

# JIAXIN ZHANG

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## Summary

I am currently a PhD student in Artificial Intelligence at the University of Strathclyde, my research focuses on advancing AI's numerical reasoning through deep learning technologies. I have strong foundation in NLP and deep learning principles including Large Language Models, and 5 years experience in Python and relevant frameworks such as PyTorch and Hugging Face. Prior to my PhD, I accumulated two years of professional experience as a Natural Language Processing Engineer. My commitment to AI research is driven by a philosophy of "Making the World a Better Place", which inspires my active involvement in public service and community assistance across both academic and non-academic spheres. Outside of my academic and professional pursuits, I am passionate about running, reflecting my belief in the power of good habits to foster personal and professional growth.

## Skills

**Programming Languages:** Python, HTML, CSS, SQL

**Deep Learning Framework:** Pytorch, Transformers, Accelerator, scikit-learn, pytorch-lightning

**Analysis and Visualization:** numpy, pandas, matplotlib, TikZ

**Tools:** git, bash, vim, L<sup>A</sup>T<sub>E</sub>X

**Languages:** Chinese (native), English (proficient)

## Education

### University of Strathclyde

Oct 2020 – May 2024 (Estimated)

*PhD in Computer and Information Sciences*

*Glasgow, UK*

- Thesis: Advancing Mathematical Reasoning with Deep Learning: From Numerical Insights to Geometrical Understanding
- Scholarship: Fully funded by "Strathclyde Centre for Doctoral Training (SCDT) Research Studentship"
- Research Interests: automated mathematical reasoning by deep-learning models, automated reasoning by LLMs

### University of Sheffield

Seq 2017 – Oct 2018

*MSc in Advanced Computer Science*

*Sheffield, UK*

- Key Courses: Object Oriented Programming and Software Design, Text Processing, Machine Learning and Adaptive, Intelligence, Natural Language Processing, Data Science with Python

### Chang'an University

Seq 2011 – Jul 2015

*BSc in Network Engineering, Computer Science*

*Xi'an, China*

- Chang'an University is part of the Double First Class University Plan and Project 211 of China

## Work Experience

### University of Strathclyde, UK | TA of CS 985 Machine Learning for Data Analytics

Feb 2022 – Apr 2024

- Guided students in applying deep learning methods learned in class and directed the Teaching Assistant team in evaluating exams and assignments for the Machine Learning for Data Analytics course.

### TCL Technology, China | NLP Researcher

May 2019 – Sep 2020

- Collected a substantial dataset, comprising 60,000 conversational pairs and 1 million data points, for training the ChatBot. Developed and implemented a Python-based pipeline for the efficient cleaning and processing of data.
- Used TensorFlow to develop a ChatBot utilizing the advanced NLP technologies of Seq2Seq architecture with VAE.
- Designed a retrieval system of on the pre-trained BERT model, enhancing the ChatBot to select the relevant responses.
- Proposed Bucket-Search algorithm to optimize the response retrieval efficiency, reducing the response time within 20ms.
- Developed a Poetry matching system utilizing the BK-tree, enabling fast matching of user inputs less than two words.
- Built statistical language model to evaluate the ChatBot's responses.

### Ping An of China, China | NLP Engineer Intern

Mar 2019 – Apr 2019

- Collaborated with a team to establish guidelines and built an automatic pipeline to automate the approval process of insurance provisions utilizing advanced NLP and deep learning technologies.
- Implemented tools for extensive text processing tasks such as extracting vital information from the raw text.

### Bayes Data Intelligence Technology Service, China | NLP Engineer

Oct 2018 – Dec 2018

- Used scikit-learn library to build a classification model in logistic classification algorithm to categorize the objectives of various stores within a designated business district based on an analysis of structured information.

## Publications

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Please also check my [Google Scholar](#) page. The first author is highlighted by \*.

### Accepted Papers


1. Jiaxin Zhang\*, Yashar Moshfeghi. **GOLD: Geometry Problem Solver with Natural Language Description**. Accepted in the NAACL 2024 Findings.
2. Jiaxin Zhang\*, Yashar Moshfeghi. **ELASTIC: Numerical Reasoning with Adaptive Symbolic Compiler**. Accepted for Advances in Neural Information Processing Systems 35 ([NeurIPS 2022](#)).
3. Jiaxin Zhang. **A Combination of Lexicon-Based and Classified-Based methods for Sentiment Classification based on Bert**. Accepted in Journal of Physics: Conference Series (2021).

## Other Project

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### Sentiment Analysis for Long Sequence with BERT | *Personal Project*

April 2020 - July 2020

- Integrated a lexicon-based approach with BERT for efficient sentiment classification of Stanford movie reviews.
- Developed an innovative pre-training technique for large language models, emphasizing word polarization.
- Implemented a Sentiment Attention Mask, based on SentiWordNet, to streamline resource usage and time for training and inferring with the BERT model.
- GitHub : [https://github.com/KnightZhang625/Project\\_SentimentAnalysis](https://github.com/KnightZhang625/Project_SentimentAnalysis)


### TensorFlow Version for the UniLM | *Personal Project*

Oct 2019 – Dec 2019

- Since the original implementations of UniLM model is based on Pytorch. I implemented a TensorFlow version for UniLM from scratch, including the entire process from training to deployment.
- Github : [https://github.com/KnightZhang625/BERT\\_TF](https://github.com/KnightZhang625/BERT_TF)


### NLP TESLA | *Personal Project*

June 2019 – July 2019

- Developed NLP TESLA, an open-source framework that rewrites Intel's nlp-architect in TensorFlow v1.15, offering a comprehensive end-to-end pipeline for training, evaluating, and deploying deep-learning models in NLP.
- GitHub : <https://github.com/KnightZhang625/TESLA>

### Natural Language Generation with Various Styles | *Master Dissertation*

May 2018 – Sep 2018

- Conducted a study on the utilization of structured texts for generating sentences in diverse styles, under the supervision of Prof. Andreas Vlachos, achieving a Distinction grade for this dissertation.
- Applied hierarchical clustering to analyze the golden output data, identifying the semantic variety present within the text data.
- Trained a neural language model using a single Bi-LSTM encoder and multiple LSTM decoders, each corresponding to a different data cluster.
- Developed various statistical language models for each cluster to evaluate the quality of sentences generated by the trained neural language model.
- Github : <https://github.com/KnightZhang625/Master-Dissertation>

## Service to the Research Community

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1. 3rd MATH-AI Workshop at NeurIPS'23 Reviewer, Oct 2023
2. CogSci 2024 Reviwer, Feb 2024

## Honors & Rewards

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1. NeurIPS 2022 Scholar Award, received in Oct 2022.
2. Strathclyde Centre for Doctoral Training Research Studentship, recipient of the studentship for the PhD study.