Sheng Kai Chen

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Research focus on **Visual SLAM**, **Robotic Manipulation**, and **Explainable AI**. Strong background in deep learning optimization, edge computing, and robotics integration. Interested in building intelligent, transparent, and safety-aware robotic systems aligned with emerging AI and robotics research.

Education

Yuan Ze University, Taiwan (R.O.C) Sep. 2024 to Jun. 2025

M.Sc. in Electrical Engineering

- **Research Interest**: Visual SLAM, Robotics, Explainable AI, Lightweight Deep Learning
- **Publication**: Autonomous Robots (2, Submitted), IEEE Trans. on Education (3, Submitted), IEEE Access (1, under review), ICCE-TW 2025 (1), ICCR 2025 (1)

Yuan Ze University, Taiwan (R.O.C) Sep. 2020 to Jun. 2024

B.Sc. in Electrical Engineering

- **Graduation Projects:** Omni-bearing Autonomous Mobile Manipulator; Golf Swing Phenomena Analysis
- **Publication**: ICMEW 2023 (1)

Research Experience

Explainable System for Inverse Kinematics Jan. 2025 to May. 2025

M.S. Research, advised by Po-Chiang Lin

- Proposed an explainable IK framework integrating SHAP and InterpretML to analyze decision logic and safety correlation.
- Designed Improved IKNet and Focused IKNet, achieving balanced feature attribution and enhanced obstacle-avoidance stability.
- Prepared a journal submission to Autonomous Robots

Enhanced ORB-SLAM3 with Point-Cloud Refinement Sep. 2024 to Jan. 2025

M.S. Research, advised by Po-Chiang Lin

- Integrated YOLOv8-based dynamic filtering and CUDA-accelerated point cloud refinement to enhance ORB-SLAM3 robustness.
- Achieved 25.9% reduction in ATE RMSE and 30.4% improvement in trajectory median accuracy on KITTI dataset.
- Prepared a journal submission to Intelligent Service Robotics

Golf Swing Phenomena Analyzing Jan. 2023 to Jul. 2023

B.S. Capstone, advised by Huang-Chia Shih

- Developed a computer vision system (OpenCV + YOLO + MediaPipe) for precise club and posture tracking.
- Applied Lagrangian mechanics to model swing dynamics and quantify kinetic—potential energy interactions.
- Conference Paper published in IEEE ICMEW 2023.

Omni bearing Autonomous Mobile Manipulator Jul. 2022 to Dec. 2022

B.S. Capstone, advised by Po-Chiang Lin

- Built an autonomous mobile robot integrating LiDAR, depth camera, and robotic arm under ROS2 Foxy framework.
- Implemented SLAM navigation and vision–based elevator control, achieving complete self–guided mobility.
- Successfully demonstrated full autonomous navigation and manipulation.

Lab and Mentoring Experience

Graduate Mentor Dec. 2025 to Jun. 2025

- Supervised two undergraduate projects on robotic arm modeling and digital twin applications.
- Resulted in publications at IEEE International Conference on Consumer Electronics — Taiwan (ICCE–TW) 2025 and International Conference on Control and Robotics (ICCR) 2025

Laboratory Management and Educational Research Assistant Dec. 2025 to Jun. 2025

- Assisted advisor in lab hardware management, competition organization, and coordination of research on robotics education.
- Supported data analysis, course design, and academic writing for studies on learning outcomes and scaffolding strategies.
- Prepared three submissions to IEEE Transactions on Education.

Teaching Assistant Feb. 2023 to Jun. 2025

- Supported courses in Robotics, Computer Vision, Data Structures, and Programming.
- In total of being TA for nine courses and four semesters.
- Duties: graded assignments, prepared exams, and provided tutoring.

Internship

National Center for High–Performance Computing, Taiwan (R.O.C) Jul. 2025 to Aug. 2025
Summer Intern, Division of Virtual–Real Integration

- Developed AI agent for remote computer control with AR glasses streaming via RTSP.
- Trained UR10 robotic arm models for singularity–aware motion planning.
- Publications: Conference paper accepted at TANET(Taiwan Academic Network Conference) 2025 and National Computer Symposium (NCS) 2025

Ta Chou Industry, Thailand Jul. 2024 to Aug. 2024
Summer Intern, Division of Management

- Managed IT infrastructure, social media, and provided technical support in Thai.
- Repaired machines and designed factory fixtures.

