Jiajun An | https://jiajunan.github.io/

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RESEARCH INTERESTS:

Mechanical design, Robotic tail, Legged robots, Haptic devices.

EDUCATION:

Ph.D. 2023, The Chinese University of Hong Kong (CUHK), Hong Kong, China (2023 QS World: 38). *Aug. 2018-May. 2023*

Major: Mechanical and Automation Engineering. Supervisor: AU Kwok Wai Samuel. GPA: 3.787/4.0.

M.Sc. 2018, Purdue University, USA. *Aug. 2016-May. 2018*

Major: Mechanical Engineering. 3+2 Program (1 year exchange). GPA: 3.823/4.0.

B.S. 2017, Shanghai Jiao Tong University (SJTU), China (2023 QS World: 46). *Sep. 2013-Jul. 2017*

Major: Mechanical Engineering. GPA: 3.79/4.0 (5/37, Tsien Hsue-shen class, Honor Program).

PROJECT EXPERIENCES:

- **Towards Agile Maneuver for Terrestrial Robots with Spatial Morphable Inertial Appendage**

  Project Description: My Ph.D. thesis project, the objective is to propose novel spatial morphable inertial tail designs with enhanced inertial adjustment capability in three-dimension (3D) space and investigate its capability in assisting agile maneuvers for terrestrial robots. *(Supervisor: Prof. AU Kwok Wai Samuel, CUHK, Sep. 2018-Jan. 2023.)*

- **A Novel 3-DoF Large Force Haptic Device for the Wrist Motion**

  Project Description: Personal proposed project, the objective is to design a haptic device capable of providing large output forces, low inertia, high force transparency, high stiffness, and a large range of motion. The project targets potential applications in VR devices, teleoperation masters, and exoskeletons. *(CUHK, Apr. 2023-Until Now.)*

- **Teleoperated Legged-Manipulator with Replaceable Instruments**

  Project Description: Lab project, we aim at developing a teleoperated legged-manipulator robot system with replaceable instruments for the application in hospitals and logistics warehouses. Now I am the mechanical design group leader. *(Supervisor: Prof. AU Kwok Wai Samuel, CUHK, Jan. 2023-Until Now.)*

- **Humanoid Leg Design Based on Parallel Mechanism**

  Project Description: Personal proposed project, the objective is to enhance the performance of humanoid leg joints using parallel mechanisms. In the latest design, I propose the utilization of three motors in the hip joint of the leg to collectively drive the hip pitch movement. *(CUHK, Oct. 2019-Until Now.)*

- **Design of a Humanoid Dexterous robot hand**

  Project Description: Lab project, the objective is to develop an innovative drive-by-wire approach for humanoid robot finger design, while simultaneously increasing the degree of freedom (DoF) of the robot hand from 13 to 22. Additionally, we aim to integrate new angle sensors, haptic sensors, and temperature sensors into the design of the robot hand. (*Supervisor: Prof. Fuchun Sun, IEEE Fellow, Tsinghua University, Jun. 2017-Aug. 2017.*)

- **A Human-Robot Interactive System Based on Hand Gesture Recognition**

  Project Description: Lab project, the objective is to establish a mutual interactive function between a computer camera and

a robotic hand. This system aims to achieve real-time recognition (within 0.05 seconds) of hand gestures, specifically Rock, Scissors, and Paper. I am the project group leader. *(Supervisor: Liang Gong, SJTU, Jan. 2017- May. 2017.*)

- **Design of Foldable Four-rotor Unmanned Aerial Vehicles (UAV)**

  Project Description: Course project, the objective is to develop foldable models of four-rotor UAVs and design their internal mechanisms for structural coordination and synchronization. I am the project group leader. *(Supervisor: Xinming Zhao, SJTU, Apr. 2015-Aug. 2015.)*

- **Object Recognition and Intelligent Grasping Based on NAO Robot Vision**

  Project Description: Lab project, the objective is to program the route planning and grasping motion trajectory planning strategies for the NAO robot. I am the project group leader. *(Supervisor: Chuntao Leng, SJTU, Feb. 2014-Jul. 2014.)*

PUBLICATION LIST

[1] Y. Tang, J. An (co-first author), X. Chu, S. Wang, C. Y. Wong, and K. W. Samuel Au, "Towards Safe Landing of Falling Quadruped Robots Using a 3-DoF Morphable Inertial Tail," *ICRA*, 2022.
[2] J. An, X. Ma, C. H. David Lo, W. S. Ng, X. Chu, K. W. Samuel Au, "Design and Experimental Validation of a Monopod Robot with 3-DoF Morphable Inertial Tail for Somersault," *IEEE Transaction on Mechatronics*, 2021.
[3] J. An, T. Y. Chung, C. H. D. Lo, C. Ma, X. Chu and K. W. Samuel Au, "Development of a Bipedal Hopping Robot With Morphable Inertial Tail for Agile Locomotion," *BioRob*, 2020.
[4] "Morphable inertial appendage, systems and associated methods," *US Provisional Patent*, US 62/810,258.

COMPETITION EXPERIENCES

- ***Team Member*, Professor Charles K. Kao Student Creativity Awards** ***2nd Place*** *May. 2019*
- ***Team Member*, RoboMaster2018** *Jan. 2018-May. 2018*
- ***Team Member,* Purdue Mechatronics Robot Competition** ***2nd Place*** *Jan. 2017-May. 2017*
- ***Team Member,* The 9th National College Students' Social Practice and Technological Competition for Energy Conservation and Emissions Reduction** ***2nd Prize*** *Feb. 2016-Aug. 2016*
- ***Team Member,* RoboMaster2016** *Jan. 2016-Jul.2016*
- ***Team Leader,* The 2nd SUAV Contest in SJTU** *Nov. 2015-Apr. 2016*
- ***Team Member,* Mathematical Contest in Modeling America** ***2nd Prize*** *Feb. 2015*
- ***Team Member,* The 10th *Freescale* Cup National Smart Car Contest** ***1st Prize*** *Jan 2015-Aug. 2015*
- ***Team Member,* RoboCup China Open 2014** ***2nd Place*** *July 2014-Dec. 2014*
- ***Team Leader,* The 2nd NAO Robot Online Programming Contest** ***Gold Award*** *Feb.2014-Jul.2014*

HONORS AND AWARDS

- Eleme Industry Scholarships 2014-15, Shanghai Jiao Tong University *Oct. 2015*
- National Scholarship 2013-14, Shanghai Jiao Tong University *Oct. 2014*