Ruochen WU

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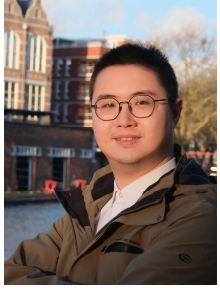

EDUCATION BACKGROUND

Delft University of Technology (TU Delft) 09/2023 – today

MSc. in Multi-Machine Engineering(MME), Mechanical Engineering | Weighted Average Score: 8.23/10.0

Courses: Control System Design | Reliability & Maintenance of Transport Equipment | Operation & Maintenance | Measurement Technology | Machine Learning for Transport and Multi-Machine System | System Analysis and Simulation

Central South University (CSU) 09/2018 – 06/2022

B.Eng. in Transportation Equipment and Control Engineering | **GPA:** 3.47/4.0 (WES)

Courses: Advanced Mathematics | Linear Algebra | Probability and Statistics | Analog Electronics Technology | Digital Electronics Technology | Artificial Intelligence and Automatic Drive | Vehicle Structural Strength and Dynamics (ANSYS)

RESEARCH EXPERIENCES

TU Delft, AI Energy Lab & Austrian Institute of Technology (AIT) 11/2024 – today

AI for Science – Interpretable Intraday Price Prediction Integrating Kolmogorov-Arnold Networks (KANs) and Large Language Models (LLMs)

Master Graduation, Supervisor: Dr. Jochen CREMER

- Designed a price prediction model for intraday electricity market with actionable trading insights.
  - Introduced the *KAN architecture* white-box deep learning model for the first time in IDM price forecasting, ensuring high interpretability to address risk management concerns.
  - Pioneered *Dynamic Edges Rebearing (DER)* and validated its effectiveness based on the newly proposed auto-cycle training process.
  - Explored various benchmarks, including linear regression and genetic programming-based symbolic regression, to assess the training effectiveness of the white-box KAN model.

TU Delft, Adaptive Metastructures, Mechanisms and Machines Lab (JAM Lab) 09/2024 –01/2025

Robotic Optimization – Multi-Sensor Fusion for Soft Robot Pose Estimation Using Co-Training Method

Core Member, Supervisor: Dr. Jovana JOVANOVA

- Perceived and detected the dynamic posture of a novel soft robotic arm.
  - Utilized a 3D camera module to detect the *multi-directional posture* of a soft robotic arm.
  - Integrated IMU and 3D camera data into a *semi-supervised* mutual supervision framework to minimize errors.

TU Delft, Adaptive Metastructures, Mechanisms and Machines Lab (JAM Lab) 06/2024 – 10/2024

Robot Creation – Integration System Design of SMA-SMP Based Morphing Structure for Soft Robotics

MSc Research Assignment, Supervisor: Dr. Jovana JOVANOVA & Dr. Aaron CHEN

- Developed a morphing structure and integrated control systems for advanced transformations.
  - Designed and fabricated the first SMM-based *soft robotic* system enabling dynamic and continuous operations.
  - Developed an *unsupervised learning* system with *image recognition* based on IR cameras for temperature detection.
  - Implemented a closed-loop *control system* with a PID controller for real-time and accurate shape adjustments.

CSU, Key Laboratory for Rail Traffic Safety 02/2021 – 07/2021

Robot Creation – An Automatic Service Robot in Train Compartments

Team Leader, Advisor: Dr. Fan WU

- Designed an autonomous service robot prototype for high-speed railway systems with multiple functions.
  - Implemented SLAM-based navigation with LIDAR and RRT for *positioning* and *obstacle avoidance*.
  - Developed *mechanical* and *electronic* systems for wheeled locomotion for omnidirectional, smooth movement.
  - Developed a real-time system for air bacteria monitoring and disinfection.

PROJECT EXPERIENCES

Logistics, Queueing Theory, Simulation, and Visualization 02/2024 – 06/2024

Logistics Simulation for Large-Scale Events and Carbon Emission-Based Strategy Optimization

Group Leader, Supervisor: Ir. Mark DUINKERKEN & Dr. Frederik SCHULTE

- Simulated random order occurrences and vehicle queues using *Salabim*, and employed a *Markov chain* to randomly generate real-time congestion scenarios for big events.
- Optimized logistics strategies based on the road network in the downtown area of Amsterdam, with the goal of minimizing carbon emissions while considering cost as the objective function.
- Created detailed visual maps and real-time statistical dashboards to present the actual state of the logistics system.

Maintenance Strategy Exploration 02/2024 –04/2024

Maintenance Strategy of Gas Processing Plants utilizing Sensor-based Standard Norsok Z-008

Group Leader, Supervisor: Dr. Xiaoli JIANG & Mr. Geert Henk Wijnants (Company Supervisor)

- Engaged in in-depth discussions with Mr. Wijnants, an expert in STORK asset management, to identify the current pain points in corporate maintenance practices.
- Conducted a risk assessment of key assets at a specific Dutch natural gas production plant based on the *Norsok Z-008*

standard, and provided recommendations for maintenance strategies.

PUBLICATIONS

Multi-Sensor Fusion for Soft Robot Pose Estimation Using Co-Training Method — Submitted
Integration System Design of SMA-SMP Based Morphing Structure for Soft Robotics — Under Review
Numerical comparison of ventilation modes on the transmission of coughing droplets in a train compartment. *Journal of Wind Engineering and Industrial Aerodynamics*. 231. 105240. 10.1016/j.jweia.2022.105240.

SKILLS & PROFICIENCIES

Technical Skills Stack: Python programming, Deep Learning, Logistics Simulation & Design, Robotics Design and Control, Image Recognition, FEM
Languages: Mandarin (*Native speaker*), English (*Proficient*, IELTS 7, GRE 330+4.0)
Hobbies: Basketball, Saxophone