Zhian (Aria) Ruan

E: zhianruan2025@u.northwestern.edu || T: (205)2857518 || Portfolio

EDUCATION

Northwestern University **Evanston, IL**
Bachelor of Science in Mechanical Engineering (Robotics) | Minor in Computer Science *Sep. 2022 – Jun. 2025*
GPA: 3.91/4.00 | McCormick Undergraduate Honors Program | Certificate in Human Computer Interaction
Relevant Coursework: Mechatronics, Dynamic Systems, Embedded Programming, SLAM, Machine Learning

University of Illinois at Urbana Champaign **Urbana, IL**
Bachelor of Science in Mechanical Engineering | Minor in Informatics *Aug. 2020 – May. 2022*
GPA: 4.00/4.00 | Certificate in AI in Medicine | Dean's List & Edmund J James Scholar for 2020 – 2022

PROFESSIONAL EXPERIENCE

Tesla, PCBA -- Power Electronics and Energy Product **Fremont, CA**
Manufacturing Engineer Intern: Software Automation *Jan. 2024 – Jun. 2024*
- Implemented a real-time, camera-based, multi-barcode scanning and classification system using OpenCV, enabling rapid identification, processing, and documentation simultaneously
- Developed 5 applications to analyze, examine, and visualize documents for production purposes (e.g. BOM, inventory), significantly reducing manual errors and streamlining PCB assembly work orders

Northwestern University, Center for Robotics and Biosystems **Evanston, IL**
Undergraduate Research Assistant: Embedded System & Hardware Design *Mar. 2023 – Dec. 2023*
- Devised a path following robot based on ATmega32U4 for at 4m/s in low lighting condition,
- Tuned PID position controller based on IR sensors and PD speed controller based on encoder via trial-and-error, and attained an over 95% success rate
- Established UART communication with ESP32 as a Wi-Fi module to receive command from a higher-level controller, integrated a circuit consisting of a power source and LEDs for computer vision

Shirley Ryan AbilityLab, Neurorehabilitation and Neural Engineering Lab **Chicago, IL**
Research Intern: Medical Robotics Testing *Jun. 2023 – Aug. 2023*
- Developed a test system for transparent haptics rendering on lower-limb exoskeleton using ROS Noetic
- Evaluated and validated parameters for PID and IIR filter by generating Bode plot and shift in RMSE in Python
- Achieved near zero output at human movement frequency with a less than 10 ms delay in real-time

University of Illinois at Urbana Champaign, Human Dynamic and Control Lab **Urbana, IL**
Undergraduate Research Assistant: Data Processing *Jul. 2021 – Jul. 2022*
- Built an EMG database and a quantitative measurement for abnormal muscle behavior, focusing on post-processing in time and frequency domain with digital filters, Fast Fourier Transform, and residual analysis in MATLAB

PROJECTS

Visual-Inertial Odometry SLAM for Multi-robot System *Feb. 2024 – Now*
- Created a sparse point cloud map using IMU and Odometry data on TurtleBot3 and improved mapping accuracy with EKF
- Set up a UAV environment with Gazebo and PX4 flight control for efficient data collection and algorithm testing
- Studied extensively in Multi-State Constraint Kalman Filter (MSCKF) and sematic SLAM in multi-robot system

Machine Dynamics Simulation of a 2 Revolute Joints Robot *Dec. 2023*
- Modeled a rigid body (with elastic impact) inside a box handled by a 2R robot as an end effector via Lagrangian mechanics and RK4, and implemented gravity compensation due to mass of the links and joints of the robot with optimal control

Embedded Computing and Mechatronics with the PIC32 Microcontroller *Dec. 2022 – Jun. 2023*
- Learned Microchip PIC32 architecture, embedded C, digital communication protocols, and digital signal processing, and interfaced with sensors and actuators, including ultrasonic sensor, DC motors, servo motors, IMU, and OLED display

SKILLS & CERTIFICATES

Leadership: Northwestern Badminton Club Executive Board *Apr. 2023 – Now*
Programming: Python, MATLAB, C/C++, SQL
Developer Tools: Git, Linux, ROS, OpenCV, Pandas, Docker, TensorFlow (keras), Tkinter, Figma
Engineering: CAD, CAM , microcontroller, rapid prototyping (3D printer, laser cut), machine shop, soldering, PCB design
Certificate: Machine Learning Specialization by Stanford & DeepLearning.AI