MA, YUXIN
+1 734-834-2969 | yuxinma@umich.edu

Expected Graduation Date: 05/2024

EDUCATION

University of Michigan, Ann Arbor, College of Engineering   **Ann Arbor, United States**
M.S.E in Mechanical Engineering, GPA: 4.0/4.0   09/2022 – Present
- Achieved A+ in 50% courses.
- Member of Tau Beta Pi, the Engineering Honor Society.

Nankai University, College of Artificial Intelligence   **Tianjin, China**
B.Eng. in Intelligent Science and Technology, GPA: 88.57/100   09/2018 – 06/2022
- Merit Student for all-rounded excellence for three consecutive years.
- Scholarship for Academic Excellence 2021 (Top 6%).
- Scholarship for Innovation 2021 (Top 3%).
- Volunteerism Scholarship 2020 (Top 3%).
- Excellent Student Leader as recognition of taking a leading role in extensive student activities.

SKILLS

- Programming Languages: C, C++, C#, Python.
- Software and Frameworks: Matlab, Simulink, PyTorch, TensorFlow, ROS, Solidworks, OpenCV.
- Manufacturing Systems Operation: CNC, laser-cutting machine, 3D printer.

PUBLICATION

- **Yuxin Ma**, Yunyao Cai, Zeyu Wang, Mingzhu Sun and Xin Zhao, "Visual Detection of Cells in Brain Tissue Slice for Patch Clamp System," 2021 IEEE 11th Annual International Conference on CYBER Technology in Automation, Control, and Intelligent Systems (CYBER), 2021, pp. 521-526. (Published)
- Jiongzhi Yang, Thomas E. Augenstein, Jiajie Qiu, Edward P. Washabaugh, **Yuxin Ma**, "Design and Validation of a Pancake Style Planetary Gearbox for an Eddy Current-Based Wearable Gait Training Robot". (Submitted)
- **Yuxin Ma**, Dennis Bernstein, "Adaptive Stabilization of the Kapitza Pendulum with Slider-Crank Actuation". (In Preparation)
- **Yuxin Ma**, Dennis Bernstein, "The Dynamics of a Bead Sliding on a Freely Rotating Slanted Wire". (In Preparation)

RESEARCH EXPERIENCE

Intermediate Dynamics Research   12/2022–Present
Research Assistant, Advisor: Prof. Dennis Bernstein, University of Michigan
- Contributed to revising and developing new content for a dynamic book.
- Derived equations of motion for various examples using Euler-Newton Dynamics and Lagrangian Dynamics.
- Two manuscripts are in preparation.

Simulated Robotic Arm Control Through Principle Component Analysis of IMU Data   11/2023 – 12/2023
Research Assistant, Advisor: Prof. Chandramouli Krishnan, University of Michigan
- Employ principle component analysis (PCA) on the data collected by these IMUs to generate a straightforward two-dimensional velocity control schema with very limited body motions.
- Handle the singularities and edge cases of the robotic arm.

Design and Validation of a Pancake-Style Planetary Gearbox for an Eddy Current-Based Wearable Gait Training Robot   01/2023 – 11/2023
Research Assistant, Advisor: Prof. Chandramouli Krishnan, University of Michigan
- Improve the original design of the eddy current-based wearable gait training robot.
- Accomplished fabrication and assembly of the eddy current-based wearable gait training robot.
- Assisted in human subjects experiments to assess the effectiveness of the new design for functional resistance

training.

Human-like Multi-Agent Navigation based on Knowledge Distillation   10/2021–05/2022
Undergraduate Research Thesis, Advisor: Prof. Lei Sun, Nankai University
- Proposed a new fusion network framework to learn the navigation strategy that agents can produce human-like trajectory in the process of avoiding collision in a completely decentralized environment.
- Used the success rate, additional distance and energy efficiency to prove that the better navigation performance of this algorithm.

Image Processing Research, China Aerospace Science and Industry Corporation Limited (CASIC)

Research Assistant   07/2021 – 08/2021

- Assisted in infrared image classification and implementation, wrote programs to do pre-classification, explored automated image annotation using auto-annotate tool
- Undertook image enhancement for low-quality images with blurred shooting, unclear image details, low gray level, poor contrast, etc. by utilizing image processing methods such as edge detection

Visual Detection of Cells in Brain Tissue Slice for Patch Clamp System   06/2020 – 06/2021
National Student Innovation Training Program, Micro-operation Robot Lab, Nankai University
Research Assistant (Group leader), Advisor: Prof. Xin Zhao & Prof. Mingzhu Sun
- Defined a clarity evaluation function based on principal component analysis (PCA) by combining the gray features and texture features of differential interference contrast (DIC) images of mouse brain tissue slices.
- Divided DIC images into clear class and blurred class using K-Means Algorithm.
- Implemented a neuron detection process based on sliding window and pre-trained GoogLeNet classifier to take cell detection in the selected clear images.
- Published a research paper **Yuxin Ma**, Yunyao Cai, Zeyu Wang, Mingzhu Sun, Xin Zhao. "Visual Detection of Cells in Brain Tissue Slice for Patch Clamp System.", *the 11th IEEE International Conference on CYBER Technology in Automation, Control, and Intelligent Systems*.
- Achievements: Award of Excellence recipient.

Surgery Simulation System for Knee Joint Replacement   01/2020 – 06/2020
Research Assistant, Advisor: Prof. Juanjuan Zhang, HCI Gait Lab, Nankai University
- Took charge of the MRI and CT image fusion and user interface optimization for the system that realizes 3D reconstruction of MRI and CT images of bones of the lower limb and allows user to simulate surgery.

ACADEMIC COMPETITION

Mathematics-Statistics-AI Interdisciplinary Innovation Competition, Nankai University   04/2020 – 08/2020
Thesis: Automatic Cell Patch Clamp System based on Three-Dimensional Localization, 3rd-class Award
- Participated in the competition as the only undergraduate in the graduate-level project, assisted in the three-dimensional localization using Hill Climbing Algorithm and Template Matching Methods.
- Utilized deconvolution algorithm and a contacted electrode resistance measurement method to conduct horizontal and vertical localization of brain cell slice image respectively.

Rixin Cup Mathematical Contest of Modeling, Nankai University   10/2019 – 11/2019
- Trained the models using weather forecasting data and the electricity generation output data retrieved from a renewable-energy power plant.
- Predicted electricity generation output based on eXtreme Gradient Boosting (XGBoost), LighGBM and sklearn-RandomForest, shortlisted as top 9 among 200+ teams as the only one undergraduate team.

ACTIVITIES

Tau Beta Pi, the Engineering Honor Society | *Member*   09/2023 – Present
Office of Volunteer and Community Service, Nankai University | *Director*   09/2019 – 09/2021
Intel Artificial Intelligence Training Program | *Participant with Certificate*   07/2020