KPMG Taiwan, Taiwan (R.O.C) Feb. 2024 to Jul. 2024
Intern Consultant, Digital Transformation Team, Division of Management Consulting

- Analyzed government AI policies and corporate digital transformation cases using the KPMG Connected Enterprise framework.
- Applied Trusted AI frameworks (LIT, SHAP) to financial data and corporate XAI cases

After–Class Activities Experience

International Volunteer
Ta Thong Chinese School, Thailand Jun. 2023 to Jul. 2023

- Teaching English and holding events with Chinese cultures.
- Teaching coding and IT skills.

Chair of Student Council Jul. 2022 to Jun. 2023

Yuan Ze University Student Association

- Manage student council and being the chair in each meeting.
- Supervising the student executive center and review the budget of whole association.

Executive Secretary of Student Executive Center Sep. 2021 to Jun. 2022

Yuan Ze University Student Association

- Assisting president of managing whole association.
- Reviewing the procedure of holding events.

Research Fields and Skills

- Research Areas: Visual SLAM, Robotics, Edge AI, Explainable AI, Digital Twin
- Technical Skills: Python, C/C++, PyTorch, TensorFlow, OpenCV, ROS, YOLO, MediaPipe, LIT, SHAP
- Soft Skills: Leadership, Project Management, Cross-cultural Collaboration, Technical Writing

Awards and Scholarship

- Yu-Ziang Scholarship (YZU, Taiwan) Sep. 2024 to Jun. 2025
- Outstanding Graduate Award (YZU, Taiwan) Jun. 2024
- Young College Elite of 2023 (China Youth Corps, Taiwan) Mar. 2023
- Third Place of 2022 YZU Maker Competition Robot Fighting (YZU, Taiwan) Dec. 2022

Publications

Journal Paper

- **S.K. Chen**, Y.L Tsai, C.C Chang, Y.C. Chen, P.C. Lin, "Explainable Neural Inverse Kinematics for Obstacle-Aware Robotic Manipulation: A Comparative Analysis of IKNet Variants", Intelligent Service Robotics (Submitted)
- **S.K. Chen**, J.Y. Chao, J.Y Chang, P.L., P.C Lin, "PCR-ORB: Enhanced ORB-SLAM3 with Point Cloud Refinement Using Deep Learning-Based Dynamic Object Filtering", Autonomous Robots (Submitted)
- **S.K. Chen**, Y.D Liu, P.C Lin, "Addressing Cognitive Load and Achievement Gaps in Introductory Computer Science: A Novel 5C-Loop Framework Integrating", IEEE Transactions on Education (Submitted)
- P.C Lin, **S.K. Chen**, "Learning-by-Doing and Scaffolding Strategies for Improving Learning Outcomes in EMI Internet of Things Courses", IEEE Transactions on Education (Submitted)
- **S.K. Chen**, P.C Lin, "Layered Learning and Adaptive Progression: A Novel Framework for Enhancing Robotics Education Outcomes", IEEE Transactions on Education (Submitted)
- S.Y. Lim, C.R. Ong, J.S. Chow, K. Lee, Q.P. Soo, J.H. Deng, J.K. Huang, **S.K. Chen**, Y.D. Liu, Y.C. Liu, H.C. Hsien "Machine-Learning Empowered Propagation Measurement and Modeling for an Amphitheater", IEEE Access (Reviewing)

Conference Paper

- **S.K. Chen**, Y.L Tsai, C.C Chang, Y.C. Chen, P.C. Lin, "Inverse Kinematics Neural Network Models for Improving Inference Efficiency and Memory Usage", IEEE ICCE-TW 2025
- **S.K. Chen**, J.Y. Chao, J.Y Chang, P.L. Wu, P.C Lin, "Efficient Grasp Detection via Knowledge Distillation: A Lightweight Generative Grasping Convolutional Neural Network Framework", ICCR 2025 (Accepted)
- **S.K. Chen**, T.Y. Liu, Y.D. Liu, H.C. Shih, "Analysis of Physical Phenomena in Golf Swing", IEEE ICMEW 2023
- **S.K. Chen**, J.H. Wu, C.Y. Lin, Y.T. Lin, "An Intelligent AI glasses System with Multi-Agent Architecture for Real-Time Voice Processing and Task Execution", NCS 2025
- **S.K. Chen**, J.H. Wu, "Intelligent Singularity Avoidance in UR10 Robotic Arm Path Planning Using Hybrid Fuzzy Logic and Reinforcement Learning", TANET 2025