Yipu Xu

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Education

Monash University, Clayton, Australia **Jul 2024-Now**
Master of Information Technology

- GPA: 80/100 (WAM)
- **Main Course:** Foundations of Data Science (92/100, HD), Cloud Computing and Security (90/100, HD), IT Research Methods (86/100, HD), Advanced Database Technology (80/100, HD).

Wenzhou Medical University, Zhejiang, China **Sept 2019-Jun 2023**
Bachelor of Information Management and Information System

- Average Score: 78.95/100

Research Interest

- Urban Computing & Public Health Intelligence
- Clinical Natural Language Processing (NLP)
- Intelligent Decision Support Systems
- Human-AI Collaboration

Project Experience

Urban Computing: An Accessibility and Efficiency Analysis of Melbourne's Public Transport
Urban Computing Researcher, Monash University, Clayton

- **Core Research:** Systematically evaluated the public transport network in Melbourne's Box Hill area by integrating PTV's GTFS data with ABS geographical datasets, leveraging SQL and QGIS for in-depth spatial-temporal analysis.
- **Methods & Implementation:** Developed a comprehensive accessibility scoring model to quantify service levels, precisely identifying unserved residential mesh blocks (>300m walking distance). This model also facilitated an efficiency assessment based on peak-hour passenger flow, service duration, and average waiting times.
- **Key Findings & Impact:** Revealed the network's structural weaknesses, such as heavy reliance on buses and insufficient rail coverage. Pinpointed critical low-accessibility hotspots and long-wait bottlenecks, culminating in a set of data-driven optimization recommendations delivered to PTV to enhance service planning and equity.

Machine Learning: Predictive Analysis of Chatbot Dialogue Utility
Machine Learning Researcher, supervised by Guanliang Chen at Monash University, Clayton

- **Core Research:** Predicted the utility scores of human-chatbot interactions using machine learning techniques and analyzed key factors influencing dialogue quality.
- **Methods & Implementation:** Preprocessed data using rule-based filtering and normalization, then engineered structural and semantic features (TF-IDF, PCA, LDA, SVD). Selected XGBoost as the core model, achieving over a 20% improvement in key metrics (RMSE/MAE) compared to baselines after hyperparameter tuning.
- **Outcome:** Utilized SHAP for model interpretability, identifying the key conversational features that drive utility and providing actionable insights for enhancing dialogue quality.

Environmental Data Science: Correlating Bushfires, Land Cover, and Agricultural Impact
Data Analytics Researcher, supervised by Guanliang Chen at Monash University, Clayton

- **Core Research:** Investigated the complex correlations between wildfires and agricultural ecosystems (especially wheat production) by integrating diverse datasets (forestry, agriculture, meteorology, insurance).
- **Methods & Implementation:** Cleaned and integrated datasets using R; employed EDA to confirm a significant positive correlation between fire frequency and forest/ grassland coverage and identified a lagged negative impact of severe fire seasons on the following year's wheat yield.
- **Outcome:** Developed linear regression and PCA models to quantify key factors and utilized a time-series approach, accounting for the "Black Summer" anomaly, to forecast future fire and agricultural trends.

Predictive Modeling: KNN Regression for Residential Market Price Prediction
Machine Learning Researcher, supervised by Guanliang Chen at Monash University, Clayton

- **Project Overview:** Conducted an end-to-end machine learning workflow, including feature engineering on text descriptions (regex), data preprocessing (one-hot encoding, scaling), and building an optimized KNN regression model validated with 10-fold cross-validation.

Cloud Application Development: A Serverless Media Analysis Platform on AWS
Cloud Application Developer, supervised by Jay Zhao at Monash University, Clayton

- **Project Overview:** Designed and deployed a scalable, serverless cloud application. Utilized AWS Lambda and Python to implement AI-driven auto-tagging of media files upon S3 upload and provided a comprehensive media management service via a RESTful API.

Internship Experience

Hangzhou First People's Hospital **Jul. 2022-Apr. 2023**
Hardware Engineer & Database Administrator, Hangzhou, China

- Managed software/hardware maintenance, deployment, and troubleshooting for over 500 terminal devices across 20+ clinical and administrative departments.
- Independently diagnosed and resolved an average of 25+ technical support tickets weekly, maintaining an average fault recovery time of under 2 hours and ensuring the stability of the HIS.
- Executed over 1,000 data addition and modification requests in the database with a zero-error rate.

Research Experience

AI Othello Game: Design and Implementation using Evaluation Functions & Game Tree Search
Undergraduate Thesis Researcher, supervised by Prof. Wei Xu at Wenzhou Medical University, Zhejiang

- **Core Research:** Investigated the AI decision-making process in human-computer games, focusing on game tree search, heuristic evaluation functions, and strategic choices.
- **Methods & Implementation:** Based on the Minimax principle, designed and implemented a composite heuristic evaluation function combining positional, mobility, and greedy strategies to guide AI decisions. Developed the complete system in C#, including data persistence.

Technical Skills

Programming Languages: Python (Proficient), R (Proficient), C#, Java, JavaScript/TypeScript

Data Science & Machine Learning:

- **Frameworks & Libraries:** Scikit-learn, XGBoost, PyTorch, TensorFlow, Caret, Tidyverse, ggplot2
- **Algorithms:** Linear Regression, Random Forest, XGBoost, KNN, CNN, PCA, LDA, Clustering, Sequential Pattern Mining
- **NLP:** TF-IDF, Word Embeddings, Topic Modeling, SHAP (Model Interpretability)
- **Computer Vision:** Medical Image Processing

Database Technologies: SQL (Proficient), SQL Server, PostgreSQL/PostGIS, Oracle

Cloud & Development: AWS (Lambda, S3), ASP.NET, Vue, Node.js, Mobile & Distributed Systems, RESTful API Design

Visualization Tools: QGIS, ECharts, MATLAB, AntV, Tableau

Methodologies & Design: IT Project Management, Software Engineering, System Analysis & Design, UI/UX Design

Awards

Third-class Scholarship (2020)

Language

IELTS Overall 6.5 (Writing 7.0)