Yecheng (Geoffrey) WANG

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EDUCATION

University of Leeds | Leeds, UK   Aug 2023 – Jul 2027
- BEng Mechanical Engineering, Year0: 75.67/100, Year1: 84.17/100

Southwest Jiaotong University (SWJTU) | Chengdu, China   Aug 2023 – Ju1 2027
- BEng in Mechanical Design, Manufacturing and Automation *(SWJTU-Leeds Joint School)*
- Overall Average Score:93.08/100 (Ranking: Top 5%) ; Major Average Score:95.83/100
- Scholarship: **National Scholarship** (top 0.2%, 2023-2024 & 2024-2025 academic years)

PUBLICATION

1. Y. Wang, MBO-YOLO: An enhanced YOLOv8n-based algorithm for detecting marine benthic organisms, *2025 AIITA*, Xi'an, China, 2025, pp. 854–860, DOI: 10.1109/AIITA65135.2025.11047694.

RESEARCH SKILL & INTEREST

Research Interests: Robotics, Robot Manipulation, Medical Robotics, Autonomy, Robot-Learning, SLAM, and CV
Programming Languages: Python, C++, MATLAB, HTML/CSS, Markdown
Robotics & Simulation: ROS, ROS2, Simulink, StateFlow, RViz
Computer-Aided Design (CAD): SolidWorks
Software & AI Perception: PyTorch, YOLO, DeepSeek API, SPSS, MongoDB, OpenCV, MobaXterm

RESEARCH

YOLO-Based Intelligent Automatic Checkout Shopping Cart   Chengdu, China
Designer & Developer, Student Research Training Program, Advisor: Prof. Zhiguo LONG   Apr 2024 – Apr 2025
- Engineered a Raspberry-Pi 5-driven shopping cart prototype, integrating a 210° fisheye camera and HX711 weight sensor for real-time product monitoring and automated checkout.
- Designed a weight-vision consistency checking mechanism and a 2-DOF pan-tilt laser pointer subsystem as a physical feedback mechanism to automatically indicate non-recognized items during weight-vision mismatches.
- Calibrated the camera FOV and sensor placement to reduce Sim-to-Real discrepancies and, ensuring high-fidelity inference.
- Integrated a Multi-Scale Dilated Attention (MSDA) module into the YOLOv8n backbone, strengthening feature interaction for multi-scale objects while maintaining a lean computational profile suitable for edge deployment.
- Evaluated refined model's performance on YOLOv8n baseline, achieved a 92.4% mAP@.5 and 91.5% Recall, and attained a per-item identification latency of under 1 second.

MBO-YOLO: An Enhanced YOLOv8n-Based Algorithm for Detecting Marine Benthic Organisms   Chengdu, China
Independent Research   Oct 2024 – Mar 2025
- Developed MBO-YOLO to detect small and blurred marine organisms in complex underwater environments
- Integrated a P2 detection layer, Non-Local Block attention, and BiFPN to enhance feature extraction, attention accuracy, and deep feature fusion.
- Achieved improvements of 2.2% in mAP50 and 2.9% in mAP50:95 on the URPC2020 dataset, outperforming the YOLOv8n baseline with minimal added complexity.

INTERNSHIP

Hangzhou Xiaowu Intelligence Co., Ltd   Hangzhou, China
Mechatronics Engineer Intern   Jul 2025 – Aug 2025
- Developed robotics-related technical skills and gained internal certifications in ROS and embedded systems during working shifting from Production & Quality Control Department (PQC) and R&D Verification Department.
- Executed production-level calibration of multi-sensor SLAM systems (LiDAR, camera/QR code) on lift and forklift AMRs in PQC, using point cloud distribution monitoring to validating mapping fidelity and localization accuracy.
- Diagnosed and mitigated perception failures caused by mechanical misalignment during system assembly, improving sensor mounting and optimizing SLAM robustness.
- Conducted large-scale regression testing of navigation stack using 600+ validation metrics in R&D department to assess path planning and obstacle avoidance performance in complex environments.
- Detected and addressed deployment-stage edge cases in multi-sensor fusion and SLAM loop closure and assisted in locating problems and making solutions.

COMPETITION

Multi-Stage Production Decision Research Driven by Profit Maximization   Chengdu, China
Programmer & Modeler, Provincial Second Prize, China Undergraduate Mathematical Contest in Modelling   Sep 2024
- Abstracted multi-stage manufacturing systems with quality uncertainty and discrete inspection and disassembly decisions into tractable stochastic optimization models through four structured assumptions.
- Designed sampling inspection models and single-stage production decision models for each phase, and formulated an integrated multi-stage production optimization framework.
- Applied Monte Carlo simulation, genetic algorithms, and single-objective optimization to solve dynamic decision problems under uncertainty, incorporating stochastic defect rates and multi-stage cost propagation.

Machine Learning-Based Student Employability Evaluation and Job Recommendation System   Chengdu, China
Web Developer, 2024 Chinese Collegiate Computing Competition   Feb 2024 – Jun 2024
- Developed the system's front-end interface using HTML/CSS to construct user interaction pages. Designed and implemented the front-end to back-end interaction logic, ensuring a cohesive functional flow for the entire system

- Utilized Python and MongoDB for back-end development and database management. Provided robust back-end support for user data storage, job information retrieval, and result display.

