Yuanshao Yang

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Education

Aug 2023 - Present **University of Michigan - Ann Arbor**
College of Engineering
Mechanical Engineering BSE / Concentration in Robotics GPA: 4.00/4.00

Sept 2021 - July 2023 **Sichuan University, Chengdu**
Sichuan University - Pittsburgh Institute
Bachelor of Engineering in Mechanical Engineering GPA: 3.84/4.00

Honors & Awards

Dec 2023 / May 2024, University of Michigan — University Honors
Dec 2023 / June 2024, University of Michigan - College of Engineering — Dean's List
Oct 2023, Sichuan University — Dean's List (10 % Annual Tuition, 30/230)
Oct 2022, Sichuan University — Academic Star Scholarship (20 % Annual Tuition, 3/230)
Oct 2022, Sichuan University — Comprehensive Academic Scholarship, 2nd Prize (TOP 4 %)
Oct 2022, Sichuan University — Outstanding Student Leader of the Year

Projects

Series Spring Design & Evaluation for Open-Source Leg
July 2024 - Present

Instructor: Prof. Elliott J. Rouse, Zach Bons
Neurobionics Lab, Robotics, University of Michigan

- Literature review of torsional spring design
- Middleware Design to link spring in series
- Testing the performance of the series spring

New Controller Implementation for Open-Source Leg
Mar 2024 - Present

Instructor: Prof. Elliott J. Rouse, Senthur Ayyappan
Neurobionics Lab, Robotics, University of Michigan
GitHub Repository Posted

- Literature reviews on the structure of bionic legs and 3-Phase Brushless DC Motors
- Redesign the Python Library for compatibility with multiple actuators
- Design baseplate for new controller board on the original actuator
- Implementation of the new controller board to expand alternative choices of actuators
- Test actuator functions based on new designs

Development & Motion Analysis of Robot Swimmer
Dec 2023 - Present

Instructor: Prof. Alex K. Shorter
Mechanical Engineering, University of Michigan
GitHub Repository Posted

- Develop an E. coli-based robot swimmer model with a sphere head and quad flagella
- Design & optimize the CAD model for robots' smooth 2-D motion in uniform, viscous flow

- Validate the mechanical design by CFD analysis
- Use correlation analysis towards design parameters to optimize mechanical design
- Develop a path-planning algorithm for obstacle avoidance
- Design the feedback control model to perform reference tracking

An Automated Vehicle with Tracking System
Mar 2023 - Aug 2023

Instructor: Prof. Qi Lu

Sichuan University - Pittsburgh Institute

GitHub Repository Posted

- Development of a self-tracking vehicle with tennis-ball-recognition
- Focusing on image recognition algorithm and object tracking method in the Tracking System
- Training and testing the image recognition model (YOLO v3) on the camera module for better effects of tennis ball recognition
- Implementation of a PID controller for the servos in the stabilizer to achieve object tracking
- Implementing and testing the functionality of the tracking system

Research Intern of Prof. Xiaobo Zhou
Mar 2022 - June 2023

West China Hospital Biomedical Big Data Center, Sichuan University

GitHub Repository Posted

- Work on diagnostic data of cardiac patients through feature selection
- Develop regression models (e.g., Random Forest) via Scikit-Learn and PyTorch in Python and use training data sets of clinical diagnostic data
- Test model performance on internal test datasets
- Perform interpretability analysis of built models using variable sensitivity analysis
- Enhance classification processes' precision of the model by analyzing visualized Decision Trees

Extra-Curriculum Activities

M.S.D.M (Math, Science, Data, and Modelling) Club
June 2022 - Present

Co-Founder
Sichuan University

- Establish an academic club aiming to integrate and share math-related resources
- Organize online seminars twice a month, attracted 10 people
- Invite professors to give pre-competition guidance to students planning to compete in MCM/ICM
- Manage member recruiting, seminar content planning

Skills

- Programming
  - C/C++, Python (PyTorch, Scikit-Learn, etc)
- Tools
  - Keil MDK, MATLAB & Simulink Toolbox, LaTeX, SolidWorks, AutoCAD, MSC Adams

Research Portfolio

Research Statement

- My primary research focuses on the the mechanical design & control of prosthesis joints, for a better performance of prostheses developed
- My ultimate research goal is to explore the dynamic behaviors of human limbs, and develop approaches (e.g. prosthesis) to aid various human motions
- These goals guides my steps towards more emphasis on human locomotion analysis, and wearable robotics design

Publications

In Review

Yang, Yuanshao et al. (2024). "Motion Analysis and Design of Bionic Swimming Robot".