Wan-Ling Tsai

tsaiwanling99@gmail.com | 0911-127-364 | tsaiwanling | tsaiwanling.github.io | 蔡宛玲 | LinkedIn

About me

I am Wan-Ling, a master's student in Mathematical Modeling and Scientific Computing at NYCU, specializing in Generative AI and Manifold Learning. I interned at MediaTek as a Machine Learning Engineer, optimizing AI models and improving data analysis. I excel in communication and teamwork, shown through leadership in TWSIAM NYCU Student Chapter. I am eager to apply my expertise to solve challenging problems in the AI industry and am open to potential collaborations.

Education

National Yang Ming Chiao Tung University — **Sep 2022 – Present**
Master Program of Mathematical Modeling and Scientific Computing, Department of Applied Mathematics — GPA: 4.20/4.30
Advisor: Prof. Te-Sheng Lin

National Yang Ming Chiao Tung University — **Sep 2018 – Jun 2022**
Department of Applied Mathematics — GPA: 3.21/4.30

Skills

- **Python**
  a. Handcrafted Diffusion Models / Manifold Learning
  b. Model Lightweighting/ Model Parallelization, Accelerating and Reducing the Burden of Models
  c. Feature Selection
  d. Experiment Design
- **MATLAB**
  a. Using numerical method to approximate the solution of PDE
  b. Project：Landmine game with full functionality
- **JavaScript / HTML / CSS**
  a. Project ： Created an interactive webpage to visualize and analyze the Spotify Tracks dataset.

Work Experience

Teaching Assistant
Department of Applied Mathematics, NYCU, 2022-2024

1. Computational Mathematics 2022-2023
2. Linear Algebra 2023-2024

AI Engineer Intern
MTK AIDE, Taiwan, 2022-2023

In this year, I participated in 4 projects and received 2 Contribution Awards.

1. Weak IC prediction
   - Implementation, technique learning: model ensemble. This architecture has been successfully used in over two projects.
   - Algorithms survey: anomaly detection. To understand its mathematical and applied scikit-learn functions to predict weak IC.
2. Modem aging prediction
   - Using model ensemble, figure out the anomaly pattern, split the data in 3 different level.
   - Verifying the feasibility of the model, adjusting the features and parameters.
3. Scaling factor in wireless signals prediction
   - Data mining, figure out the data bias and assist the project team to correct the experimental design in time.
   - Solve the AI model sizing problems, reducing cycle by 20% while keeping performance.
4. Traffic pattern in physical shared channel prediction
   - Designed an online model that updates information in real-time as the base station receives signals.
   - Personally reported project progress to supervisors and client departments, bypassing the PM.
   - Leading rookie interns in experiments.

Selected Projects

Analysis of Generative Models: Novel Perspectives through Manifold Learning (Master's Thesis) (2024 TWSIAM)

- Conducted an in-depth exploration and theoretical analysis of Diffusion Models (e.g. DDPM, DDIM, Diffusion Schrodinger Bridge) and Manifold Learning (e.g. Diffusion Maps, ROSELAND), implemented these models from scratch.
- Applied the manifold learning technique to generative AI data, validating its effectiveness on the MNIST dataset and providing insights for improving model training.

Manifold Learning for Linear Dimensionality Reduction (2022 TWSIAM)

- Using manifold learning to analyze the structure of MNIST dataset within linear dimensionality reduction.
- Understanding which categories have low classification accuracy using LDA for linear dimensionality reduction.

Honor

- TWSIAM 2024 Paper Poster Contest First Place Award
- TWSIAM 2022 Paper Poster Contest First Place Award

Extracurricular Activities

- President /Sub President – TWSIAM NYCU Student Chapter
- Vice Coordinator – Joint Orientation Camp of Three Departments
- Leader – Volleyball team of department
- Member – Departmental Societies (Activity Group, Academic Group)