# Wan-Ling Tsai

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## 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

**AI Engineer Intern 2022-2023**
*MTK AIDE, Taiwan*

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

- Chapter/Sub Chapter – TWSIAM NYCU Student Chapter
- Teaching Assistant – Required courses of Applied Mathematics (Computational Mathematics / Linear Algebra)
- Leader – Volleyball team of department
- Member – Departmental Societies (Activity Group, Academic Group)
- Vice Coordinator – Joint Orientation Camp of Three Departments