System Dynamics-Based Water Level Control and Prediction Model for the Great Lakes   Chengdu, China
Modeler & Writer, 2024 Interdisciplinary Contest in Modeling (ICM)   Feb 2024
- Utilized SPSS for data processing and analysis to build a multiple regression prediction model simulating Great Lakes water level changes, based on three key environmental factors: net basin supply, precipitation, and evaporation.
- Created charts and graphs to ensure a rigorous academic structure and effective visualization of the findings
- Authored the competition paper, systematically presenting the model's construction, data support, and predictive results. Created charts and graphs to ensure a rigorous academic structure and effective visualization of the findings

PROJECT

Magnetic Capsule Robotic Arm Navigation System Design & Simulation (Leeds)   Feb 2026 – Present
- Developed a high-precision MATLAB Inverse Kinematics (IK) solver for a 2-DOF planar robotic arm, enabling automated trajectory planning for a magnetic capsule navigation system in a colonoscopy simulator.
- Implemented custom Elbow-down configuration logic and geometric constraints to maximize workspace efficiency and ensure predictable arm behavior during surface scanning.
- Architected a robust coordinate transformation framework to map global colonoscopy trajectory data to the robot's local frame, incorporating a modular offset system for flexible base positioning.
- Engineered a full-stack simulation environment to visualize kinematics and validate point reachability; designed an automated data pipeline to discretize angular trajectories into motor counts for seamless C++ embedded integration.

Autonomous Rover Control System Design & Implementation (Leeds)   Nov 2025 – Feb 2026
- Engineered a robust C++ embedded control architecture for an autonomous delivery buggy on Arduino Mega.
- Designed a Finite State Machine (FSM) to manage mission-critical stages and integrated a linear actuator for precise 6 m payload delivery without stopping penalties.
- Developed a dual-mode control strategy with a runtime-selectable closed-loop PI velocity controller, by incorporating straight-line synchronization (Ksync) and encoder low-pass filtering to suppress motor variance and sensor noise.
- Conducted validation via the ReLOAD platform and real-world testing to tune PID gains and anti-windup constraints; mitigated FWD front-wheel slip by relocating encoders to non-driven rear wheels for accurate velocity estimation.

A Bridge Load Analysis, Simulation and Manufacture (SWJTU)   Mar 2025 – Apr 2025
- Leveraged principles of engineering statics to develop a 2D truss bridge mathematical model with 24 linear equations.
- Utilized MATLAB for matrix computations and load simulation analysis, successfully predicting the most vulnerable components and theoretical maximum load.
- Developed a MATLAB App Designer GUI to enhance user interaction; simulation results demonstrated high correlation with empirical data, accurately predicting failure locations.

Helicopter Altitude PID Control System Development (SWJTU)   Mar 2025 – Apr 2025
- Developed an autonomous UAV altitude control system using Arduino/C++ and PID control, achieving stable hovering within ±0.02m for >5 seconds. Validated performance on Wokwi simulation and ReLOAD physical platforms.
- Integrated and debugged controller hardware and software (data acquisition, PID computation, PWM output). Optimized Kp, Ki, Kd, and base PWM parameters through telemetry log analysis.

Rubber Band Powered Buggy Design & Manufacturing (SWJTU)   Nov 2024 - Dec 2024
- Led the end-to-end design and fabrication of the buggy, including conceptualization, material selection, structural modeling, and power transmission system development.
- Utilized SolidWorks for theoretical calculations and CAD drafting of the lightweight chassis, custom gears, and wheels, and assisted on fabrication and assembly. Spearheaded the structural design and participated in debugging.

EXTRACURRICULAR ACTIVITIES

SWJTU Engineering Practice and Innovation Association   Chengdu, China
Co-founder   Nov 2023 – Present
- Designed and institutionalized the engineering association's organizational structure, standardizing roles, responsibilities, and workflows to enable efficient daily operations and sustainable student engagement.
- Managed and integrated university workshops (Creative Lab, 3D Printing, Laser Engraving), providing equipment access, technical guidance, and hands-on project support for student projects.
- Established a sustainable project ecosystem, enabling iterative development of high-potential student projects.
- Attracted and trained 100+ new participants annually, fostering students' engineering practice, problem-solving skills, and readiness for national and university-level competitions.

National Unmanned Aircraft System Challenge: Urban Package Delivery & Flight Coordination   Workshop
1st Prize & Best Presenter, Real World Design Challenge - Embry-Riddle Aeronautical University (US)   Oct 2020 – Jan 2021
- Gained foundational knowledge in aircraft design, aerodynamics, structural mechanics, and UAV system engineering, covering basic design and performance evaluation methods.
- Spearheaded the overall UAV design and urban delivery mission planning, involving comprehensive system modeling and a thorough business feasibility analysis.

National Youth Aviation and Aerospace Model Championship   Aug 2018 & Aug 2019
- Represented the Zhejiang provincial team for two consecutive years, competing in F3K radio-controlled Discus-Launch Gliders and P3T radio-controlled catapult gliders.
- Participated in the assembly, debugging, and maintenance of carbon fiber composite radio-controlled gliders, gained expertise in model aircraft control techniques and on-site troubleshooting.