

Tsung-Wun Wang

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Education

National Taiwan University, Taipei, Taiwan

Master of Science in Mechanical Engineering (Overall GPA: 4.0/4.3) *Mar. 2021 – Aug. 2023*

- Thesis Title: Development of 3D Reconstruction and Navigation for Mobile Robots
- Relevant Coursework: Advanced Computer Vision, 3D Computer Vision with Deep Learning Applications, Operating Systems, Adaptive Signal Processing, System Identification

Bachelor of Science in Mechanical Engineering (Overall GPA: 3.7/4.3) *Sep. 2016 – Jun. 2020*

- Relevant Coursework: Robot Vision, Introduction to Robotics, Machine Learning

Professional Experience

Vecow Co., Ltd., Taipei, Taiwan

Embedded Systems Engineer *Aug. 2024 – Present*

- Designed and configured MIPI CSI-2 interfaces in Vivado to support multiple cameras.
- Integrated GPS and IMU sensor fusion algorithms into the PetaLinux for enhanced navigation capabilities.
- Developed applications in PetaLinux to ensure seamless integration of hardware and software components.

Software Engineer *Oct. 2023 – Aug. 2024*

- Synchronized and visualized point clouds from LiDARs and cameras using the PCL library.
- Fine-tuned PTP and gPTP protocols for precise GPS time synchronization system-wide.
- Developed a sensor fusion algorithm integrating IMU and GPS for AMR navigation.
- Integrated GPS and IMU sensor fusion recipes into the PetaLinux environment.

Aeroprobing Inc., Taipei, Taiwan

Firmware Engineering Intern *Jun. 2021 – Aug. 2022*

- Worked on FreeRTOS to synchronize multiple tasks on the drones.
- Managed sensor modules using SPI/I2C/UART protocols.
- Applied the extended Kalman filter to estimate orientation, altitude, and position.
- Controlled and fine-tuned drones based on PID control in cascade loops.

Course Projects

Sign-Agnostic Dynamic SLAM *Fall 2022*

- Optimized the original NICE-SLAM by applying Sign-Agnostic optimization.
- Implemented Mask-RCNN to remove dynamic obstacles in our SLAM structure.
- Conducted experiments with a handheld RealSense camera to validate our method.

Publications

- Tsung-Wun Wang, Han-Pang Huang, and Yu-Lin Zhao, "Search-based Path Replanning for Autonomous Navigation and Obstacle Avoidance," Best Student Paper Award, in *Proc. of the 21th International Conference on Automation Technology*, Taiwan, Nov. 2024.
- Tsung-Wun Wang, Han-Pang Huang, and Yu-Lin Zhao, "Vision-based Autonomous Robot Navigation in 3D Dynamic Environments," Best Paper Award, in *Proc. of the 41st National Conference on Mechanical Engineering of CSME*, Kaohsiung, Taiwan, Nov. 2024.
- Tsung-Wun Wang, Han-Pang Huang, Chiou-Shann Fuh, "Improved Real-Time Dense ORB SLAM with GPU Implementation," in *Proc. of the 36th IPPR Conference on Computer Vision, Graphics, and Image Processing*, Kinmen, Taiwan, Aug. 2023.
- Tsung-Wun Wang, Po-Yu Lin, Tian-Ju Wu, Pei-Yuan Huang, Cheng-Chi Lee, Hsin-Lin Chen, Feng-Li Lian, "Robotic Arm with A Parallel Gripper applying Mask R-CNN for Garbage Classification," Best Student Paper Award, in *Proc. of the 16th International Conference on Automation Technology*, Taipei, Taiwan, Dec. 2019.

Skills & Interests

- **Programming Language:** C/C++, C#, Python, Matlab, Shell Scripting, HTML/CSS, LaTeX
- **Programming Platform:** Linux, git, ROS, Vivado, STM32 CubeIDE, Arduino, PetaLinux
- **Software:** AutoCAD, Solidworks, Inventor, PTC Creo (Pro/E), FreeCAD, LabVIEW, Simulink