Sumant Sharma

750 N Shoreline Blvd, Mountain View, CA 94043 – sumant28@gmail.com – (404) 952-8102

WORK EXPERIENCE

Wisk Aero LLC
Computer Vision Algorithms Engineer

08/19/2019 – Present
2700 Broderick Way, Mountain View, CA

- Designing, developing and evaluating an optical sensing subsystem for an unmanned aircraft system to enable applications such as GPS-denied navigation. Use of MATLAB, Python, and C++.
- Leading research and development on computer vision algorithms and navigation software to enable autonomous aircraft operations.
- Defining and documenting key engineering requirements for the aircraft navigation architecture and the optical sensing subsystem.

Millenium Engineering LLC
Systems Engineer III

09/01/2017 – 03/30/2018
1400 Crystal Drive, Suite 800, Arlington VA 22202

- Contracted to work at NASA Ames Research center for qualifying computer vision-based navigation architectures for future small satellite mission concepts.
- Developed software-based validation tools and test cases to characterize the performance of deep learning and image processing-based computer vision algorithms. Use of MATLAB and Python.
- Wrote technical reports documenting the results of the performance characterization for use by engineering staff at NASA Ames Research Center.

Stanford University
Graduate Research Assistant

09/26/2015 – 06/30/2019
496 Lomita Mall, Room 202, Stanford CA 94305

- Designed, developed, and validated multiple computer vision-based navigation architectures to enable aerospace applications such as on-orbit servicing of defunct satellites. Use of MATLAB, Python, C++.
- Created the first-ever large-scale image dataset to validate computer-vision algorithms and predict performance margins and robustness in anticipated flight conditions.
- Integrated prototype algorithms with existing navigation algorithms on a robotic hardware testbed to validate and qualify the navigation architecture for use in future commercial on-orbit servicing missions of Infinite Orbits (Private Limited).

EDUCATION

Stanford University
Doctor of Philosophy (PhD), Aeronautics & Astronautics

09/21/2015 – 09/26/2019
Stanford, CA

Stanford University
Master of Science (MS), Aeronautics & Astronautics

09/23/2013 – 01/07/2016
Stanford, CA

Georgia Institute of Technology
Bachelor of Science (BS), Aerospace Engineering

08/23/2009 – 05/05/2013
Atlanta, GA

- Programming Languages: Python, C++, MATLAB & Simulink, Fortran, R, HTML, LaTeX
- Software: TensorFlow, PyTorch, Robot Operating System, OpenCV, OpenGL, AutoCAD, Autodesk Inventor, LabView, Altair Hypermesh, Ansys Workbench

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Cited 147 times, as reported by Google Scholar in January 2020.

Neural Network-Based Pose Estimation for Noncooperative Spacecraft Rendezvous 2020
S Sharma, S D'Amico
IEEE Transactions on Aerospace and Electronic Systems (Accepted)

Pose Estimation For Non-Cooperative Spacecraft Rendezvous Using Neural Networks 2019
S Sharma, S D'Amico
AAS/AIAA Astrodynamics Specialist Conference, Ka'anapali, Maui HI, USA

Pose Estimation For Non-Cooperative Spacecraft Rendezvous Using Neural Networks 2019
S Sharma, S D'Amico
AAS/AIAA Astrodynamics Specialist Conference, Ka'anapali, Maui HI, USA

Towards Robust Learning-Based Pose Estimation of Noncooperative Spacecraft 2019
TH Park, *S Sharma*, S D'Amico
arXiv preprint arXiv:1909.00392

Satellite Pose Estimation Challenge: Dataset, Competition Design and Results 2019
M Kisantal, *S Sharma*, TH Park, D Izzo, M Märtens, S D'Amico
arXiv preprint arXiv:1911.02050

Robust Model-Based Monocular Pose Initialization for Noncooperative Spacecraft Rendezvous 2018
S Sharma, J Ventura, S D'Amico
Journal of Spacecraft and Rockets 55 (6), 1414-1429

Pose Estimation for Non-Cooperative Spacecraft Rendezvous Using Convolutional Neural Networks 2018
S Sharma, C Beierle, S D'Amico
IEEE Aerospace Conference, Big Sky MT, USA

Generative Adversarial Networks for High-Fidelity Simulation of Spacecraft Proximity Operations 2018
S Sharma, C Beierle, S D'Amico
Technical Note, Stanford Space Rendezvous Lab (SLAB)

Towards Pose Determination for Non-Cooperative Spacecraft Rendezvous using Convolutional Neural Networks 2017
S Sharma, C Beierle, S D'Amico
1st IAA Conference on Space Situational Awareness, Orlando FL, USA

