Li-Wei Yang

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EDUCATION

Carnegie Mellon University - School of Computer Science (CMU SCS)
Pittsburgh, PA
Master in Robotic Systems Development
(expected) May 2025
Courses: Planning and Decision-making in Robotics, Optimal Control & Reinforcement Learning, Talking to Robots,
Robot Autonomy, Manipulation & Estimation & Control, Advanced Computer Vision, Robot Mobility

National Taiwan University (NTU)
Taipei, Taiwan
Bachelor in Biomechatronics Engineering
Jun. 2022
Courses: Robotics, Machine Learning, Medical Mechatronics and Control, Data Structures and Algorithms, Digital Image Processing
Honor: Prof. Takasaka Memorial Scholarship, Presidential Award

SKILLS

Programming: C/C++, Python (PyTorch, OpenCV), Java, MATLAB, Julia
Robotics: Motion Planning, Optimal Control, Computer Vision
Software/Tools: ROS2/ROS, MoveIt2, Gazebo, SolidWorks, 3D Slicer, Qt, Git, Arduino, Android Studio, Google Test

WORK EXPERIENCE

Smith+Nephew
Pittsburgh, PA
R&D Intern (Robotics System Verification Engineering Intern)
May 2024 - Aug. 2024
- Analyzed and visualized registration algorithm results for total hip arthroplasty, boosting registration efficiency by 75%.
- Developed and automated 20 C++ tests using GoogleTest, enhancing code reliability and reducing testing time by 50%.
- Executed 15 manual test cases, identifying multiple bugs for the development team and accelerating product launch.

RESEARCH EXPERIENCE

Center for Artificial Intelligence and Advanced Robotics
Taipei, Taiwan
Research Assistant, topic: Companion Healthcare Aid Robot Manager
Feb. 2022 - Oct. 2022
- Developed a voice-interactive module, enhancing facial recognition capabilities and user engagement.
- Leveraged **SQLite** to centralize physiological data from multiple users, improving system scalability and user management.
- Integrated a smartwatch with the robot using Bluetooth Low Energy protocol, optimizing data synchronization capabilities.

Robots and Medical Mechatronics Lab
Taipei, Taiwan
Undergraduate Researcher, topic: Remote Swabbing Robot
Sept. 2020 - Mar. 2022
- Constructed statistical morphing oral model using CT images in **3D Slicer**, achieving landmarks' accuracy of 2 mm.
- Won **sponsorship** worth $1600 USD from Taiwan's Ministry of Science and Technology.
- Won the best student paper award at the Conference on Advanced Robotics and Intelligent Systems.

PUBLICATIONS

Peer-reviewed Journal Articles
A Morphology Model for the Cyber-physical Operation of a Remote Swabbing Robot.
- **Yang, L. W.** & Yen, P. L., International Journal of iRobotics.

SELECTED PROJECTS

Tekkneeca − Autonomous Surgical Robots (MRSD Capstone Sponsored by Smith+Nephew)
Present
- Integrated novel registration algorithm to replace invasive IR trackers for surgical robots, achieving drilling accuracy of 4 mm.
- Designed **MPC** controllers to compensate for subtle bone motion during the surgery, achieving a compensation speed of 6 mm/sec.
- Leveraging MoveIt2 hybrid-planning architecture with KUKA LBR Med 7 to account for obstacles and define recovery behavior.
- Led a team of 5 as the project manager and scrum master using Agile with Scrum.
- https://mrsdprojects.ri.cmu.edu/2024teame/

ARoboT − Autonomous Pixel Art Builder
May. 2022
- Integrated symbolic task planner to stack 3D-printed blocks to form a pixel art
- Designed the system logic using ROS service, ensuring seamless communication between various nodes.
- Utilized MoveIt with the RRTConnect planner to plan Franka Emika Panda trajectory to pick-and-place building blocks.
- Conducted eye-in-hand extrinsic camera calibration to enhance the accuracy of object detection and pose estimation.

Mobile Lost and Found Robot
Jan. 2022
- Led a team of 4 to integrate an object-searching robot using depth camera and lidar.
- Implemented DWA **navigation** and AMCL **localization** methods.
- Applied BRISK and RANSAC algorithms in object searching and found all lost items.

Steganography Qt Application
Dec. 2021
- Built a steganography application using **Qt** and **C++**, with AES 128 as encryption algorithm.
- Compared multiple steganography methods, including LSB, DCT, and DWT steganography.