Ruotong Jia (Rico)

(773) 273-1566 | **https://ricojia.github.io/** | ruotongjia2020@u.northwestern.edu

EDUCATION

Northwestern University, Evanston, IL **December 2020**

- Master of Science in Robotics, GPA 3.73 /4.0

University of British Columbia, Vancouver, BC **May 2019**

-Bachelor of Applied Science in Electrical Engineering

SKILLS

- **Programming: C, C++, Python, MATLAB, Excel VBA, Git**
- **Robotics: ROS, Rethink Intera, Microchip PIC, Arduino, Motion Planning, Filter-Based SLAM**
- **Electrical Engineering: Control Systems, Signal Processing, Power Electronics**
- **Coursework: Machine Learning, Computer Vision, Robot Navigation, Kinematics, Operating System, Mechatronics**
- **Languages: Fluency in English and Mandarin, conversational Spanish**

WORK EXPERIENCE

Robot Navigation Intern | ***Shirley Ryan AbilityLab, Northwestern University, USA*** **June - September 2020**

- Implemented a high-performance motion planning stack for a smart wheelchair, with four fine-tuned ROS navigation stack planners and two Search-Based-Planning (SBPL) planners, resulting in 0 collision rate and smooth robot motions in testing
- Researched the optimal-control based FASTRACK motion planning scheme and implemented it using MATLAB and ROS
- Set up test framework and implemented an automatic gmapping node for building the global map of a Gazebo world

Research Intern | ***National Laboratory of Robotics, Tecnológico de Monterrey, Mexico*** **May - July 2018**

- Built a well-functioning main PCB of a micro UAV, as well as the communication chain between the ground station, PIC microcontroller, and Sensor Network using Telnet, Serial Communication, I2C protocols
- Developed noise reduction algorithm that effectively reduces barometric altitude sensor noise by 2.7dB in SNR ratio, using impedance matching and a first order low-pass filter
- Assisted with dynamics simulation on SIMULINK for Sliding-Mode controller design using Newton-Euler's Approach

Engineering Co-op Student | ***EWOS CANADA, CARGILL INC., Surrey, Canada*** **September 2017 - May 2018**

- Actively led, managed, and coordinated multiple industrial energy conservation projects that resulted in $10000 annual saving, including air leak repair, compressed air system upgrade, and pneumatic valve replacement
- Surveyed plant motors for updated power rating, power factor and frame size and updated one-line MCC diagrams
- Independently proposed and developed an Excel VBA software for data entry, resulting in 400h/year time saving
- Provided technical support to QA lab including testing and sample management

TECHNICAL PROJECTS (*Video Demonstrations https://ricojia.github.io/*)

The Coffee Bot (https://github.com/RicoJia/coffee_bot**)** **June 2020 - Present**

- Built a differential drive tank robot for indoor coffee delivery from scratch, including mechanical structure & drive system, a 3D-printed cup holder, camera live stream, Motor and LED control, and a teleoperation interface on Raspbian using SSH

Motion Planning Packages (https://github.com/RicoJia/Motion_Planning_Rico**)** **March 2020 - Present**

- Implemented a full 2D motion planning stack, including maps (PRM, Grid Maps), global planning algorithms (A*, Theta*), global incremental planning algorithms (LPA*, D* Lite), DWA, and control (MPC) packages for Turtlebot 3 Burger in a virtual room

Landmark-Based SLAM Simulator (https://ricojia.github.io/ **)** **March 2020**

- Developed a lightweight landmark-based SLAM simulator in C++ and Python comprising: a differential drive kinematics model, landmark observations from a simulated laser scanner detector, and a robot navigation node with known-correspondence Extended Kalman Filter (EKF)
- Built feature association for cylindrical landmark recognition with 97% accuracy using circular regression

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Robot Artist (https://ricojia.github.io/ **)** **December 2019**

- Developed an efficient Depth-First-Search based path planning algorithm for drawing on letter-size paper
- Built a robust linear trajectory motion planner and a force controller for Rethink Sawyer robot with Intera's Inverse Kinematics tools (ROS Python)

Rover for Outdoor Log Inspection (https://ricojia.github.io/ **)** **April 2019**

- Implemented Phiget1040 GPS Driver Module in ROS C++, and a linear Kalman Filter for localization for fusing IMU, GPS, and Ultrasonic Data
- Designed a motor controller on driving wheels for rough terrains using state-space control techniques

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DESIGN TEAM & COMPETITION EXPERIENCE

UBC Biomedical Imaging and Artificial Intelligence (BMIAI) Hackathon - ***3rd Place*** **November 2018**

- Implemented Natural Language Processing (NLP) on Tweets for sentiment analysis using Google TensorFlow in Python 3.7, achieving 76.4% accuracy with 1000 features

UBC Sustaingineering - ***Captain*** **July 2016 - May 2018**

- Led a team of 13 highly talented engineering students on sustainability projects, including workshops, team-building activities, and fund-raising events
- Designed an efficient Perturb & Observe (P&O) MPPT algorithm for a 6V-12V pico standalone solar system on Simulink, later implemented the controller in a Reverse-Buck DC-DC Converter topology
- Initiated and supervised a Wireless Solar Pump Data Transmission System Project for developing communities in Nicaragua
- Implemented an Arduino-3G communication channel for solar pump's wireless data transmission with its control computer

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HOBBIES & INTERESTS

- History, cultures
- Fitness
- Languages
- Singing