

## TECHNICAL SUMMARY

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**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, Unity3D

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

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

## EDUCATION AND ACADEMIC EXPERIENCE

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**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

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**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

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- [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.