Seaborn, Kivy, JUnit, Maven

Languages: English (Native), German (Professional)