XINLEI ZHANG | CURRICULUM VITAE

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RESEARCH INTERESTS

Understanding the math underlying robotic systems for their controller (brain) design
Keywords: dynamics, robust and optimal control (estimation), data-driven method (reinforcement learning)

EDUCATION

North Carolina State University (NCSU) 08/2024 - Present
Ph.D. Student in Mechanical Engineering Raleigh, US

South China University of Technology (SCUT) 09/2020 - 07/2024
B.Eng. in Intelligent Manufacturing, cumulative GPA: 3.78/4.00 Guangzhou, China
Thesis: Design of Magnetic Source Configuration and Pose Estimation Algorithm in Electromagnetic Tracking System

PUBLICATION (* INDICATES CO-FIRST AUTHORS)

On Ambiguity in 6-DoF Magnetic Pose Estimation (first two-page preview) Second-round Review
Xinlei Zhang*, Shuda Dong*, Yifeng Zeng and Heng Wang
Submitted to **International Journal of Robotics Research (IJRR)**

PATENT

Electromagnetic positioning system, electromagnetic positioning method and device Pending
Heng Wang, Xinlei Zhang, Shuda Dong, Dekang Liu, Yifeng Zeng, Suqi Liu
Applied to CN Patent, No.CN118444243A

A Virtual Ultrasonography Simulator for Skill Training Using Magnetic-Inertial Probe Tracking Pending
Heng Wang, Shuangyi Wang, Suqi Liu, Shuda Dong, Xinlei Zhang
Applied to CN Patent, No.CN116312122A

RESEARCH EXPERIENCE

Magnetic Medical Robotics Lab, SCUT 09/2021-07/2024
Undergraduate Research Assistant Guangzhou, China
Advisor: Prof. Heng Wang

- Research on amgbiuity in magnetic & inertial 6-DoF pose estimation systems in robotic applications

SELECTED COURSE PROJECTS

Point-to-point Kinematic Control of the 3-Joint Robotic Arm in the Presence of Obstacles Fall 2024

- Utilizd direct optimization and model predictive control to achieve kinematic control of a 3-joint robotic arm

Building, Fine-tuning, and Locally Deploying Large Language Models (LLMs) with Customized Dataset Fall 2024

- Built and fine-tuned GPT-2, fine-tuned and locally deployed llama 3.1 (8b), both with customized dataset

Tendon-Driven adn Flex Sensor Based Gesture Tracking Hand Exoskeleton Spring 2023

- Utilized PID controlled motors to actuate exoskeleton, and flex sensor to close the gesture tracking loop

TECHNICAL SKILLS

Control & Estimation Algorithm: PID, model predictive control (MPC), extended Kalman filter (EKF)
Programming: Proficient in **MATLAB** & Simulink, Python, C/C++, HTML
Optimization: MATLAB Optimization Toolbox, CasADi
Operating System: ROS2, Linux
Hardware: Solidworks modeling, embedded system development (Arduino, STM32, Raspberry Pi)