Zeyu (Dennis) Wang

PROFESSIONAL SUMMARY

Master of Information Technology (AI) student at the University of Melbourne (graduated) with a strong foundation in machine learning, software development and AI infrastructure. Solid experience in building and evaluating machine learning models, full stack software development with competence spanning all phases of the development life cycle. Passionate about AI algorithms and leveraging AI in practical solutions

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RESEARCH / INTERN EXPERIENCE

Sound Event Tagging

MicroCode Electronics Co, Ltd, Nanjing, Jiangsu *Jan 2025 - Present*

- Provided with real-time recorded raw audio files, conducted **audio analysis** with Librosa, built and trained convolutional neural network for audio tagging using **Keras** and audio specific features (MFCCs)
- Complied with clients' requirements, converted keras models to RKNN models for **deployment** on NPUs, validating **inference consistency** on embedded Linux system (Ubuntu) with scripted test cases; **automated** the conversion and testing workflow and documented full steps for client's further testing
- Currently experimenting with more complex models in processing more datasets

Advanced RAG Optimisation (Independent Research)

Self Employed *May 2025 - Present*

- Extended the RAG built in MDAP research project, explored advanced **RAG optimisations** and techniques
- Adapted both document-based retriever (BM25) and vector retriever (sentence embedding + vector database) for document retrieval and implemented RRF for combining retrievers' results; evaluated the pros and cons for **different vector databases** among FAISS, ChromaDB and Weaviate
- Utilised huggingface model for **speech recognition** that allowed RAG to incorporate video or audio inputs
- Implemented **query optimization** techniques for more accurate retrieval, as well as **contextual compression** techniques to improve the quality of retrieval documents
- Currently implementing **multimodal retrieval** using **VLMs** and exploring **GraphRAG**

Conversational AI Research Assistant

Melbourne Data Analytics Platform (MDAP) *Jul 2024 - Nov 2024*

- Worked in a **cross-functional team**, understood the existing codebase through self-developed a similar legal document Q&A web chatbot with **RAG** using **Streamlit** and **Langchain**
- **Basic Pipeline**: Connected **OpenAI APIs** to the application; stored documents in **Chroma vector database** with vector embedding similarity search for document extraction; extended the chatbot with user able to switch to **LLaMA model**, connection enabled with llama.cpp

RELEVANT PROJECTS

Text Generation Detection

Statistical Machine Learning Course *First Semester of 2025*

- Given generated texts as lists of tokenised indices, applied BoW and bi/tri-grams BoW for processing; with **data cleaning**, **feature engineering** and data augmentation steps such as masked indices, low frequency words removal, combined with calculated numeric features
- Adapted out-of-fold cross validation; SMOTE and **test time augmentation** as techniques for dealing with **class imbalance**; **multi-task learning** for 2 datasets from seperate domains
- Ensemble SGD models (Logistic regression, SVM, Naive Bayes) and implemented **auto encoder** in **PyTorch** for dimension reduction; achieved **1th position** on the public leaderboard

Frontend Software Development

Software Project Course (Senstride) *Mar 2025 - Jun 2025*

- Followed an **Agile** framework, working with clients seamlessly to build a **mobile and desktop integrated software** that help patients to monitor and record their falling risks
- Implemented the patient dashboard interface and clinician features using **Vue3.js**; received positive feedback from clients and users; integrated with backend in planning for production use

Image Classification
Computer Vision Course *Second Semester of 2024*

- Performed **image segmentation** and background removal on ShapeStack dataset, applied **transfer learning** with pre-trained models to make **classification**
- Enhanced understanding in leveraging **pre-trained** VGG, Inception, ResNet from Keras; utilised Pytorch for building InceptionV4 model, and **YOLO-v9** for shape segmentation and classifying the stacking height

Natural Language Inference 🔗
Natural Language Processing Course *First Semester of 2024*

- Applied data preprocessing using **NLP techniques** (NLTK, sklearn) on 1 million evidences and thousands of claims
- Tried several **vectorizing** techniques such as Tf-IDF, BM25, BoW etc; eventually constructed a bi-encoder model with padding, embedding and **LSTM** layers using **Keras and TensorFlow**; combined with top-k embedding similarities; achieved **7th position** in Codalab competition out of 120 teams

Full Stack Web Development 🔗
IT Project Course *Second Semester of 2023*

- Built a Student Request Portal (allow students send queries easier) in a cross-functional team following the **Agile** methodologies; portal website integrated seamlessly with the university learning system
- **Backend Development:** Implemented **REST APIs** with **Spring Boot (Java)**, automated deployment and code changes via **CI/CD pipelines (Git)**
- **Database Management:** Managed **relational databases** through MySQL workbench and **MyBatisPlus** framework, which simplifying database access and take control of the SQL queries
- **Testing:** Wrote **unit tests** under Spring boot framework**;** conducted **integration tests** through Postman for APIs and features implemented
- **Frontend development:** Developed staff interface with **Vue3.js** and **AntDesignVue** component library

EDUCATION

Master of Information Technology | Artificial Intelligence
University of Melbourne, Melbourne *Mar 2024 - Present*

- **Relevant Coursework**: Natural Language Processing, Computer Vision, Statistical Machine Learning, Software Processes and Management, Software Project
- **Weighted Average Mark**: 79 | Second Class Honours A

Bachelor of Science | Computing and Software System
University of Melbourne, Melbourne *Mar 2021 - Dec 2023*

- **Relevant Coursework**: Machine Learning, Computer System, Design of Algorithms, IT Project, Software Modelling and Design, Object-Oriented Software Development
- **Weighted Average Mark**: 83 | First Class Honours

SKILLS

- **Languages** (in order of proficiency): Python | Java | SQL | R | JavaScript | C
- **Software Project Tools**: Git, Confluence, Trello, Agile
- **Software Design Frameworks**: Spring Boot, Flask, React, Vue3, Node.js
- **Machine Learning / AI Libraries**: TensorFlow, PyTorch, Keras, HuggingFace, Scikit-learn
- Competence in **cloud computing** (AWS, UniMelb Research Computing Portal), remote desktop working with **Linux** and containerizer with **Docker**
- Complete fluency in both **English** and **Mandarin**

VOLUNTEER

VCE Maths Tutor
Step Education + QS School *Jan 2021 - Nov 2024*

- More than 3 years of experience teaching students across diverse age group, high school students been taught all achieved a VCE of 90+
- Coupled with exceptional ability to communicate with different age group of people, as well as strong skill to **deliver presentations** in multiple occasions