

Mosam Dabhi

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Education

Carnegie Mellon University

MASTER OF SCIENCE IN ROBOTICS (SCHOOL OF COMPUTER SCIENCE)

Pittsburgh, USA

August 2019 – May 2021

- Advisor: **Simon Lucey**
- Thesis committee: Simon Lucey (chair), Katerina Fragkiadaki, Nathaniel Chodosh

National Institute of Technology

B.TECH. IN ELECTRONICS AND COMMUNICATION ENGINEERING

Surat, India

August 2013 – May 2017

- Advisor: **Anand Darji**

Research Interests

Computer Vision: 3D reconstruction, Multi-view geometry, Neural Rendering, Neural 3D representations

Deep Learning: Self/semi supervised learning, structured optimization

Robotics: Active Perception, Probabilistic Decision Making, Control Theory

Research Experiences

Carnegie Mellon University

GRADUATE RESEARCH ASSISTANT

Pittsburgh, PA, USA

August 2019 – Present

ADVISOR: **SIMON LUCEY, LASZLO JENI**

- Generating high-fidelity 3D reconstruction of non-rigid objects by leveraging only two physical views [1].
- Learning shape priors for sparse 3D reconstruction from images using multi-view geometry.
- Investigating implicit neural rendered pipelines for dense 3D reconstruction from images.

Apple Inc.

RESEARCH INTERN

San Francisco, CA, USA

May 2020 – August 2020

ADVISOR: **IAN FASEL**

- 2D – 3D lifting methodologies for in-the-wild 3D reconstruction.

Carnegie Mellon University

RESEARCH ASSOCIATE

Pittsburgh, PA, USA

August 2017 – August 2019

ADVISOR: **NATHAN MICHAEL**

- Sensor model for robotic exploration of unknown environments that outperforms state-of-the-art methods for Urban Search and Rescue operation scenarios [2].
- Optimal control strategy on computationally constrained platforms for aggressive aerial flights in uncertain environments [3].
- Robotic cave exploration assuming continuous representation of environment over discrete representation [4].
- System-level application of aerial robots for deploying safe, resilient, and intelligent systems in real-world scenarios [5].

Carnegie Mellon University

ROBOTICS INSTITUTE SUMMER SCHOLAR

Pittsburgh, PA, USA

May 2017 – August 2017

ADVISOR: **NATHAN MICHAEL**

- Nonlinear model predictive control strategies at the embedded level for aerial robots [6].

Carnegie Mellon University

ROBOTICS INSTITUTE SUMMER SCHOLAR

Pittsburgh, PA, USA

May 2016 – August 2016

ADVISOR: **NATHAN MICHAEL**

- Framework for planning aggressive, dynamically feasible, and optimal trajectories for aerial robots in cluttered environments [7].

Indian Institute of Science

RESEARCH INTERN

Bangalore, Karnataka, India

May 2015 – August 2015

ADVISOR: **PRASANTA KUMAR GHOSH**

- Speech-based digit recognition over Mel-frequency spectrum using support vector machines.

National Institute of Technology

UNDERGRADUATE RESEARCH ASSISTANT

Surat, India

May 2014 – August 2016

ADVISOR: **ANAND DARJI**

- Deep-learning based precision farming application.

Publications

- [1] **M. Dabhi**, C. Wang, K. Saluja, S. Looi, L. Jeni, I. Fasel, S. Lucey, “Two views are all you need” submitted to, *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition* 2021
- [2] **M. Dabhi**, W. Tabib, N. Michael, “Divergence-based Active Perception using Gaussian Mixture Models” in preparation for, *Robotics: Science and Systems (RSS)* 2021
- [3] **M. Dabhi**, A. Spitzer, N. Michael, “Aggressive Flight Performance using Robust Experience-driven Predictive Control Strategies: Experimentation and Analysis” in, *Carnegie Mellon University Repository*, Tech. Report June 2019
- [4] W. Tabib, K. Goel, J. Yao, **M. Dabhi**, C. Boirum, and N. Michael, “Real-Time Information-Theoretic Exploration with Gaussian Mixture Model Maps” in, *Proceedings. of the Robotics: Science and Systems (RSS)*, Freiburg, Germany June 2019
- [5] A. Spitzer, X. Yang, J. Yao, A. Dhawale, K. Goel, **M. Dabhi**, M. Collins, C. Boirum, and N. Michael, “Fast and Agile Vision-Based Flight with Teleoperation and Collision Avoidance on a Multirotor” in, *Proceedings of the International Symposium on Experimental Robotics*, Buenos Aires, Argentina November 2018

Posters

- [6] **M. Dabhi**, and N. Michael, “Implementation of Experience-driven Predictive Control on Computationally Constrained Platform”, in, *Robotics Institute Summer Scholar Poster Session*, Pittsburgh, United States August 2017
- [7] **M. Dabhi**, V. R. Desraj, and N. Michael, “Planning Aggressive, Dynamically Feasible and Optimal Trajectories for Autonomous Vehicles in Cluttered Environments using Mixed Integer Programming”, in, *Robotics Institute Summer Scholar Poster Session*, Pittsburgh, United States August 2016

Honors and Awards

- May 2017 **Federation of Indian Chambers of Commerce & Industry Research Scholarship**, Received RISS-FICCI scholarship for exceptionally competitive RISS 2017 program. FICCI, India
- 2016 - 2017 **Robotics Institute Summer Scholar (RISS)**, Awarded RISS (CMU) for two consecutive summers. Carnegie Mellon University, Pittsburgh, USA
- Aug. 2016 - May 2017 **Technical Education Quality Improvement Programme (TEQIP)**, Government of India, Ministry of Human Resource Development(MHRD) funding received as part of development for precision farming applications technology. MHRD, India

Professional Service

- Robotics Institute Summer Scholars (RISS)**,
• Rebuilding RISS Website
• Assistance in rebuilding RISS Admissions Systems
• RISS Admissions Committee 2018, 2020 Carnegie Mellon University, Pittsburgh, USA
- 2017 - 2020
- Robotics: Science and Systems • A Robotics Conference**,
• Student Volunteer at RSS Conference Pittsburgh, USA
- June 2018

Proficient Skills

Systems: Linux/Unix

Languages: Python, C, C++, MATLAB, \LaTeX , HTML

Software: PyTorch, Tensorflow, ROS (Robot Operating System), Git

Selected Coursework

Carnegie Mellon University: Computer Vision (**A**), Simultaneous Localization and Mapping (**A+**)
Machine Learning (**A**), Mathematics Fundamentals for Robotics (**A**)
Convex Optimization (**A**)(**Mid-Sem**)