

JIAMING ZHANG

Baltimore, Maryland, USA

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RESEARCH INTEREST

I'm highly interested in studying robotics-oriented solutions to real-world challenges in the surgical field. My specific interests include ROS development, visual-based control, motion planning, augmented reality, and reinforcement learning.

EDUCATION

Johns Hopkins University Baltimore, MD, USA
M.S.E. in Robotics, GPA 3.72/4.00 Sept. 2021 - Present

Core Courses: [Algorithms for Sensor-Based Robotics](#), [Robot System Programming](#), [Computer Integrated Surgery](#), [Applied Optimal Control](#), [Robot Motion Planning](#), [Robot Dynamics Kinematics and Control](#), [Statistical Learning](#)

Huazhong University of Science and Technology Wuhan, China
B.E. in Mechanical Engineering, GPA: 3.59/4.00 Sept. 2016 - Jun. 2020

Thesis: "Dynamics Simulation of Knee-Joint for Human Gait"

RESEARCH EXPERIENCE

Research Assistant Nov. 2021 - Present
[Laboratory for Computational Sensing and Robotics\(LCSR\)](#), [Johns Hopkins University](#) Baltimore, MD, USA

Advisor: Professor Amir Kheradmand and Professor Mehran Armand

Project: the Impedance Control on KUKA for Transcranial Magnetic Stimulation

Research Assistant Jan. 2023 - Present
[ARCADE Lab](#), [Johns Hopkins University](#) Baltimore, MD, USA

Advisor: Benjamin Killeen and Prof. Mathias Unberath

Project: Real-time Integration of Fully Automatic 2D/3D Pelvic Registration with Robotic X-ray Acquisition

PUBLICATIONS

1. **Zhang, J.** An Automatic Arranging Device for PTC Ceramic Heating Chips, *The National Practical Patent*, No.CN201920955308.X, June 2019

2. **Zhang, J.** 2D SLAM with Visual Servoing Target Tracking System for Nonholonomic Mobile Robot, *Under Review*, Submitted in Nov., 2022

SKILLS

Programming Skills:

- **Proficient at:** C++ (especially ROS related), MATLAB
- **Good at:** Python (especially in Machine Learning and Deep Learning), Mathematica, Bash
- **Familiar with:** C#

Other Skills:

- **Proficient at:** Solidworks, Opensim, Operating ABB, KUKA and UR-5 manipulators

PROJECTS

LiDAR-based SLAM Project Feb. 2022 - Sep. 2022

Goal: Implement **ROS packages** enabling the robot to track an object in an unknown area

Outcome: Ended up with a manuscript that is under review

- Applied the **Gmapping** and **Cartographer** to construct a grid map for an unknown test field
- Developed ROS packages for locating and tracking objects in the grid map using 2D images generated by a pinhole camera
- Collaborated with other team members to test and analyze the performance of the robotic software.

Robotic Motion Planning Algorithm Packages

Apr. 2022 - May. 2022

Goal: Develop a series of packages for Surgical Robotic Motion Planning problems

- Implemented a path planning package that contains Probabilistic Road Map(PRM) algorithm, **Rapidly Exploring Random Tree(RRT)** algorithm, Artificial Potential Field(APF) algorithm
- Implemented a path planning program of a **flexible needle**, where the asymmetric needle tip is modeled as a nonholonomic mobile robot, using **RRT** algorithm
- Developed a Point Cloud to Point Cloud Registration and a Pivot Calibration package using **Python**
- Developed a program for inverse-pendulum based on reinforcement learning using **Python**

Optimal Control of the Quad-copter Obstacle-Avoiding Task

Nov. 2021 - Dec. 2021

Goal: Generate a optimal trajectory by controlling the motors of the quad-copter

- Simplified the dynamics model of the quad-copter and linearized it
- Represented the 3D obstacles as ellipsoids
- Implemented a **MATLAB** code to solve the collision-free and optimal trajectory based on **Discrete Dynamic Programming** method

MCM: The Mathematical Contest in Modeling

Jan. 2019 - Feb. 2019

Goal: Design a mathematical model for evacuation system of Louvre Museum

- Utilized the **A-star algorithm** to compute the optimal evacuating path for every tourist
- Implemented a **C++** program to demonstrate and solve our mathematical model

The Asia-Pacific Robot Contest (Robocon)

Oct. 2018 - Jun. 2019

Goal: Build a robot that can transport daily items

- Designed a special gripper for holding specific objects
- Applied basic **PID control** to the robotic gripper via **MATLAB**

WORKING EXPERIENCE

Narwal Robotics & HUST-Wuxi Research Institute

Jiangsu, China

Intern Robotics Engineer

Oct. 2020 - May. 2021

Mentor: Dr. Gang Zhang

- Participated in LiDAR-based SLAM development for Robot Vacuum Product
- Solved the problem of hand-eye calibration during robot assembly
- Cooperated with the hardware team to test and analyze the prototype

TEACHING EXPERIENCE

Whiting School of Engineering, Johns Hopkins University

Baltimore, MD, USA

Teaching Assistant for Statistical Learning For Engineers (EN.530.641)

Fall 2022

Whiting School of Engineering, Johns Hopkins University

Baltimore, MD, USA

Teaching Assistant for Robot Motion Planning (EN.530.663)

Spring 2023

SCHOLARSHIPS AND AWARDS

2019 **The Scholarship for Scientific Research Innovation of HUST**

Wuhan, China

2020 **Graduate with Honors in HUST**

Wuhan, China