

# Xiaohuan Pei

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## EDUCATION

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### University of Sydney

*Mphil, Major in Computer Science*

Publications: *Two ICDM conference papers accepted. Two other projects are still under reviewing.*

Honor: *Best student paper*

Sydney, Australia

*Feb. 2022 – May. 2023*

### University of Sydney

*Master of Information Technology*

Core courses: *Machine Learning, Advanced Deep Learning*

Sydney, Australia

*Aug. 2020 – Nov. 2021*

## RESEARCH EXPERIENCE

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### Meta-Learning based Search Engine for Neural Networks

*University of Sydney, Deep Learning Lab*

Oct. 2022 – Present

*Cooperative Research*

- Pre-Training neural network architectures via Contrastive learning.
- Complete a basic front-end web demo for the pretrained retrieval embedding.
- Writing the paper by Latex for ICCV2023.

### Code-Comment Contrastive Pre-training and Fine-Tuning

*University of Sydney, Software Engineering Lab*

Sep. 2021 – Apr. 2022

*Cooperative Research*

- Parse code content and AST structure by parser tools.
- Pre-training the BERT on the pair (Code-Comment) datasets.
- Investigate the Zero-shot Fine-Tuning performance to the downstream tasks.
- The paper and code has been published by ICDM (core rank A\*). [\[code\]](#)

### Self-Attention Gated Model for Cognitive Diagnosis Recommendation

*University of Sydney*

Jul. 2021 – Sep. 2021

*Cooperative Research*

- Introduce a hierarchical architecture for simulating the students' behavior and ability.
- Introduce attention mechanism and basic model-based meta learning to solve the cold-start problems.
- The paper has been published by ICDM (core rank A\*). [\[code\]](#)

### Representation Learning for Cognitive Medical Question-Answer

*University of Sydney, Capstone Project*

Mar. 2021 – Jul. 2021

*Cooperative Research*

- Responsible for the design of fusion model.
- Reproduction of the VQATransformer by Tensorflow and Pytorch.
- Extend the task to apply an Auto-Encoder model to the task of Medical Image Search Engine on the CLEF datasets. [\[code\]](#)

### Federated Recommendation System by Mixup Latent Features

*University of Sydney*

Mar. 2021 – May. 2021

*Individual Research*

- Data argument with mixup on user-item embedding latent features.
- Implemented federated learning framework.
- Allocate the local client to train and backward the parameters and gradients to aggregate.
- Wrote a research draft by latex to record my study. [\[code\]](#)

### Data Argument for Student's Ability Representation on Q-matrix

*Central China Normal University*

Jun. 2019 – Oct. 2019

*Individual Research*

- Explore transfer learning methods to construct educational recommendation system.
- Data argument with mixup features and labels.
- Implement Markov Chain Monte Carlo approach to train cognitive diagnosis models.

### Artificial Intelligence Research Assistant

*Central China Normal University*

May. 2017 – Nov. 2018

*Individual Research*

- Implemented basic deep learning methods(CNN, RNN, Auto-Encoder) to practice some basic projects.
- Visualized pre-processing data to show collaboration.
- Compared the performance of the ConvMF method with the traditional PMF method, acting on the movielens dataset.

## PROFESSIONAL PROJECTS

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### **ABSA for Financial Analysis** | *Python, Pytorch*

Sep. 2020 – Jan. 2021

- Pre-training financial BERT for the downstream tasks.
- Downstream task: Aspect Sentiment Classification.
- Downstream task: Aspect Term Extraction.
- Downstream task: Opinion Lexicon Extraction.

### **Living Face Detection** | *Python, Pytorch*

June. 2021 – Aug. 2021

- Detect face dynamic bbox by retinaface framework.
- Live action recognition via radial transformation functions.
- Distinguish true/fake live videos.
- Embodying a trade-off balance of accuracy and user experience.

### **Database Application Development** | *PostgreSQL, Python, Flask*

Jun. 2020 – Sep. 2020

- Create an entity relationship diagram.
- Complete postgresQL coding with appropriate constraints.
- Implement function of adding, updating patient lists by transaction and functional coding.
- Develop a simple full-stack web application with Flask, with the functions of login in, alter database, control of authority and so on.

## TEACHING EXPERIENCE

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### **Deep Learning COMP5329** | *pytorch*

Mar. 2023 – present

- Teaching the code implementation of deep learning.
- Design and marking the assignment.
- Question-Answering for the problems.

## TECHNICAL SKILLS

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**Languages:** Python, SQL (Postgres), C/C++, Latex, Markdown

**Developer Tools:** Git, Docker, Google Cloud Platform, VS Code, Anaconda

**Libraries:** Pytorch, Keras, NumPy, Pandas, Matplotlib