JIE WANG

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Mobile Robotics Researcher

I am a postdoctoral associate currently working on deep learning-based perception, path planning and controls for micro aerial vehicle (MAV) systems and used to work on modeling, controls, and simulations of a quadrupedal track-legged robot. I am excited about any technology that improves the autonomy of robotic systems, especially a combination of learning-based and model-based techniques.

Education

Doctor of Philosophy, Mechanical Engineering, 2017
University of Calgary, Calgary, Alberta, Canada
Dissertation: *Autonomous Locomotion Mode Transition of Ground Hybrid Robots*
Supervisor: Dr. Alex Ramirez-Serrano

Bachelor of Engineering, Mechanical and Electrical Engineering, 2011
Northwest A&F University, Xi'an, Shaanxi, China
GPA: 81.3/100

Awards

Mitacs Career Connect, University of Calgary, 2018–2019
Research Assistant Scholarship, University of Calgary, 2011 - 2017
First Class Academic Scholarship, Northwest A&F University, 2010 - 2011
The National Scholarship, Ministry of Education of China, 2009 - 2010
Outstanding Student Leader Award, Northwest A&F University, 2008 - 2009

Work Experience

Postdoctoral Associate, Geomatics Engineering Department
University of Calgary, Calgary, Alberta, Canada **2018 – Current**

- Implemented state-of-the-art visual SLAM algorithms including PTAM, LSD-SLAM, ORB-SLAM, and LDSO on MAVs
- Develop techniques coupling learning-based perception with path planning and control for micro aerial vehicle systems
- Develop solutions for orientation-and scale-invariant multi-vehicle detection, tracking, and speed estimation from Unmanned Aerial Videos

Research Experience

Ph.D. Researcher, Autonomous Reconfigurable/Robotic Systems Lab
University of Calgary, Calgary, Alberta, Canada **2011 – 2017**

- Proposed algorithms for autonomous locomotion mode transition of Ground Hybrid Robots
- Developed simplified wheeled & legged multibody dynamics models for algorithm tests
- Built a hierarchical control system for a track-legged quadruped robot Cricket
- Created simulations of the Cricket robot using the V-REP for accurate analysis
- Interfaced the V-REP simulations with MATLAB and Python for data analysis and energy evaluations

- Designed and tested climbing gaits of steps negotiation with different heights for Ground Hybrid Robots
- Gained broad knowledge and experience with ground, aerial, and manipulator robots by communicating and cooperating with other lab member projects

Research Assistant, Mechanical and Electronic Engineering College
Northwest A&F University, Xi'an, Shaanxi, China **2009 - 2011**

- Participated one National Natural Science Foundation of China sponsored project and performed research on image denoising based on a hybrid wavelet transform method
- Designed, made and tested electrical circuit boards for a greenhouse monitoring and warning system project

Teaching Experience

Light Prototyping Technician, Schulich School of Engineering
University of Calgary, Calgary, Alberta, Canada **2014 - 2016**

- Provided technical supports (e.g. 3D prints, Arduino, NI myDAQ) for undergraduate capstone design projects
- Managed and maintained lab equipment and inventory (e.g. 3D printers and base electronics)
- Created and revised standard operation procedure documents of lab equipment

Teaching Assistant, University of Calgary, Calgary, Alberta, Canada
ENGG 200 - Engineering Design and Communication **2016 - 2016**

- Tutored 9 student groups on their introductory engineering design projects at all stages

ENME 461 - Foundations of Mechatronics **2014 - 2014**

- Delivered weekly tutorial lectures and advised the assignments issues
- Supervised 6 mechatronics design project labs

ENME 339 - Engineering Graphics and CAD **2014 - 2014**

- Instructed the bi-weekly SolidWorks design labs
- Advised 32 students' design projects and guided their 3-D printings

ENME 339 - Computing Tools for Engineering Design **2013 - 2013**

- Tutored 9 MATLAB programming and 4 LabVIEW project labs

ENME 538 - Mechanical Design Methodology and Application **2011 - 2013**

- Advised 10 student groups of their capstone design projects
- Communicated projects process with sponsors, professors and students
- Graded assignments, design logbooks, presentations, reports, peer assessments

Publications

[J1] **Jie Wang**, Sandra Simeonova, and Mozhdeh Shahbazi, "Orientation- and Scale-Invariant Multi-Vehicle Detection and Tracking from Unmanned Aerial Videos," Remote Sensing, vol. 11, no. 18, pp. 2155, 2019. [pdf]

[C1] **Jie Wang**, Camilo Cortes, and Mozhdeh Shahbazi, "Evaluating the Mapping Quality of Monocular SLAM Solutions for Micro Aerial Vehicles," International Archives of Photogrammetry, Remote Sensing and Spatial Information Sciences (ISPRS Archives), vol. XXX-X, pp. XX-XX, 2019. [Submitted]

[C2] **Jie Wang**, and Alex Ramirez-Serrano. "Stair-climbing and energy consumption evaluation of a leg-tracked quadruped robot," in Proc. of the IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM), pp. 1448–1453, 2016. [pdf]

[C3] **Jie Wang**, and Alex Ramirez-Serrano. "Locomotion Mode Transition Study of Ground Hybrid Robots," in Proc. Of the International Conference on Climbing and Walking Robots and Support Technologies for Mobile Machines (CLAWAR), pp. 531–538, 2016. [pdf]

[P1] **Jie Wang**, Alex Ramirez-Serrano, and Krispin Davies, "Autonomous Locomotion Mode

Transition Simulation of a Track-legged Quadruped Robot Step Negotiation", arXiv:1905.04235, 2019. [pdf]

Extracurricular Activity

Mentor of FIRST LEGO League of team Supernova (2008 – 2009)

Reviewer of the IEEE/RSJ International Conference on Intelligent Robots and Systems (2017, 2018, and 2019)

ANSYS Recognized Training Certificates of "Introduction to ANSYS Design Modeler" and "Introduction to ANSYS Mechanical" granted by ANSYS official experts after attending a four-day classroom training workshop and passing evaluation exams (2014)

Vice President of the college student union of Northwest A&F University (2008 – 2009)