Chun-Kai Yang

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Education

National Taiwan University (NTU) Sep 2021 – Dec 2025
Bachelor of Science in Engineering – Electrical Engineering

- **Coursework:** Robot Sensing and Control(A+), Reinforcement Learning(A+), Deep Learning in Computer Vision(A), Machine Learning(A+), Introduction to IoTs(A), Embedding System(A+)
- 2021-Fall Dean's List Award (Top 5% in Department)

Research Experience

Robot Learning Lab, NTUEE Taipei, Taiwan
Undergraduate Researcher, Advisor: *Prof. Shao-Hua Sun* Jan 2023 – Present

- Designed a diffusion-based imitation learning framework, enhancing robustness, increasing performance by up to 50%, and improving data efficiency by 100%
- Developed a video-based skill learning framework extracting skills from optical flow, enabling multi-task and cross-embodiment generalization with minimal action supervision
- Evaluated vision-language-action models (VLA) and video generation models for synthetic data generation
- Deployed algorithms on ALOHA, resolving hardware instability and system failures through systematic debugging and workflow optimization

Publications

Learning Skills from Action-Free Videos ICML Workshop, 2025
Hung-Chieh Fang, Kuo-Han Hung, Chu-Rong Chen, Po-Jung Chou, ***Chun-Kai Yang****, et al.*

Diffusion Imitation from Observation [Page][arXiv] NeurIPS, 2024
Bo-Ruei Huang, ***Chun-Kai Yang****, Chun-Mao Lai, Dai-Jie Wu, Shao-Hua Sun*

Work Experience

Lasertec Taiwan Inc. Taipei, Taiwan
Data Scientist Intern May 2025 – Sep 2025

- Designed deep learning methods to correct camera-parameter mismatches in lithography mask anomaly detection, achieving 98.9% production precision across 500K+ images through a data synthesis to evaluation pipeline
- Accelerated inference speed by 23.4x via parallel data processing and caching strategies, scaling metric analysis by 500x (from 1K to 500K data points) and enabling comprehensive relational review across 30+ metrics
- Reduced human review time by 4.4x and improved data analysis efficiency by 10x by developing three web tools, including a labeling platform, a config-driven image viewer, and a metrics visualization dashboard

Instill AI London, UK
AI Engineering Intern Jun 2024 – Aug 2024

- Integrated 3 vendors' APIs into production using Golang; supported 20+ functionalities including OAuth2 authentication and improving workflow efficiency and coverage
- Developed a scalable, generalized unit testing framework with a mock server for HTTP functions, enabling robust multi-module testing and reducing external dependencies
- Built a logger to convert complex Golang classes into human-readable formats, reduced debugging time by ~50%

Academic Projects

Multimodal Perception and Comprehension in Autonomous Driving [Code][Poster] Nov 2024 – Dec 2024

- Developed a 2-stage RAG-enhanced LLaVA system for autonomous driving perception, using segmentation and depth features to improve spatial understanding and scene comprehension
- Achieved 5x training speedup by optimizing multi-GPU workflows and integrating DeepSpeed with Liger kernels for memory, communication, and throughput efficiency

Reinforcement Logic Optimization for a General Cost Function [Code][Report] May 2024 – Jun 2024

- Achieved the best performance in the course (NTU EE3012: Introduction to Electronic Design Automation)
- Developed a reinforcement learning framework (A2C) for logic synthesis with Yosys, designing effective state- and action-space and a reward function under limited information provided by tools
- Outperformed baselines, including Greedy and Simulated Annealing, across all netlist and cost estimator combinations

Collaborative Review for Intelligent Code Analysis using LLMs [Code][Report] May 2024 – Jun 2024

- Achieved the highest score in the course (NTU CSIE7190: Cryptography and Network Security)
- Developed a multi-agent framework to identify vulnerabilities and mismatches between commit message and code changes
- Achieved higher human preference scores on real-world datasets over traditional tools (e.g., CodeQL), with higher efficiency and broader issue detection

Reinforcement Learning for Physically Competitive Sports [Code][Report] Nov 2023 – Dec 2023

- Developed a two-stage curriculum reinforcement learning framework to train competitive fencing humanoid agents
- Created a MuJoCo environment for fencing simulations, integrating custom reward shaping to enhance training efficiency

Application Projects

Preliminary Diagnostic and Disease Monitoring Medical Service [Code] Sep 2024
Taipei Codefest (Hackathon), Taipei City Government

- Developed a full-stack application that visualizes yearly disease trends using government open data and provides location-based clinic recommendations
- Integrated Large Language Models (LLMs) to deliver personalized guidance and redirected users to the most suitable hospital websites for treatment

NTUEE Light Dance [Code][Demo] Oct 2022 – Mar 2024

- Collaborated in a 50+ member student-initiated project recreating Britain's Got Talent-style LED Dance performances
- Developed main algorithms and CLI tools, achieving 2.5x frame rate performance with parallel processing
- Refactored lagacy codebase into modular components, improving maintainability and enabling rapid feature extension
- Designed data storage structure and serialization methods for LED control system, reducing storage usage by 30% while maintaining fast access and scalability for large-scale performances

Google 2023 Hardware Product Sprint - Fire Guardian [Code][Demo] Jun 2023 – Aug 2023

- Designed a real-time fire escape system with Raspberry Pi, integrating web interfaces for remote monitoring and control
- Developed dynamic escape routing algorithms that adapt to real-time environmental condition changes
- Established reliable edge device communication with MQTT and BLE Mesh; implemented user notification system for instant alerts and status updates

MakeNTU Equipment Reservation Website [Code][Demo] Dec 2022 – Feb 2023

- Developed a full-stack reservation website for Taiwan's largest student-maker hackathon using React, Express, MongoDB
- Deployed the application using Docker, Nginx, and Cloudflare to serve a wide audience

Leadership Experience

NTUEE Student Association Sep 2023 – Jun 2024
IT Lead

- Directed a 10+ members team to develop and maintain digital platforms for student association activities; created React-based mini-games that engaged 200+ participants and ensured reliable system performance during events
- Organized workshops on web design, Linux, and Git/GitHub; designed hands-on exercises for 80+ attendees and strengthened members' technical and collaboration skills

NTUEE Night Sep 2023 – Apr 2024
Director-in-Chief

- Directed 100+ performers and staff across multiple teams, managing task allocation, scheduling, and on-site execution for seamless event operations
- Managed venue preparation, program flow, vendor negotiation, and final approval of event deliverables

Nine-Department Intercollegiate Christmas Ball Sep 2022 – Dec 2022
Deputy Director of General Affairs

- Coordinated 50+ staff through training, task allocation, and scheduling; ensured seamless collaboration across teams
- Managed venue layout, program flow, and on-site execution with real-time contingency handling

Skills

Languages: Mandarin (Native), English (Fluent, IELTS 7.5), Japanese (Beginner)
Robotics & Control: ROS2, ALOHA, Motion Planning, Computer Vision
Programming: C/C++, Python, Golang, Cuda, TypeScript, MongoDB, PostgreSQL
Embedded Systems: Raspberry Pi, Arduino
DevOps: git, Docker, Linux/Unix