

Andrew Price



Doctoral Candidate

Laboratory:

Space Robotics Laboratory
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Summary

Doctoral Candidate at Tohoku University, Japan studying machine vision systems for orbital debris capture applications. Software strengths in MATLAB and Python. Significant experience in flight data acquisition, large scale testing and computer vision pose estimation. Career objective to be part of the debris-removal solution in the near-Earth orbital environment.

Education

Doctoral Candidate, Aerospace	Tohoku University 2019 - Present	Japan
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Master of Applied Science, Aerospace	Carleton University 2013 - 2015	Canada
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Bachelor Engineering, Aerospace	Carleton University 2009 - 2013	Canada
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Employment

Visiting Researcher 6DoF Pose Estimation, Synthetic Rendering, Network Compression	Ecole Polytechnique Fédérale de Lausanne 2022 - 2023	Switzerland Dr. Mathieu Salzmann
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Associate Researcher Large-Scale Testing, Flight Measurement, Aero-Acoustics	National Research Council 2015 - 2019	Canada Dr. Sebastian Ghinet
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Research/Teaching Assistant Data Acquisition, Teaching	Carleton University 2012 - 2015	Canada Professors F. Nitzsche, M. Ahmadi and C. Merrett
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Software Skills

MATLAB	Blender (Image Rendering)
Python	GIMP (Image Editing)
Linux / Windows	LaTeX
NI LabVIEW	Visual Basic
C++	HTML

Publications

1 Journal	Journal of Intelligent Material
16 Conf. Proceedings	Systems and Structures, CVPR,
12 NRC Public Reports	IEEE Aerospace, AIAA Scitech,
1 Trade Journal	Noise-Con, AHS, Inter-Noise

Awards

- CVPR2021 AI For Space Workshop Best Presentation Award
- Japan Monbukagakusho MEXT and Tohoku University GP-Mech Scholarships
- International Institute of Noise Control Engineering: Young Professional's Grant
- Various Carleton University Departmental and Dean's List Scholarships

Projects

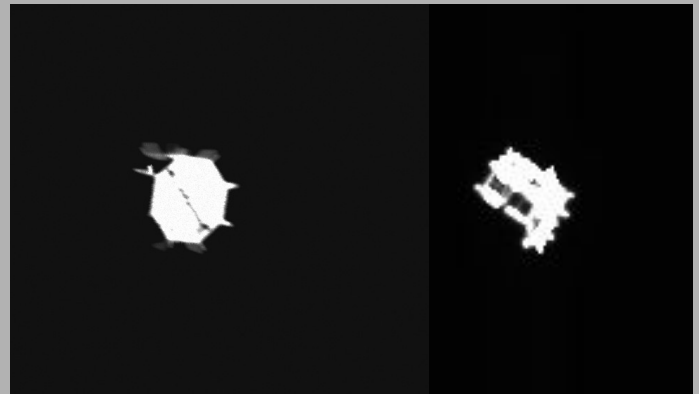
Hayabusa2 Minervall-2 Pose Estimation 2021

Given 61 real images of the Minervall-2 rover taken by the Hayabusa2 ONC-W2 camera during deployment, estimate the 6DoF pose of the rover. This project posed particularly difficult challenges:

- 1) No training dataset
- 2) Minerva rover is D_8 Order 16 Symmetric
- 3) Image quality is poor by ML standards

Workflow: Develop synthetic dataset, train detector, solve symmetric PnP problem.

Right: Synthetic Dataset Example Image



Synthetic

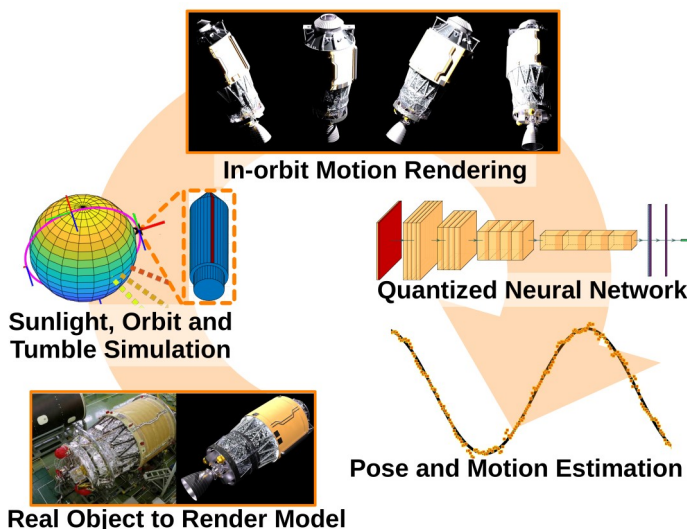
Real

Computer Vision Pose Estimation

Ongoing

In support of the JAXA Commercial Removal of Debris Demonstration (CRD2) program, develop a synthetic image dataset, accounting for rigid body tumbling and earth orbit. Train a small lightweight pose estimation neural network and further compress (quantize) the network. Reconstruct the tumble estimation. The final network was only 5.5MB and was designed for small spacecraft edge-computing.

Left: Project Flow



Other projects include:

1. The acoustic and visual detectability of an aircraft; construction of a 1 square kilometre time synchronized microphone and camera array.
2. The development and deployment of a data acquisition system on 4 Royal Canadian Air Force aircraft. Subsequent analysis of all data.
3. Development of the real-time active noise controller for the National Research Council (NRC) new Centre for Air Travel Research (CATR) facility.
4. Satellite qualification test engineer apprenticeship at the NRC Aeroacoustic facility.

Extra-curricular

- Co-founder of the National Research Council (NRC) Early Career Network (ECN)
- PADI open water diver certified
- Can speak beginner level Japanese and French