Rahul Moghe

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Education

The University of Texas at Austin Aug '17 - Dec '20 (Expected)
PhD, Aerospace Engineering and Engineering Mechanics: *Control, Autonomy and Robotics* **GPA: 4.00/4.00**
Graduate Portfolio Program in Robotics
Advisors: Dr. Maruthi Akella & Dr. Renato Zanetti
Dissertation: Adaptive estimation and calibration for Visual-Inertial Navigation

The University of Texas at Austin '15 - '17
MSE, Mechanical Engineering: *Dynamics, Systems and Controls* **GPA: 3.88/4.0**

Indian Institute of Technology Bombay Jul '11 - '15
B.Tech., Mechanical Engineering with Honors **GPA: 8.44/10**
Minors in Systems and Control Engineering

Professional Experience

Robotics Research Intern Jun-Sep '19
Schlumberger-Doll Research Center, *Cambridge, MA*

- Developed **state estimation** algorithms to predict failures based on **time series** data in oil field operations
- Deployed code generated using **Simulink** models & **AsyncAPI** for communication on the real system
- Tested Levenberg-Marquardt based least squares algorithms for **parameter estimation** on real data
- Assessed on-line filtering algorithms for **system identification** to be used for robust control

Publications

- **R. Moghe**, R. Zanetti and M. Akella, 'Adaptive Kalman Filter for Detectable Linear Time-Invariant Systems', **Journal of Guidance, Control, and Dynamics**, 42(10):2019, doi:10.2514/1.G004359
- **R. Moghe** and R. Zanetti, 'On-line hazard detection algorithm for precision lunar landing using semantic segmentation', **AIAA SciTech Conference**, 2020.
- M. Almeida, **R. Moghe** and M. Akella, 'Real-Time Minimum Snap Trajectory Generation for Quadcopters: Algorithm Speed-up Through Machine Learning', **IEEE Int. Conf. on Robotics & Automation**, 2019.
- **R. Moghe**, R. Zanetti and M. Akella, 'Covariance Matching filter for IMU error estimation', **AAS/AIAA Astrodynamics Specialist Conference**, 2018.
- **R. Moghe**, R. Zanetti and M. Akella, 'Covariance Matching Kalman filter for observable LTI systems', **IEEE Conference on Decision and Control**, 2018.

Research Projects

Robot Soccer for Aldebaran Nao Robot: Robotics Course Project Aug '18

- Implemented Extended Kalman filters and Particle filters for localization using camera based object detection
- Stood 4^{th} out of 10 teams in the penalty shootout competition on a miniature soccer field
- Tested complete coverage D* path planning algorithm with landmark weithed paths on the robot

Variable Structure and Fuzzy Inference control on a double inverted pendulum May '16

- Implemented a hybrid unstable energy-based controller for stabilizing the inverted pendulum
- Tested the controller on the double inverted in LabVIEW with NI CRIO Module
- Designed an Adaptive Neuro-Fuzzy Inference System (ANFIS) to control the system at its unstable position

Mixed-Integer Convex Optimization for optimal sensor alignment in surveillance Dec '15

- Formulated mixed integer constraints for solving a multi-agent sensor surveillance problem
- Convexified the problem to maximize the adversarial agents observed by the sensors using CVX toolbox

Skills

C++, Python, ROS, MATLAB, Simulink, CodeGen, Tensorflow, Convex Optimization, LabVIEW

Relevant Courses

Optimal Control Theory	Nonlinear & Adaptive Control	Advanced Topics in Estimation Theory
Convex Optimization	Neural Networks for Control	Verification/Synthesis of Cyberphysical Systems

Positions, Awards & Achievements

- Graduate Research Assistant at ReNeu Robotics Lab, NEAR lab, and C-DUS Lab, UT Austin '16 - '19
- Travel Award, IEEE CDC '18
- Professional Development Award, Cockrell School of Engineering, UT Austin '18
- Graduate Teaching Assistant, Mechatronics Lab, UT Austin '15 - '16
- Field Engineering Intern at Schlumberger Asia Services Ltd '14