Arun Lakshmanan

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Technical Summary

Languages Python, C, C++, C#, Bash, TEX

Libraries NumPy, SciPy, Matplotlib, PSOPT, scikit-learn, opencv

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

Operating Systems 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 Stratclyde in Scotland on space-related projects and participated at the Scottish Space School. (Jun 2012)

Research Assistant
Summer 2015 – (Current)

- Optimal trajectory generation for robots in congested environments.
- Integration of quadrotors in public safety applications.

Teaching Assistant
Spring 2015

- 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)

- Optimal control formulation to minimize perceived discomfort of humans in the vicinity of robotic agents.
- Contructed a virtual reality enivronment to simulate robot dynamics.

Line-of-sight based collision avoidance
Sep 2015 – Dec 2015

- Implementation of a novel trajectory generation algorithm using line-of-sight rate.
- Identifying nearby obstacles based on heirarchical clustering of feature points.

Quadrotors in Public Safety Applications
May 2015 – Aug 2015

- Developed an external monocular vision based localization system trained to detect flying quadrotors to be used in firefighting scenarios.

Nonlinear controller for path following
Sep 2014 – May 2015

- 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.