

TECHNICAL SUMMARY

Highlights Extensive robotics development on ground robots and quadrotors, including implementation of low-level control in **C++** on embedded systems, trajectory generation and navigation using **ROS/Python**, computer vision based obstacle avoidance using **OpenCV**.

Languages Python, C, C++, C#, Bash, TeX

Libraries & Packages NumPy, SciPy, Matplotlib, scikit-learn, OpenCV, roserial

Software MATLAB, Simulink, *git*, Processing, Unity

Operating Systems & Middleware Linux (Ubuntu), ROS (Indigo)

Hardware mbed LPC1768, Odroid XU4, Beaglebone Black, AutoQuad 6, CrazyFlie 2.0

EDUCATION AND ACADEMIC EXPERIENCE

Aerospace Engineering,

Master of Science
[University of Illinois at Urbana-Champaign](#)
 2014 – expected 2016
 Urbana, IL

Relevant Coursework *Advanced Robotics Planning, Nonlinear & Adaptive Control, Virtual Reality, Control System Theory & Design, Introduction to Robotics, and Digital Control Systems*

Research Working with Prof. Naira Hovakimyan in optimal trajectory generation for robotic agents in urban environments.

Mechanical Engineering,

Bachelor of Technology
[VIT University](#)
 2010 – 2014
 Vellore, India

Relevant Coursework *Numerical Methods, Finite Element Analysis, Dynamics of Machinery, and Computational Fluid Dynamics*

Research Worked under Prof. Satyajit Ghosh on modeling accreted ice on aircraft structures for light passenger aircrafts.

Abroad Worked at the [University of Strathclyde](#) in Scotland on space-related projects and participated at the Scottish Space School. (Jun 2012)

[Research Assistant](#)
 Summer 2015 – (Current)
[Teaching Assistant](#)
 Spring 2015

- Optimal trajectory generation for robots in congested environments.
- Integration of quadrotors in public safety applications.
- Taught a course on numerical methods in the Computer Science department.
- Mentored students on different numerical analysis methods and their implementation in *Python*.

RESEARCH EXPERIENCE

[Optimal trajectory generation](#)
 Jan 2016 – (Current)

[Line-of-sight based collision avoidance](#)
 Sep 2015 – Dec 2015
[Quadrotors in Public Safety Applications](#)
 May 2015 – Aug 2015
[Nonlinear controller for path following](#)
 Sep 2014 – May 2015

- Optimal control formulation to minimize perceived discomfort of humans in the vicinity of robotic agents.
- Constructed a virtual reality environment to simulate robot dynamics.
- Implementation of a novel trajectory generation algorithm using line-of-sight rate.
- Identifying nearby obstacles based on hierarchical clustering of feature points.
- Developed an external monocular vision based localization system trained to detect flying quadrotors to be used in firefighting scenarios.
- Implementation of L1 navigation guidance logic on differential wheeled robots.
- Designed an Extended Kalman Filter for state estimation.

PUBLICATIONS

- [1] Marinho, Lakshmanan, Cichella, Widdowson, Cui, Jones, Sebastian, Goudeseune. **VR Study of Human-Multicopter Interaction in a Residential Setting**. *Virtual Reality (VR)*, IEEE. IEEE, 2016.
- [2] Lele, Lakshmanan. **Optimization of Extreme-Weather Forecasting Systems in Developing Nations**. *International Research Journal of Earth Sciences*, 2015.