Liam Watts

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SUMMARY

I am a Computer Science Honours graduate from the University of Sydney, where I completed a thesis on Few-Shot Learning in Natural Language Processing. I've been studying in the Machine Learning field for three years through taking courses in both University and Coursera, designing and applying models at Telstra and now through my research in NLP. Currently I'm at Australia's National Science Agency, CSIRO, researching NLP's applications in Medical Information Retrieval.

EDUCATION

Bachelor of Advanced Studies (Honours) (Computer Science) 85 WAM, First Class | Mar 2021 - Dec 2021
UNIVERSITY OF SYDNEY

- Honours thesis: *The Applications of Meta-learners to Few-Shot Incremental Learning*
  Joint Supervisors: Senior Lecturer Josiah Poon, Lecturer Caren Han
- Coursework: Natural Language Processing, Deep Learning, Advanced Machine Learning

Bachelor of Computer Science with Distinction 89 WAM | Feb 2018 - Dec 2020
UNIVERSITY OF WOLLONGONG

- Major in Big Data
- International exchange to Singapore and Dubai in 2019
- Coursework: Machine Learning Algorithms and Applications, Computational Intelligence, Linear Algebra and Groups, Advanced Engineering Mathematics and Statistics

EMPLOYMENT

CSIRO | STUDENT RESEARCHER Dec 2021 - Mar 2022

- I'm working in the Data61 Language and Social Sciences team under the supervision of Dr. Sarvnaz Karimi and Dr. Maciej Rybinsky
- I've completed a literature review of Neural IR methods, trained the 3 billion parameter T5 model on a computing cluster with slurm, huggingface transformers and deepspeed
- Reimplemented the best base retrieval method of TREC2021 Clinical Trials track and developed an improved version with similar nDCG@10 for a 10x smaller model
- Currently I'm designing a method for rephrasing retrieval of clinical trials as an NLI problem to improve factual accuracy. In the future I will write and publish a paper describing this algorithm

TELSTRA | DATA ANALYTICS AND MANAGEMENT SUMMER VACATIONER Nov 2020 – Feb 2021

- I performed feature engineering for large amounts (1-5Gb) of unstructured event data with Numpy and Pandas
- Then trained LSTMs to perform time series classification on the event data using Tensorflow
- I optimised the model for the particular business problem, focusing on the precision metric. Then I assisted in deploying the model to production

TELSTRA | DATA ANALYST INTERN Jan 2020 – Feb 2020

- Extracted customer demographic data from a large database using SQL
- Created and presented visualisations of customer demographic data in Matplotlib
- Designed a model to predict customer conversions and deployed it to AWS

TELSTRA | BIG DATA INTERN Nov 2018 - Dec 2018

- Retrieved data from HIVE with SQL and Spark
- Extracted features from data and performed analysis with Python and Pandas
- Created an interactive graph with D3.js to visualise the results

PROJECTS

HONOURS THESIS ⬈   2021

- My thesis applied Few-shot learning with Meta-Learners to problems more grounded in the real world
- I identified a pattern of unrealistic evaluation methods in Meta-Learning and argued that they are better applied to Incremental Learning
- I identified limitations in and improved on the few incremental meta-learners available
- Through this project I've developed as a researcher. I learnt how to critically review literature, find a research problem, design solutions to said problem, perform experiments, give analysis and communicate this process through academic writing

NEURAL ORDINARY DIFFERENTIAL EQUATIONS BASED LANGUAGE MODELLING ⬈   2021

- A group work research project in which we applied Neural Ordinary Differential equations (NODE) to language modelling
- I lead the project with my experience in NLP. I worked on designing and implementing new models to adapt NODE to language modelling, describing these techniques in the report along with editing
- We introduced improvements to our baseline NODE model but found NODE models, in general, are not suited to this task and perform worse than traditional LSTMs and Transformers

VALUETUBE ⬈   2020

- A group work capstone project supervised by Professor Davoud Mougouei where we built an alternate version of YouTube with a recommendation algorithm based on suggesting people videos that match their values
- I designed and implemented the recommendation algorithm, including sourcing and labelling a dataset of video comments and applying multiple NLP models to perform recommendation

A CLASSICAL AI FOR PLAYING CONNECT 4 ⬈   2018

I learnt the basics of classical AI algorithms for evaluating game trees, then created a program to play connect 4 in Java

EXTRACURRICULAR LEARNING

SELF STUDY OF JAPANESE   2019 Onwards

I started self-studying Japanese on my exchange to Singapore and am now able to converse, read books and the news

DEEP LEARNING SPECIALIZATION | ANDREW NG, COURSERA   2019

MACHINE LEARNING | ANDREW NG, COURSERA   2019

INTRODUCTION TO DATA SCIENCE IN PYTHON | UNIVERSITY OF MICHIGAN, COURSERA   2018

SKILLS

Languages: Python, SQL, C++, JavaScript, Java, R
Libraries: Pytorch, Pytorch Lightning, Tensorflow, Transformers, Numpy, Pandas, Matplotlib

AWARDS

UOW GLOBAL HONOURS SCHOLAR   2018-2020

WESTPAC YOUNG TECHNOLOGIST SCHOLARSHIP   2018-2020

DEAN'S MERIT LIST   2018, 2020