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Northwestern University

Ruotong Jia (Rico)

Master of Science in Robotics

TECHNICAL SKILLS

Programming
- C, C++
- ROS
- Python
- MATLAB, Simulink
- Excel VBA
- R

Electrical Engineering skills
- Control Systems
- Signal Processing
- Telecommunications Systems
- Error Control Coding
- Analog Circuit Design
- Power Electronics

Tools
- Altium
- ARM Controller
- PSIM, Circuit Maker
- Oscilloscope, Multimeter
- SolidWorks
- Microchip MPLAB, PIC controller

EDUCATION

University of British Columbia — **Graduation Date:**
Bachelor of Applied Science – Electrical Engineering — **May 2019**

Northwestern University — **Anticipated Graduation Date:**
Master of Science in Robotics — **December 2020**

SCHOLARSHIPS & PRIZES

UBC BMIAI Hackathon 3rd Place — **November 2018**
UBC Go Global Structured Undergraduate Research Program Award — **June 2018**
Scotiabank Student Mobility Award — **June 2018**
Dean's Honor List — **May 2014**
Outstanding International Student Award — **August 2013**

PROFESSIONAL WORK EXPERIENCE

National Laboratory of Robotics, ITESM, Mexico — **May 2018 – August 2018**
Research Intern

- Successfully designed and implemented PCB and mounted electronics of a micro UAV
- Implemented the communication chain between the ground station, PIC micro-controller, and Sensor Network using Telnet, Serial Communication, I2C protocols
- Developed noise reduction algorithm for barometric altitude sensor using impedance matching and a second order low-pass filter, which resulted in a 2.7dB decrease in SNR ratio and a 0.7s step response time constant
- Assisted with dynamics simulation on SIMULINK for Sliding-Mode controller design using Newton-Euler's Approach

EWOS Canada, Cargill Aqua Nutrition — **September 2017 – April 2018**
Engineering Co-op Student

- Actively leading, managing, coordinating multiple industrial energy conservation projects, 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 accomplished a fully-functional data entry software for QA lab using Excel VBA
- Maintain professional communications globally with other Cargill departments, consulting firms, and contractors
- Provide technical support to QA lab such as testing and sample management

DESIGN TEAM & COMPETITION EXPERIENCE

UBC Biomedical Imaging and Artificial Intelligence (BMIAI) Hackathon **November 2018**

3rd Place

- 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 Open Robotics **September 2018 – Present**

Software Lead

- Independently learned and trained software teammates to get familiar with C++ and ROS (Robotics Operating System) for International RoboCup 2020

UBC Sustaingineering **July 2016 – May 2018**

Captain http://www.sustaingineering.com/the-team

- Simulated and on using Hill-Climbing-based Perterb & Observation (P&O) MPPT algorithm for standalone solar system on Simulink
- Physically implemented a MPPT controller in a Reverse-Buck DC-DC Converter for a 6V - 12V pico solar standalone solar system
- Initiated and supervised Standalone Photovoltaic Project and Wireless Solar Pump Data Transmission System Project
- Coordinated administrative initiatives such as recruitment and weekly follow-ups
- Continuously brought motivation to the team by giving motivational speeches and care
- Implemented an Arduino-3G communication channel for wireless data transmission

TECHNICAL PROJECTS

Pan-Tilt Camera Tracking System **September 2018 - April 2019**

- Implemented a pan-tilt camera system that tracks blue objects with maximum speed at 0.7 rad/s

Rover for Outdoor Log Inspection **September 2018 - April 2019**

- Implemented Phiget1040 GPS Driver Module on ROS Melodic in C++
- Implemented a 3D Kalman Filter (including latitude, longitude, and angle from true north)for localization realized by GPS + IMU sensor fusion on ROS Melodic in C++
- Calibrated the 3D Kalman Filter with IMU variance measurements and GPS Circular-Error-Probability
- Designed PD Motor Control on driving wheels for rough terrains

Simulated Lead-Lag Based Artificial Pancreas **April 2017**

- Proposed a lead-lag controller with a feedback loop that stabilizes blood glucose within 70mU/min – 180 mU/min
- Achieved 55.2° system phase margin and 12.2 dB system gain margin
- Investigated various topologies such as feed-forward controller and Smith Predictor

Tone Mapping Operation on HDR images **December 2016**

- Designed a Gaussian filter on MATLAB
- Implemented histogram equalization algorithm on HDR images
- Built a real-time linear ceiling algorithm on MATLAB for mapping HDR luminance to SDR luminance
- Built a real-time perception ceiling algorithm for mapping HDR

Electrical Turbo-Fan Helicopter **January 2016 – April 2016**

- Established a PID-based dual-motor control system with 5% overshoot and a settling time of 2.2 seconds.
- Assembled and tested infrared distance detection unit and optical angle reading unit
- Created 255-speed simultaneous control of two DC brushless motors with one ARM microcontroller
- Designed mechanical structure of the helicopter on SolidWorks

PROFESSIONAL AFFILIATIONS

IEEE Robotics and Automation Society Student Member **February 2019 – Present**

IEEE Electronic Devices Society Student Member **February 2019 – Present**