Hao-Fang Cheng

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EDUCATION

Master in Electrical Engineering Aug 2021 - Aug 2023

National Taiwan University, Taipei, Taiwan

GPA: 4.08/4.3

Bachelor in Mechanical Engineering Sep 2017 - Jun 2021

National Taiwan University, Taipei, Taiwan

GPA: 3.81/4.3

Last 60 points GPA: 4.11/4.3

Relevant Courses: *Robotics, Computer Vision, Control System, Machine Learning, Mechatronics*

PUBLICATION

Hao-Fang Cheng, Yi-Ching Ho, and Cheng-Wei Chen. "DentiBot: System Design and 6-DoF Hybrid Position/Force Control for Robot-Assisted Endodontic Treatment." arXiv preprint arXiv:2310.09691 (2023). (Submitted to Transactions on Robotics)

Hao-Fang Cheng, Yi-Chan Li, Yi-Ching Ho and Cheng-Wei Chen. "Force-guided alignment and file feedrate control for robot-assisted endodontic treatment." 2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS). IEEE, 2022.

Chun-Yeon Lin, Hao-Tse Chen, **Hao-Fang Cheng**, and Yu-Jun He. "Electrical Impedance Sensing System Design for Abnormal Object Detection." 2021 IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM). IEEE, 2021. (Best Paper Finalist)

RESEARCH EXPERIENCE

National Taiwan University/Taiwan | *Research Assistant in NASA Lab, Electrical Engineering Department.*

Apr 2024 - Present, May 2021 - Feb 2023

- Designed DentiBot, a robot arm with a force/torque sensor and self-made positioning module for autonomous dental endodontic treatment. [YouTube Video]
- Developed a string-based patient tracking module for localization and motion tracking with precision under 1mm.
- Implemented a hybrid 6-DoF position/force control strategy for effective and safe treatment.
- Verified DentiBot through pre-clinical tests with dentists at Taipei Veterans General Hospital.

Polytechnique Montreal/Canada | *Research Intern in MIST Lab, Computer Science Department*

Feb 2023 - Aug 2023

- Integrated UWB localization system on six drones for human-drones interaction, enabling drones to follow dancer's motion and avoid collisions.
- Enhanced multi-vehicle SLAM by applying ultra wide-band (UWB) sensors as extra distance reference.

National Taiwan University/Taiwan | *Research Assistant in MIARL Lab, Mechanical Engineering Department.*

Sep 2020 - Jun 2021

- Integrated an electrical impedance sensing system to detect abnormal objects in tissues.
- Utilized a DNN network to estimate the location and size of abnormal objects.

WORKING EXPERIENCE

Taiwan Space Agency/Taiwan | *Summer Intern in Fly-Control Group*

Jul 2020 - Aug 2020

- Worked on an autonomous drone project, evaluating the drone in indoor environments.
- Developed mode-switching capabilities for the drone, enabling transitions between different control modes.
- Fine-tuned controller parameters, allowing it to the drone to perform 360-degree rolls.

HONORS & ACCOLADES

2020 TDK National Creative Design Competition (Flying Group) | *2nd place* Oct 2019

- Designed an autonomous drone to follow a ground trajectory, navigate obstacles, and deliver payloads.
- Led the first university team to join this competition, building a functional drone from scratch.
- Served as team leader, organizing team members and securing resources.

Dean's Award | Aug 2020

TEACHING EXPERIENCE

Electrical Circuit Experiment | *Teaching Assistance* Jan 2022 - Jan 2023

- Lectured undergraduate students and resolved technical issues related to electrical instruments.

Programming for Business Computing | *Teaching Assistance* Sep 2020 - Jan 2021

- Guided new programmers in learning Python and assisted them with homework assignments.

SKILL

- Programming: Python, C++, MATLAB, ROS, Linux
- CAD software: Fusion360, Inventor, AutoCAD
- Language: Chinese (Native), English (TOEFL 103)