Jiarui Xu

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Summary

- Studying Master of Data Science (Research) at USYD, specializing in ML, familiar with common ML & DL algorithms;
- Focused on the application of LLMs, with experience in topic modeling, model deployment and retrieval augmentation;
- Active in the open-source community, exploring technical details through code & contributing to open-source projects;
- Familiar with Shell scripts, PyTorch framework and HuggingFace platform, involved in Docker enterprise deployment;
- Pursuing a career that bridges professional and academic interests in the field of LLMs.

Technical Skills

Languages/Database: Python, MySQL

DA Libraries: NumPy, Pandas, SciPy, Matplotlib

RAG: Langchain, Sentence-Transformers

Visualization Tools: Tableau, NetworkX, D3.js, Tulip, yEd

ML Framework: SciKit Learn, PyTorch, TensorFlow, HuggingFace, MLForce(self-developed)

Education

University of Sydney, Sydney **Feb 2023 – Jun 2024**

Master of Data Science **WAM**: 82.1 **Specialization**: Machine Learning

Units: *Computational Statistical Methods (HD), Machine Learning and Data Mining (HD), Advanced Machine Learning (DI)*

Nanjing Tech University, Nanjing **Sep 2017 – Jun 2021**

Bachelor of Industrial Engineering **GPA**: 3.77/4 **Specialization**: Logistics and Supply Chain Management

Internship

FunPlus **Dec 2023 – Feb 2024**

Tech Middleware - AI Tech - AIGC Intern

- Tracked frontier models and rapidly built demos to explore the feasibility and limitations of the practical application.
- Participated in RAG technology research, monitoring and comparing the latest in models and frameworks.
- Deployed multi-turn chat models incorporating external knowledge bases and utilizing vLLM to accelerate inference.
- Developed various components within the RAG framework and integrated them into a universal framework.
- Assisted in the development of multimodal search tools, independently responsible for the development and deployment of the LLM retrieval augmentation generation.

Projects

NumPy-Based Machine Learning Framework Development | *NumPy* **Aug – Nov 2023**

- **Keras-Style Multilayer Perceptron (MLP) using NumPy** *Git*
  - **Activation Functions**: Implemented all activation functions available in PyTorch, along with their derivatives.
  - **Layers**: Implemented Dense with various initialization strategies, Batch Normalization, and Dropout layers.
  - **Optimizers & Callbacks**: Developed popular optimizers, multiple learning rate schedulers, and early stopping.
  - **MLP**: Engineered regression and classification loss functions and integrated other advanced techniques.
  - **Results**: Achieved satisfactory performance on various datasets efficiently.
- **Non-negative Factorization (NMF) using NumPy** *Git*
  - **Algorithms**: Implemented eight effective and efficient NMF algorithms, each with distinct loss functions.
  - **Experiments**: Conducted extensive experiments on two facial image datasets under ten different noisy conditions.
  - **Framework**: Designed a comprehensive framework to facilitate the easy creation of new algorithms for academic research.

Multi-Modal Integration for Text-Image Classification | *PyTorch Git* **Apr – Jul 2023**

- **Extraction**: Deployed distilled BERT models for text encoding and utilized ResNet or DenseNet for image encoding.
- **Integration**: Implemented self-attention and cross-attention mechanisms to effectively integrate features extracted from multimodal sources.
- **Outcomes**: Achieved a top 22% (31/142) ranking with an F1 score of 87.5% in an internal Kaggle competition.