

CHANG-WEN (ERNIE) WANG

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Education

M.S., Dept. of Electrical Engineering, National Cheng Kung University (NCKU), Taiwan

2020-2022

B.S., Dept. of Electrical Engineering, National Cheng Kung University (NCKU), Taiwan

2016-2020

GPA 3.6/4.3

Research

Research interests: Robotics, System Engineering, Manipulator Trajectory Planning

A Collision-free Trajectory Planning Policy for Multiple DoFs Manipulators | Jan.-Jun. 2022

- Improved the Forward and Backward Repeat Inverse Kinematics into collision-free and orient considered algorithm
- Invented an online arm control algorithm that considers obstacles with linear complexity
- Proven workable on manipulators with DoFs from 5 to 7 in a real-world environment

SCARA Control System | Jan.-May 2021

- Programmed SCARA to move in a specific orientation and speed with Jacobian controller

Publications

- [1] Y. -T. Su et al., "A Fully Automatic Calibration for Vision-Based Selective Compliance Assembly Robot Arm and Its Application to Intelligent Wafer Inspection Scheduling," in IEEE Access, vol. 10, pp. 50100-50113, 2022.

Relevant Coursework

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| Graduate | Introduction to Neural Network, Machine Learning, Principle of Robotics, Practical Linear Programming Theory and Applications, Visual Servoing System, Fundamental System Engineering, Image Processing |
| UnderGrad | Introduction of Computer Science, Linear Algebra, Operation System, Graph Theory, Single Chip System Design and Application, Introduction to Software Engineering, Computer Algorithm, Control Engineering |

Skills

Advanced: C++ | *Intermediate :* Python, Robot Operating System | *Basic:* CMake, MatLab, SolidWork, JavaScript

Projects

Robot system design & arm control, Humanoid robot - John | Jan.-May 2022

- Designed the robot system structure based on Robot Operating System (ROS) on Nvidia Xavier NX
- Developed the collision-free manipulator controller for 5 DoFs arm

Robot control system developer, Rescue robot system - Debris Walker | Oct. 2019-Apr. 2020

- Built the robot to search and locate victims automatically in debris
- Designed an ad hoc network to notify rescuers and release network nodes if signal strength were weak
- Enabled real-time trajectory optimization on Nvidia Jetson nano

Robot system designer, Androsot, Federation of International Robot-Sport Association | Feb.-Aug. 2019

- Built a multi-robot system to play soccer games without human assistance
- Designed a low-cost communication system to reduce the communication time up to 80% of the wifi-based one
- Upgraded the robot control system to reduce robot response time with safe interrupts

System developer, Somatosensory musical instrument - Fising | May-Jul. 2019

- Built the sensory components to detect the action of the user.

Creator, Mock Wireless Ad Hoc Rescue Network | Nov. 2018-Jan. 2019

- Engineered network nodes to self-locate and pass data through other nodes to prevent signals from being blocked
- Designed the algorithm to detect and localize newly joined nodes freely to expand the covered area
- Assembled a system to justify the effectiveness with 5 concept prototypes

Front, backend developer, Tele Rehabilitation System - TRESY | Jun.-Nov. 2018

- Developed a system to construct human 3D motion from 2D images
- Integrated human joint mapping algorithm and designed the user frontend

Proposer, Quadcopter With Hand Motion Controller | Jan.-Aug. 2017

- Invented a somatosensory controller for the quadcopter to react to hand motions
- Improved the UX of the controller to be more ergonomic when controlling

Work Experience

Advisor of Physics Society, Tainan First Senior High School, Taiwan | Mar. 2020-Jun. 2022

- Advised content of courses and experiments to make the class more entertaining and inspiring
- Delivered an introductory course for beginners to control LEDs with Arduino and physic buttons
- Instructed a develop team of quadcopter flight control and power system

Leader Experience

Team leader, Debris Walker | Oct. 2019-Apr. 2020

- Organized and scheduled milestones in a team of 3 undergrads in electrical engineering and 1 in Engineer Science
- Coordinated and arbitrated between software and hardware designs

Organizer, Androsot, Federation of International Robot-Sport Association | Feb.-Aug. 2019

- Designed the system structure and schedule milestones in a team of 5 electoral engineering undergrads students

Awards and Honors

Second Place in Best Student Award

- International Conference on Advanced Robotics and Intelligent System | Aug. 2022

- Chosen among 91 papers called worldwide, mostly in Taiwan

Honorable Mention in Best Master's Thesis Award - Robotics Society of Taiwan | Aug. 2022

- Equivalent to third place, following two special awards

Three Champion in Androsot competition - Federation of International Robot Sport Association | Aug. 2019

- Competed with 11 other international teams, including Korea, Taiwan, and Mexico
- Outperformed other teams in all tournaments, namely 2 soccer challenges and a 3 vs 3 formal soccer game series

Honorable Mention in Arm Design Contest - Arm Taiwan | Nov. 2018

- Led a three-member team to construct human 3D motions from 2D images, which ranked top 10 among 150 teams

Interests

Badminton, Baseball, Playing Guitar, Watching Movies, and Being a Maker