Reduced-dynamics pose estimation for non-cooperative spacecraft rendezvous using monocular vision 2017
S Sharma, S D'Amico
38th AAS Guidance and Control Conference, Breckenridge CO, USA

Comparative assessment of techniques for initial pose estimation using monocular vision 2016
S Sharma, S D'Amico
Acta Astronautica 123, 435-445

Automated point cloud correspondence detection for underwater mapping using AUVs 2016

M Hammond, A Clark, A Mahajan, *S Sharma*, S Rock
OCEANS 2015, Washington DC, USA

Review of Techniques for Initial Pose Estimation of Uncooperative Spacecraft using Monocular Vision   2015
S Sharma, S D'Amico
Proceedings of International Workshop on Satellite Constellations and Formation Flying, Delft, Netherlands

Wall effect on fluid–structure interactions of a tethered bluff body   2013
S Sharma, V Raghav, N Komerath, M Smith
Physics Letters A 377 (34-36), 2079-2082

Efficient modeling of dynamic blockage effects for unsteady wind tunnel testing   2013
S Sharma, V Raghav, N Komerath, M Smith
The American Helicopter Society's 69th Annual Forum and Technology Display, Phoenix AZ, USA

Aerodynamic instability modes for a load slung from a helicopter   2012
S Sharma, N Komerath, M Smith, V Raghav
The American Society of Mechanical Engineers' International Mechanical Engineering Congress and Exposition

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AWARDS

DJI Developer Challenge   2016
Second place in an international competition with 200 teams. Built and developed an unmanned aerial vehicle that autonomously performs search-and-rescue activities, takes-off, and lands from a moving Ford F-150 truck.

Best Creative Project   2016
For developing software that creates a computer-generated video of a spacecraft orbiting in low Earth orbit. Part of the CS 148 course at Stanford University.

Georgia Institute of Technology Graduate Research Fellowship   2013
Declined.

Cornell University Fellowship for Graduate Studies   2013
Declined.

CETL/BP Outstanding Teaching Assistant Award   2013
For organizing recitation sessions of the Calculus II course at Georgia Institute of Technology.

American Helicopter Society Lichten Competition   2013
Southern region winner for developing a physics-based simulation of a slung bluff body in a wind tunnel.

Vertical Flight Foundation Barry J. Baskett Scholarship   2012
Scholarship awarded to support vertical flight research projects at the John Harper wind tunnel at Georgia Institute of Technology.

President's Undergraduate Research Award   2012
Scholarship awarded to support vertical flight research projects at the John Harper wind tunnel at Georgia Institute of Technology.

Invited Peer Reviewer 2020

Invited as a peer reviewer of multiple manuscripts on design, development, and integration of complex systems for aerospace vehicles. Currently acting as a reviewer for IEEE Transactions on Aerospace and Electronic Systems (TAES), Advances in Space Research (ASR), CEAS Aeronautical Journal, IEEE Access Journal, Internal Journal of Aerospace Engineering (IJAE), International Journal of Intelligent Computing and Cybernetics (IJICC), AIAA Journal of Guidance Controls and Dynamics (JGCD), AIAA Journal of Spacecraft and Rockets (JSR).

Organizer & Judge, Spacecraft Pose Estimation Challenge 2019

Organized the first-ever pose estimation challenge for aerospace applications as part of a joint-effort by Stanford University and the European Space Agency. Developed the image dataset for the competition as well as developed metrics and criteria to judge the submissions from the participating teams.

Co-Chair, Nominations Commission 2016

The Nominations Commission is part of the Associated Students of Stanford University. As its co-chair, organized and oversaw the appointment of student representatives to the Stanford University committees.

Volunteer Park Ranger 2016

Acting as the eyes of Jasper Ridge Biological Preserve (Stanford University), patrolled the perimeter fence and more than 20 miles of trails and roads on a mountain bike to protect and preserve its integrity.

Graduate Student Leader 2015

Lead the Stanford Summer Engineering and Technology Study Tour to India. Oversaw student selection (reading applications, interviewing), planned course materials, communicated with companies, universities, and government agencies in India to organize tours for Stanford undergraduate and graduate students.

Student Mentor 2014

Provided academic mentorship to middle school students of Da Vinci Academy (Gainsville, GA). Interacted with the students to give pointers, ideas, and encouragement in the pursuit of science and engineering.

Note-taker, Office of Disability Services 2011

Provided note-taking services to students with difficulty in concentrating, writing, accessing verbal information, and other issues during multiple undergraduate courses at Georgia Institute of Technology.

Airplane Coordinator 2011

At the Yellow Jacket Flying Club of Georgia Institute of Technology, supervised maintenance, diagnose of malfunctions, ordering and replacing of parts, and detailed monthly inspections of four Cessna 172 aircraft.