Chi-Yao Huang

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EDUCATION

- **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

- **Arizona State University (ASU)** — Tempe, AZ
  Research Assistant - Prof. Yezhou Yang — *Aug 2021 - Current*
  - **Self-supervised Visual Odometry**: Control implicit features for visual odometry in the latent space, eliminating the need for complicated calibration process and conventional handcrafted graph structures.
  - **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 an the first Mixed Reality (MR) device presented by HTC VIVE, which combines Virtual Reality (MR) 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.
    - Troubleshot 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)