PEI-AN HSIEH

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Education

Department of Electrical Engineering, National Taiwan University (NTU)   *Taipei, Taiwan*
B.S. in Electrical Engineering   *Sep 2018 - June 2022*

- GPA: 4.09/4.3 (3.94/4.0)
- Rank in Class: 34/196 (17%)
- Related courses: Robotics, Algorithms, Data Structure, Control Systems, Intermediate Dynamics, Convex Optimization, Stochastic Control

Award

2022 Spring   **Dean's List Award**, Department of Electrical Engineering, NTU

Publication

[1] P. C. Chen, **P. A. Hsieh**, J. Y. Huang, S. C. Huang, and C. W. Chen, **"Design and Evaluation of the infant Cardiac Robotic Surgical System (iCROSS)"**, *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, October 23-27, 2022, Kyoto, Japan

Research Experience

Next-generation Automated Surgical Apparatus (NASA) Lab, NTU   *Taipei, Taiwan*
Advisor: Prof. Cheng-Wei Chen

- **Design and Evaluation of infant Cardiac Robotic Surgical System (iCROSS)**   *Sep 2020 - June 2022*
  This research focuses on developing a dual-arm surgical robot system to assist infant PDA closure through teleoperation. This includes mechatronics, system integration, and both mechanical and software design.
  1. Rendered two **haptic feedback** forces—tool to tool and tool to trocar— by the **artificial potential method**.
  2. Utilized Unity to read the position values and set the force feedback of the joysticks.
  3. Evaluated a **rapid collision detection algorithm**, an improved version of the oriented bounding box (OBB) method. It consists of more intricate geometries and conditional statements.
  4. Implemented the algorithm using LabVIEW, achieving a **60 Hz** execution speed.

Mechatronics and Controls Lab, UCLA   *Los Angeles, USA*
Advisor: Prof. Tsu-Chin "T-C." Tsao

- **The Development of a Qt-Ethercat Software System**   *June 2022 - Present*
  This project aims to develop a software system capable of controlling motors through Ethercat from a Qt operator interface.
  1. Established a software environment using **LinuxCNC**, a real-time operating system.
  2. Integrated Ethercat libraries to Qt and tested the compatibility.
  3. Examined the **software system** on a Raspberry Pi board by controlling a servo motor.

Course Projects

Educational Writing Game Development Project
Feb 2022 - June 2022

SPECIAL PROJECT UNDER PROF. PING-CHENG YEH

- Implemented a **Chinese character recognition algorithm** that judges the correctness of Chinese characters by projecting strokes.
- Created a game-playing **operator interface** that processes images and communicates to servers with GraphQL by Unity.

Multi-Directional Drawing Manipulator
Nov 2021 - Jan 2022

COURSE TERM PROJECT OF **ROBOTICS**

- Applied **Canny edge detection algorithm** to obtain image contours.
- Formulated a **trajectory-forming algorithm** to decide the trajectories to draw an image given the contours.
- Employed the **Robot Operating System (ROS)** to control the robot and integrate the programs.

Converter Simulation Challenge
Nov 2019 - Jan 2020

COURSE TERM PROJECT OF **INTRODUCTION TO POWER ELECTRONICS**

- Used **PID and Maximum Power Point Tracking (MPPT) control** to improve performance under different voltage conditions.

Letter Recognition Application
Nov 2018 - Jan 2019

COURSE TERM PROJECT OF **COMPUTER PROGRAMMING**

- Trained a **Convolution Neural Network (CNN)** to identify english letters using the EMNIST dataset.

Skills

Programming Languages	C/C++/C#, Python, LabVIEW, MATLAB/Simulink, JavaScript, Go, Verilog
Engineering Softwares	Autodesk, Qt, Unity
Operating Systems	ROS, Linux, LinuxCNC, Windows
Others	PyTorch, OpenCV, Git, LaTeX
Test Scores	• TOEFL score: 108/120 (R:29/30 L:29/30 S:23/30 W:27/30) • GRE score: 324/340 (Q;169/170 V:155/170, AW:4.0)

Extracurricular Activities

Captain of the NTUEE Soccer Team
Sep 2020 - June 2021

- **Headed 20 teammates** to participate in intramural competitions.

NTU Student Social Service
Oct 2019

- Held a camp with **28 group members** for **35 elementary students** in Pingxi.

NTUEE Orchestra First & Second Violin
May 2019 & Dec 2019

- Performed with **34 musicians** twice in the NTUEE Orchestra concerts.