

Chi-Yao Huang

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EDUCATION

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- **Arizona State University (ASU)** Tempe, AZ
Ph.D in Computer Science Current
 - **Arizona State University (ASU)** Tempe, AZ
M.S. in Robotics and Autonomous systems (Artificial Intelligence Track); Cumulative GPA: 4.00/4.00 Aug 2021 - May 2023
 - **National Taiwan University (NTU)** Taipei, Taiwan
M.S. in Mechanical Engineering; GPA 3.83/4.3 Sep 2015 - Jun 2017
 - **National Sun Yat-San University (NSYSU)** Kaohsiung, Taiwan
B.S. in Mechanical and Electro-Mechanical Engineering; GPA 3.19/4.0 Sep 2010 - Jun 2014

EXPERIENCE

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- **Arizona State University (ASU)** Tempe, AZ
Research Assistant - Prof. Yezhou Yang Aug 2021 - Current
 - **Thesis: From SLAM to Spatial AI: Using Implicit 3D Latent Space Landmark Reconstruction for Robot Localization and Mapping:** Use learning-based 3D reconstruction and semantic labels to teach robots to understand space, enables robots to jointly optimize their trajectory and objects' poses and shapes in the environment.
 - **Advanced and Creative Team, HTC VIVE** New Taipei, Taiwan
One of eleven of Team Lambda (the core VR/AR technology development department) Sep 2017 - Feb 2021
 - **VIVE COSMOS:** VIVE COSMOS is the first inside-out Virtual Reality (VR) product originally designed by HTC VIVE.
 - Developed multi-camera VR tracking system, accuracy reaches 0.4 mm (better than human eyes).
 - Developed multiple cameras and IMU calibration, improves production capacity.
 - Product website: VIVE Cosmos Overview
 - LAMBDA SLAM demo video: LAMBDA VR TRACKING
 - **VIVE FOCUS 3:** VIVE FOCUS 3 is the first Mixed Reality (MR) device presented by HTC VIVE, which combines Virtual Reality (VR) and Augmented Reality (AR).
 - Led team of three to develop prototype of MR system in interdepartmental project.
 - Integrated MR tracking system with gesture tracking system, enables players to interact with MR with their hands.
 - Developed tightly-coupled visual-inertial SLAM, smoothens MR tracking trajectory (trajectory jitter less than 0.1 mm).
 - Parallelized SLAM algorithm on Qualcomm Hexagon, 4 times speed up on embedded system.
 - Product website: VIVE Focus 3
 - **VIVE FLOW:** VIVE FLOW is an Augmented Reality device to enable players to enjoy AR games using a simple glasses-like device.
 - Troubleshoot CPU loading issues with hardware and firmware teams.
 - Analyzed thermal problems with mechanical team.
 - Product website: VIVE FLOW
 - **Scene:** Scene is a project to detect obstacles in the environment, warns VR players to be away from potential dangers, and set up a safe playing region.
 - Constructed voxel obstacle map for indoor environments, avoids players hitting obstacles when playing.
 - Developed semantic map, enables VR/AR system to interact with real environment.
 - **NTU Robotics Lab, National Taiwan University** Taipei, Taiwan
Graduate Student and Vice System Manager - Prof. Han-Pang Huang Sep 2015 - Jun 2017
 - **Master thesis: 3D Reconstruction and Path Planning with Signed Distance Function:**
 - Fused optical flow and feature points for SLAM front-end, reduces computing cost, smoothens tracking trajectory.
 - Modified Bundle Adjustment to calculate in Lie group and Quaternion.
 - Used voxel hashing to construct dense voxel map.
 - Combined SLAM with biped robot path planning.
 - **Humanoid robot:**
 - Designed ZMP (Zero Moment Point) trajectory to make biped robots walk on uneven terrain.
 - **Vice system manager:**
 - Designed lab introduction and bridge courses for new members of the lab.
 - Managed and maintained equipment, including several robotic arms, mobile robots, and a humanoid robot.

- **Company of Air defense Artillery Battalion, R.O.C. Army** Taiwan
Battalion Dispatcher *Sep 2014 - Sep 2015*
 - Managed hundreds of cars, trucks and anti-air tanks in military exercises.
- **National Sun Yat-Sen University** Kaohsiung, Taiwan
Undergraduate Student - Prof. Yaw-Terng Su *Sep 2015 - Jun 2017*
 - **Commercial Vehicle Speed Control System:** Designed PID controller of vehicle speed control system.
 - **Stairlift for Elderly People:** Used PLC control to design a stair climber for elderly people.

AWARDS

- Ira A. Fulton Schools of Engineering Fulton Fellows Award, Arizona State University
- Student with Distinction, Arizona State University

SKILLS

- **Programming Languages:** C/C++, Python, Javascript
- **Programming Library:** OpenCV, Eigen, Ceres, PyTorch, Keras, OpenGL
- **Parallel Computing Tools:** SIMD, CEVA, Hexagon

LANGUAGES

Mandarin (native), English (fluent)