Zheng-Yan Wu

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EDUCATION

National Taiwan University (NTU) **Taipei, Taiwan**

M.S. in Mechanical Engineering (Program of System Control) *September 2021 - June 2023*

- Overall GPA: **4.12** / 4.3
- Researcher at the NTU Robotics Lab focusing on Simultaneous Localization and Mapping (SLAM), Computer Vision (CV) and Large Language Model (LLM)
- Thesis title: Development of Socially Intelligent Mobile Robots with Multilingual Dialogue, Exercise Assistance, Emotion Recognition and Human-Aware Navigation Systems

National Taiwan Normal University (NTNU) **Taipei, Taiwan**

B.S. in Electrical Engineering (Double Major) *September 2018 - June 2021*

B.S. in Mechatronic Engineering (Main Major) *September 2017 - June 2021*

- Overall GPA: **4.10** / 4.3
- Graduated with **College Honors** and received **two Presidential Awards**

SKILLS

Technical Skills

- Languages: Python, C, C++, C#, MATLAB, Verilog HDL, HTML5
- Technologies: Git, PyTorch, Docker, QT, PSpice, LabVIEW, Quartus, ModelSim, SolidWorks

Languages

- Native: Mandarin, Taiwanese
- Proficient: English

EXPERIENCE

Summer Intern at SEYI **Taoyuan, Taiwan**

Mechanical Engineer *July 2019 - August 2019*

- Developing a multifunctional measurement program using LabVIEW
- Enabling signal acquisition of vibration acceleration, displacement, temperature, and pressure, along with features for data visualization, database management, and spectral analysis

Teaching Assistant at NTU ME Automatic Control **Taipei, Taiwan**

Teaching Assistant *September 2022 - December 2022*

- Guiding students to understand feedback principles, control systems design, and system stability

Teaching Assistant at NTNU ME the Principles and Application of Sensors **Taipei, Taiwan**

Teaching Assistant *September 2020 - January 2021*

- Guiding students to understand the principles and design of various sensors, and using PSpice to design a sensor circuit and implement it

Teaching Assistant at NTNU ME Labs of Digital Logic **Taipei, Taiwan**

Teaching Assistant *February 2020 - June 2020*

- Guiding students to cultivate the ability to write Verilog HDL and utilize Quartus for synthesizing circuits and programming them onto the DE0 Nano Cyclone platform

Teaching Assistant at NTNU ME Computer Programming **Taipei, Taiwan**

Teaching Assistant *September 2019 - January 2020*

- Guiding students to cultivate foundational programming concepts and proficiency in C/C++ language coding

PROJECTS

Microsoft - Light-Weight Facial Landmark Prediction Challenge

- Using PyTorch to build MobileNetV3 to predict 68 2D facial landmarks in a single cropped face image
- Compressing the computational model to 7.9 MB because of the challenge's constraint of a 15MB model limit
- Achieving with high efficiency and minimal computational costs and compatible with mobile devices

Point Cloud Semantic Completion

- Achieving point cloud completion and semantic segmentation tasks through innovative model utilization and design, outperforming existing methods in both areas
- Preserving semantic component data, enabling user-driven modifications at the individual component level and empowering users to create new objects as needed. Additionally, harnessed noise resampling to enhance point cloud completion resolution, increasing practicality and applicability in various domains

Play Table Hockey with a 5-DoF Mechanical Arm

- Tracking the dynamic hockey ball using the RealSense d435i RGB-D camera
- Employing inverse kinematics with Kalman Filter-predicted ball coordinates to guide the robot arm's movement within its reach

Integration of DC Motor Positioning System with PID Control

- Employing an Arduino-based user interface for command input and voltage generation. Enhanced motor control by employing power amplifiers in conjunction with common-emitter push-pull amplifiers to achieve target positioning with minimized crossover distortion
- Incorporating an encoder for real-time position feedback and implementing a PID controller to precisely compensate for positional errors. Ensured operational safety by designing protective circuits featuring relays and photoresistors, enabling automatic activation of a self-hold mode upon motor rotation exceeding 180 degrees

CPU Schedule Algorithm Implementation and Comparison

- Comparing CPU scheduling algorithms in real-world scenarios to ideal conditions. Implemented First-Come, First-Served (FCFS), Shortest Job First (SJF), Round Robin (RR), and Preemptive Shortest Job First (PSJF) algorithms in C, executed them in a Linux environment, and analyzed actual execution times and process scheduling
- Recording the elapsed time of each algorithm and utilizing Python to generate Gantt charts for visualizing differences

Electronic Timer

- Utilizing Verilog to transform a 50GHz square wave signal into a precise 10Hz frequency for accurate time measurement
- Creating a timer system with a Binary Coded Decimal (BCD) counter for time calculations, featuring a dynamic seven-segment display and user-friendly start, pause, and reset functions

Intelligent Trash Can

- In response to the COVID-19 pandemic, utilizing an infrared temperature sensor for touchless operation and an ultrasonic sensor for real-time garbage level indication with LED feedback
- Addressing hygiene concerns in public spaces by creating a hands-free solution for waste disposal, contributing to the reduction of physical contact with potentially contaminated surfaces

RPG: Super Adventure

- Creating a role-playing game (RPG) by applying object-oriented programming (OOP) techniques, including inheritance, polymorphism, encapsulation, and refactoring
- Developing the game using C# within the Visual Studio environment, visualizing complex game class structures through UML diagrams
- Designing and implementing a feature-rich RPG with three distinct maps, two quests, and a diverse range of in-game items. Introduced random encounters with enemies during outdoor exploration, transitioning players into a battle window for combat. Ensured player progress persistence by automatically saving game progress as XML files, eliminating the need to restart from scratch

EXTRACURRICULAR ACTIVITIES

- NTNU ME Student Association, member *September 2019 - June 2020*
- NTNU ME Camp, Circuit Teaching Section member *January 2019*
- NTNU ME Camp, Equipment Section member *January 2018*
- NTNU ME Camp, Event Planning member *January 2017*