# Manlin Zhang

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## Education

**University of California, San Diego** *Sept 2024 - Jun 2026 (Expected)*

Master of Science in Data Science *GPA: 3.7/4.0*

- Courses: Machine Learning Algorithm, Network Data Science, Optimization, Interpretable Machine Learning, Explainability in Artificial Intelligence, Natural Language Processing

**University of Wisconsin - Madison** *Sept 2020 - May 2024*

Bachelor of Science in Mathematics *GPA: 3.7/4.0*

- Courses: Abstract Algebra, Real Analysis, Data Science, Statistics, Probability Theory, Algorithms, Calculus
- Dean's List for three consecutive semesters

## Professional Experience

**Data Analyst and Product Management Intern** *Jun 2023 - Jul 2023*

JD.com Inc., Brand Business Department

- Conducted customer churn analysis on a dataset of over one million rows in RStudio, utilizing regression analysis, ANOVA, and T-tests to generate daily insights for optimizing sales policies
- Designed and implemented A/B tests for new mobile app features, analyzing data from 500 million customers; increased Unique Visitor (UV) sales by 23.5% and Gross Merchandise Volume (GMV) by 15%
- Developed a fraud detection model using Random Forest, achieving a Z-score of 1.98 (95% confidence level) to identify coupon abuse by vendors, increasing detection accuracy by 26% and reducing fraudulent coupon use by 43%

## Publications

**"This really let's us see the entire world:" Designing a conversational telepresence robot for homebound older adults** *DIS 2024*

Yaxin Hu, Laura Stegner, Yasmine Kotturi, Manlin (Caroline) Zhang, Yi-Hao Peng, Faria Huq, Yuhang Zhao, Jeffrey P Bigham, Bilge Mutlu *July 2024*

## Research Experience

**People and Robots Laboratory, University of Wisconsin-Madison** *Oct 2023 - May 2024*

Research Assistant; Advisor: Bilge Mutlu, Yaxin Hu, Arissa Sato *Madison, WI*

- Developed a telepresence robot using Raspberry Pi SDK, ROS, and Python to enable remote touring for homebound elderly individuals and people with disabilities
- Integrated large language models (GPT-3, GPT-4) via prompt engineering, enabling responsive, conversational interactions between the robot and users
- Analyzed interaction data and robotics logs using qualitative and quantitative methods, providing insights to human and computer interaction research

**Madison Experimental Mathematics Lab** *Sept 2023 - Dec 2023*

Undergraduate Researcher; Advisor: Tullia M. Dymarz, Becky Eastham *Madison, WI*

- Constructed a 3D mathematical model illustrating Diestel-Leader Graph in Python and MATLAB
- Compared and contrasted the pattern in DL graph with Voronoi diagrams to discover its application on K-NN clustering algorithm
- Participated in Open House and Academic Forums, explaining the research progress, outcomes, and limitations

## Projects

**Enhancing 3D Vegetation Models for Wildfire Prediction using Machine Learning** *Feb 2025 - Now*

*San Diego, CA*

- Developed machine learning models to improve tree species classification and construct high-fidelity 3D vegetation models, enhancing wildfire prevention strategies.
- Processed and analyzed large-scale geospatial datasets and mapping to refine site-specific fire behavior predictions.
- Engineered predictive models using deep learning and ensemble methods, improving the accuracy of treelist generation for simulation models.

### Comparative Analysis of Machine Learning Methods for Bird Call Recognition

*Jan 2025 - Now*

*San Diego, CA*

- Conducted research on deep learning graph based audio classification, developing and evaluating machine learning models (Random Forest, SVC, XGBoost, SVM) for bird call recognition
- Designed and implemented large-scale audio preprocessing pipelines, including noise reduction, spectrogram transformations, and Mel-Frequency Cepstral Coefficients (MFCCs) feature extraction, to improve model performance
- Explored cross-modal learning approaches by integrating audio feature engineering with deep learning architectures for enhanced species classification in complex acoustic environments

### AI-Powered Network Database using LLMs for Movie Recommendation System

*Jan 2025 - Now*

*San Diego, CA*

- Construct LLMs to process and interpret structured and unstructured network logs, generating real-time summaries to assist in identifying unusual patterns and potential security threats
- Applied natural language processing (NLP) techniques to refine summaries with key metrics, such as traffic volume, packet loss, and error rates
- Integrated the LLM-based system into platforms, enabling automatic detection and classification of network events

### Interpretable Decision Sets (IDS) for Enhancing Trust in AI Models

*Oct 2024 - Dec 2024*

*San Diego, CA*

- Conducted an analysis of Interpretable Decision Sets (IDS) to improve model transparency and user trust, focusing on balancing local fidelity with global trust
- Compared and contrasted IDS with traditional explainability methods like LIME and SHAP to assess their impact on model interpretability and user decision-making
- Developed a framework for integrating IDS into decision-making processes and interpretability evaluation

### Customer Churn Prediction Model Using Machine Learning for Financial Services

*Jun 2024 - Jul 2024*

- Developed a customer segmentation model using K-Means clustering on transaction data to enhance targeted strategies
- Created an interactive Tableau dashboard with over 10 visualizations to monitor customer segments and generate actionable insights for strategic decision-making
- Launched targeted campaigns based on segmentation, using transfer learning on a large financial dataset, achieving a 15% increase in new customer conversions and 10% in revenue per user

## Skills

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| **Programming** | Python (Pandas, NumPy, SciPy, Scikit-Learn, PyTorch, TensorFlow), R, SQL, Linux, MATLAB, LaTeX, Javascripts |
| **Analytical Methods** | ML Models(Random Forest, Bayesian Optimization), Optimization, Deep Learning, Data Visualization, Data Cleaning |
| **Tools** | Tableau, Power BI, Git, Azure, GCP, AWS, Word, Excel, PowerPoint |
| **Language** | Mandarin (native), English (proficient), Japanese (intermediate) |