Yenwei Chen

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EDUCATION

National Tsing Hua University (NTHU) Hsinchu, Taiwan
Master of Science in Industrial Engineering and Engineering Management (IEEM) Sep 2023 - Aug 2025
Program: Human Factors Engineering and Design

Bachelor of Science in Industrial Engineering and Engineering Management Sep 2020 - Aug 2023
- Graduated with Outstanding Research Award in Department of IEEM.

RESEARCH EXPERIENCE

Product Realization Lab (PRL), NTHU Hsinchu, Taiwan
Research Assistant Sep 2025 - Mar 2026
Project: Human-interactive automation framework for robotic welding repair
- Proposed an end-to-end human-interactive automation pipeline, which yielded 1 manuscript in preparation and 1 pending patent from an industry-academia collaboration.
- Built a deep learning workflow for metal defect segmentation, using a hybrid Dice–Focal loss and benchmarking 3 model architectures with 7 backbones using mDice and mIoU.
- Calibrated model confidence using reliability diagrams and translated it into three-level reliability signals.
- Constructed a metal defect dataset from scratch, comprising 1,500 images across 4 classes.
- Designed heuristic algorithms for defect-region partitioning and repair path planning for robotic weld repair.
- Validated the pipeline through real-world welding experiments, achieving mDice > 0.85 and successfully executing all generated repair paths.

Graduate Researcher Sep 2023 - Aug 2025
Porject: Classification and Evaluation of Maintenance Proficiency for Adaptive Augmented Reality Assistance
- Developed a framework to quantify operator proficiency from observable behaviors and design adaptive AR assistance for different proficiency levels, yielding a manuscript under review.
- Designed a methodology to classify operator proficiency from action and gaze time-series data using GAK-based time-series clustering, evaluated with Silhouette Score and the Calinski–Harabasz Index.
- Trained an action-recognition model with Google Vertex AI and an object-detection model with YOLOv11 to identify 6 work behaviors, task-relevant objects, and the eye-tracking cursor.
- Designed a mixed-design experiment with 60 participants using Apple Vision Pro, identifying significant effects through ANOVA.

Undergraduate Researcher Mar 2022 - Aug 2023
Porject: Ergonomic workplace design based on real-time integration between virtual and augmented realities
- Proposed an immersive system integrating real-time virtual and augmented realities for ergonomic evaluation, leading to 3 academic awards and a published research paper.
- Developed AR and VR applications in Unity for HoloLens 2 and HTC VIVE Pro 2.
- Integrated the RULA ergonomic assessment method with automated skeletal pose estimation, reducing assessment time by 30 % compared with conventional manual evaluation.
- Implemented coordinate calibration for spatial alignment across AR/VR devices and the physical workspace.

Porject: Virtual Reality-Assisted Astronomy Observation and Learning System.
- Developed a VR astronomy application for a project funded by Taiwan's Ministry of Education.
- Led a 35-student VR class using VIVE Focus 3 in a real-world classroom environment.

TEACHING EXPERIENCE

National Tsing Hua University, Department of IEEM — Hsinchu, Taiwan

Lab Instructor — 2024 - 2026

AR/VR Software Development Training

- Designed and delivered AR curricula for capstone and graduate students over 3 consecutive years using HoloLens 2, Apple Vision Pro, Unity, and SwiftUI.

Teaching Assistant — 2024 - 2025

Systems Engineering and Management

Information and Communication Technologies in Smart Manufacturing

- Supported course delivery by managing materials, equipment, and organizing research institution visits.

WORK EXPERIENCE

Center for Healthy Longevity and Aging Sciences, National Yang Ming Chiao Tung University — Hsinchu, Taiwan

Software Development Intern — Dec 2024 - Jun 2025

Porject: Cross-Platform Data Management and Authentication System Based on Firebase

- Built a data management and authentication system using Firebase, across Android, iOS, and Windows interfaces.
- Developed interfaces using Unity and SwiftUI for older adults.

National Science and Technology Council & NTHU — Hsinchu, Taiwan

Staff Member — Sep 2023 - Aug 2025

- Wrote annual grant proposals on systems engineering across multidisciplinary departments.

National Tsing Hua University, Department of IEEM — Hsinchu, Taiwan

Student Assistant — Sep 2023 - Aug 2025

- Assisted with departmental administration, including annual evaluations, documentation, and event coordination.

PUBLICATIONS AND MANUSCRIPTS

- Chih-Hsing Chu, Jie-Ke Pan, and Yen-Wei Chen," Ergonomic workplace design based on real-time integration between virtual and augmented realities," *Robotics and Computer-Integrated Manufacturing*, vol. 92, Art. no. 102859, 2025, doi: 10.1016/j.rcim.2024.102859.
- Kai-Wen Tien, Yen-Wei Chen, and Chih-Hsing Chu, "Classification and evaluation of maintenance proficiency for adaptive augmented reality assistance," International Journal of Production Research, submitted for publication.
- "Human-interactive automation framework for robotic welding repair," manuscript in preparation. Research conducted by Yen-Wei Chen in collaboration with Chih-Hsing Chu and Jie-Ke Pan.

AWARDS

- Outstanding Research Award, National Tsing Hua University, 2023.
- Third Place, National Undergraduate Competition in Industrial Engineering and Management Projects & Technical Reports, 2023.
- The Excellence Award, Capstone Project Competition in IEEM, National Tsing Hua University, 2022.

SKILLS

- **Software Development:** Python, C#, Firebase, Git, OpenAI Codex
- **AI Development & Applications:** PyTorch, Semantic Segmentation, Object Detection, Human Action Recognition, LLM API Integration, Model Confidence Calibration
- **XR & Hardware Integration:** Apple Vision Pro, VIVE Headset, SwiftUI, Unity
- **Statistical Tools:** R, Clustering, Time Series Analysis, Minitab
- **Simulation:** Blender, Inventor, Omniverse
- **Languages:** Mandarin (Native), English (Proficient)