Mengmeng(Mia) Wang

www.linkedin.com/in/mengmeng-wang086 | (646)276-7068 | mw3738@columbia.edu

EDUCATION

Columbia University (CU)   **New York, NY, 12/2024**
MS in Mechanical Engineering [GPA: 4.08/4.0]
Shanghai Jiao Tong University (SJTU) (Ranked Top4 University in China)   **Shanghai, China, 06/2023**
Bachelor of Engineering in Electrical Engineering and Automation
Course: Machine Learning, Data Structure, Mechatronics & Embedded Micro, Database system, Automatic control, Data Science, Digital Signal Processing, Robot Principle, Digital Manufacturing, Power Electronics Technology

SKILLS

- Software Development: Python, C++, Machine Learning, MATLAB, Simulink, Arduino IDE, Linux, SQL, C, Microsoft office
- Hardware/Simulation: SolidWorks, Altium Designer, 3D Printing, Circuit, Mechanical Design, AutoCAD, Labview, PLECS, CNC, FPGA, Laser Cutting
- Embedded Systems & Communication: Linux, CAN bus, UART, USB, Keil, STM32

WORK EXPERIENCE

Creative Machines Lab | Multi-model Interactive Robot | *Linux, LLM, Arduino, CAN, SolidWorks, Python*   **New York, NY, 08/2024 - 12/2024**
- Developed a multi-model active interaction face robot based on LLM, combined cameras, microphones, speaker, eyeball module and motors with software systems, enhancing natural language processing and advanced video analysis based on GPT-4o, achieved Human-like facial movements.
- Enhanced brush-less motor movement and achieved smooth start-stop operation by implementing a novel motor control model with CAN bus communication, utilizing Arduino and Linux platform for testing.
- Achieved human-like neck movements by implementing pitch and nod motions through a custom 3-motor parallel neck structure, applying physical algorithms in Python for smooth parallel-controlled platform operation.
- Developed a facial recognition-based interaction model that enables coordinated eye and neck movements, creating natural interactions with people.

Luminys Systems Corporation (Dahua USA)| Product Manager | *Microsoft Office, SQL*   **Irvine, CA, 06/2024 - 08/2024**
- Built a SQL database model to efficiently manage products models and sales data, enabling secure data access and customized views for different departments to enhance cross-functional collaboration.
- Conducted comprehensive market research and customer analysis to align product strategies with evolving market demands and customer needs.
- Refined the product Roadmap by analyzing sales data to gain insights into product performance and key features, presenting improvements to clients.
- Facilitated cross-functional collaboration and communication for maximum efficiency with clients, sales, and technical teams to implement customized solutions for product improvements and drive innovation.

Creative Machines Lab | Soft Robot Fish Project | *Arduino, Bluetooth, Python, SolidWorks, AutoCAD*   **New York, NY, 01/2024 - 05/2024**
- Boosted robot performance by 43% by developing a Bluetooth test model with Arduino and identifying optimal motor frequency through data analysis.
- Designed and assembled a waterproof robotic fish, integrating mechanical and electronic components for durability, stability, and ease of testing. Utilized SolidWorks and 3D printing for the waterproof shell, laser cutting for tail, physical assembly with soldering and electronic component debugging.
- Developed a remote control model with Python for wireless communication using an Xbox controller, integrating embedded Arduino and Raspberry Pi.

PROJECTS

Machine Learning and Control Model for Robot | *Python, PyTorch, Machine Learning*   **New York, NY, 01/2024 - 05/2024**
- Developed a novel model for 2D maze navigation using edge detection techniques, effectively solving random destination challenges. Improved learning efficiency by 80% through supervised learning and PCA-based dimensionality reduction.
- Designed and developed machine unsupervised learning model for optimal 2D maze navigation, based on MLP and Convolutional Neural Network.
- Established a precise model to achieve smooth start-stop control of multi-link arms using Recurrent Neural Networks and Model Predictive Control.
- Boosted reinforcement learning efficiency 300% by leveraging physical laws, achieving faster convergence and improved control strategies.

6-Motor Bipedal Robot Full-Cycle Development | *Raspberry Pi, SolidWorks, Python, Pybullet*   **New York, NY 01/2024 - 05/2024**
- Developed, rendered and animated a CAD model for a 6-motor bipedal robot using SolidWorks, ensuring stability and accurate movement simulation.
- Assembled the robot using 3D-printed components and electronics. Organized wiring for a clean setup, enhancing accessibility and testing efficiency.
- Achieved stable and smooth robot movement by designing a control model with cosine functions and hardcoded sequences, solving the problem of the robot being unable to stably walk, increasing movement speed by 200% compared to initial performance.
- Implemented machine learning algorithms in the robot's URDF model, tripling speed and significantly enhancing stability.

Optimization Algorithms for Multi-Objective Problems and Soft Robot Simulation | *Python, Matlab*   **New York, NY 09/2023 - 12/2023**
- Achieved an 80% improvement in model precision by applying heuristic algorithms in image data fitting challenges, achieving accuracy above 95%.
- Enhanced 550% performance in shortest path optimization problem with evolution algorithm than random search and tradition hill climber algorithm.
- Enhanced the movement of a soft robot by 8 times through a genetic algorithm, using a custom-built, fully simulated spring-based model in Python.

Apple Picking Robot - Modeling and Simulation | *SolidWorks, Matlab*   **New York, NY 09/2023 - 12/2023**
- Resolved reachability or redundancy issues in apple-picking robots by designing a 5-DOF robotic arm model with optimized inverse kinematics.
- Developed an algorithm to simulate precise kinematic trajectories, optimizing manipulator dynamics to enhance accuracy and reduce motion time.
- Calculated joint angles and developed end-effector trajectories in MATLAB, ensuring accurate positioning and smooth motion paths.
- Facilitated team collaboration by organizing regular progress check-ins and providing guidance on dynamic analysis and trajectory optimization, enhancing team productivity and ensuring alignment with project goals.

Power Equipment Condition Monitoring - Intelligent Power Supply System | *C, UART, Circuit, Matlab, PWM*   **Shanghai, China 08/2022 - 09/2022**
- Designed and implemented a dual-source power circuit capable of drawing energy from both a battery and electromagnetic sources. The circuit included modules for AC rectification, filtering, and voltage transformation, delivering a stable 4.4V DC output to the load.
- Developed intelligent power mode switching model, enabling power management across 7 different states, displayed through LEDs. The system dynamically switched between electromagnetic direct power supply, battery power supply and hybrid modes based on varying rectified current inputs.
- Utilized UART communication to control the microcontroller, implementing variable duty cycle PWM for efficient and stable lithium battery charging. Corresponding LED indicators displayed different charging speeds, ensuring real-time visual feedback of the charging process.

PUBLICATION

Incipient Fault Detection of Power Distribution System based on Statistical Characteristics and Transformer Network   **08/2022**
Author: Chen Haolan, **Wang Mengmeng**, Wang Zhenghao, Pan Yuchen, Liu Yadong

HONORS & AWARDS

- 2022 The Third Prize Scholarship of Shanghai Jiao Tong University. (Top 15%)
- 2021 Gold Award in the 8th China International College Students' "Internet+" Innovation and Entrepreneurship Competition in Shanghai. (Top 1%)
- 2021 Successful Participant in The Mathematical Contest in Modeling.
- 2021 Award for Successful Participation in "TI Cup" National College Students' Electronic Design Contest (Shanghai) Undergraduate Group.
- 2019 The Freshman Scholarship of Shanghai Jiao Tong University. (Top 30 among 59,000 students in the province)