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NIU Xuezhi

Aspiring robotics PhD candidate with a **mechatronics** background and Master's research focused on optimizing gait control for soft quadruped robots. Skilled in interdisciplinary design, simulation, and practical implementation. Proficient in **Python**, **C/C++**, **Matlab**. Committed to collaborative, impactful robotics research.

Education

2021.9-present **MSc. in Mechatronics**, *KTH Royal Institute of Technology*, Stockholm, Sweden.
Master thesis: Optimal Gait Control of Soft Quadruped Robot by Model-based Reinforcement Learning
Expected Graduation: Oct. 2023

2017.9–2021.7 **B.Eng. in Mechanical Engineering**, *City University of Hong Kong*, Hong Kong SAR, China.
Modulus in Control theory, Embedded system, Machine vision, Signal and systems, Thermodynamics, Fluid dynamics, CAD/CAM, MEMS, Manufacturing techniques, Materials, Mechanics, C++ etc.

2020.1–2020.6 **Formal Exchange**, *National University of Singapore*, Singapore.
Education in MEMS, Biomaterials, Aerodynamics and Java programming

Experience

Academic

2022.1–present **Optimal Gait Control of Soft Quadruped Robot by Model-based Reinforcement Learning**, *Supervised by Lei Feng*, Master Thesis, Stockholm, Sweden.
- Designed innovative software architecture for a novel soft quadruped robot.
- Utilized model-based reinforcement learning to optimize gait patterns and motion.
- Conducted simulations and experiments to achieve superior motion speeds.
- Collaborated across disciplines to integrate the model-based approach for optimal gait control.

2022.3–2023.1 **Electronically Regulated Hybrid Valve for Milking System**, *Cooperated with DeLaval International*, HK Project, Stockholm, Sweden *Report here*.
- Led a team to design and manufacture an electronic vacuum control valve for milking systems.
- Developed a valve controller and user interface on Arduino, implementing precise continuous adjustment, and integrating Kalman filter for improved data accuracy and reliability.
- Ensured strict quality assurance and compliance with industry standards.

2022.9–2023.1 **Design and Fabrication of MEMS Actuator**, *Guided by Prof. Joachim Oberhammer*, Project course, Stockholm, Sweden.
- Led a team to design and manufacture an optical in-plane switch for routing telecommunication signals.
- Employed COMSOL simulations for optimizing electrical and mechanical behavior.
- Applied microfabrication techniques, achieving device specifications (thickness=30 m, minimum feature=4 m, minimum gap=3 m).

2022.1–2022.5 **Monocular Autonomous Drone Systems**, *Guided by Prof. Patric Jensfelt*, Project course, Stockholm, Sweden.
- Led a team developing an autonomous drone for detecting intruders and navigation in a known environment.
- Conceptualized and implemented control algorithms tailored for localization, perception and path planning modules in the Robot Operating System (ROS).
- Successfully demonstrated autonomous flight capabilities using Crazyflie 2.0 and VM275T FPV camera.

2022.1–2022.5 **Simultaneous Localization and Mapping (SLAM) for Unmanned Vehicle**, *Guided by Prof. Martin Edin Grimheden*, Project course, Stockholm, Sweden.
- Led a dynamic team in creating a SLAM system for a Turtlebot3-based unmanned vehicle.
- Learn to integrated sensor data fusion from lidar and cameras for robust performance.
- Designed and implemented comprehensive algorithms for object recognition, precise localization, trajectory planning, and control.

2020.9–2021.6 **Liquid-based Bubble-Driven TENG Generator**, *Supervised by Prof. WANG Zuankai*, Final Year Project, Hong Kong SAR, China.
- Conducted foundational research on liquid-based triboelectric nanogenerators (TENGs).
- Successfully validated and characterized the generator's performance based on self-designed station.
- Developed an innovative approach to liquid-based TENGs, advancing sustainable energy solutions.

2019.4–2020.1 **Synthesis and Manufacture of Flexible Batteries**, *Supervised by Prof. Zhang Kaili*, Internship, Hong Kong SAR, China.

- Developed and conduct research on metal hydroxides for flexible batteries using seed-assisted synthesis.
- The new synthesis method and the designed assembly module of the experiment have applied for invention patents.
- Collaborated with industry to bring flexible battery technology from concept to market, participate in market research and product testing.

Teaching

2018.1–2018.7 **Teaching Assistant**, *AP1201 General Physics*, City University of Hong Kong.
Provided course support, led discussions, graded assignments, and offered individual assistance

2022.10–2023.1 **Teaching Assistant**, *MF2007 Dynamics and Motion Control*, KTH Royal Institute of Technology.
Provided course support, led discussions, graded assignments, and offered individual assistance

Achievements

2020.9 **CN patent Grant**, *City University of Hong Kong*, Hong Kong SAR, China, "Novel high-load multi-component metal hydroxide with its synthesis method and application".
pending approval

2020.6 **Talent Development Scholarship**, *Hong Kong Special Administrative Region Government*, Hong Kong SAR, China, Hong Kong Special Administrative Region Government Scholarship(2019/2020).

2020.6 **CN patent Grant**, *City University of Hong Kong*, Hong Kong SAR, China, "A flexible battery assembly die and its structural design".
pending approval

2019.11 **Second prize in National Finals of the "Challenge Cup" Competition**, *Ministry of Education of the P.R.C., Ministry of Science, Technology of the P.R.C., etc.*, Beijing, China, "A flexible battery assembly die and its structural design".
P.S. "Challenge Cup": National College Students Curricular Academic Science and Technology Works Competition

2019.10 **Silver Prize in the National Finals of "Internet +" Competition**, *Ministry of Education of P.R.C., Chinese Academy of Sciences, Chinese Academy of Engineering, State Intellectual Property Office, Central Committee of the Communist Youth League and Guangdong Provincial People's Government, etc.*, Hangzhou, China, "A flexible battery assembly die and its structural design".
P.S. "Internet +": Innovation and Entrepreneurship Competition for China college students

2019.7 **Silver Prize in the Finals of the 8th Winning in Guangzhou and Guangdong-Hong Kong-Macao Greater Bay Area Entrepreneurship Competition**, *Guangzhou Municipal Labor and Social Security Bureau*, Hangzhou, China, "A flexible battery assembly die and its structural design".

2019.4 **Second prize in the Finals of the 5th Hong Kong University Student Innovation and Entrepreneurship Competition**, *Guangzhou Municipal Labor and Social Security Bureau*, Hangzhou, China, "A flexible battery assembly die and its structural design".

Skills & Interest

Programming C/C++, Python, ROS, Ubuntu, LaTeX, JAVA, C#

Software SolidWorks, AutoCAD, MATLAB, Endnote, Zotero, COMSOL, LS-DYNA, Solid Edge, ANSYS, EAGLE, KLayout, EasyEDA, Simplify3D, Adobe Premiere Pro, OriginLab, Adobe Illustrator, SPSS, MS Office, etc.

Hardware STM32F1/F3, NXP LPC13xx, Arduino/Raspberry Pi, Turtlebot, 3D printing, laser cutting, lathe and milling machine, PCB prototyping(LPKF), soldering, wiring, electrochemical working station, Transmission Electron Microscope (JEOL JEM-2100)/Scan Electron Microscope (FEI Quanta 450)

Languages Native Chinese, Fluent English, Limited working German, Elementary Swedish

Interests Soccer, Cooking, Reading, Cycling, Esports