Ameya Rajendra Godbole, PhD

+1(682)582-3460 | ameyarajendragodbole@gmail.com | www.linkedin.com/in/ameya-rajendra-godbole

Ashland, MA. Zip: 01721

Professional Summary

Passionate and results-driven Mechanical Engineer with expertise in robotics, physical modeling, control system design and AI-driven applications, with hands-on experience in experimental validation and supervised learning for UAVs and UGVs. Over six years of industrial experience developing and optimizing test infrastructure, designing robust testing methodologies, performance analysis, and quality assurance for physical modeling software products, ensuring reliability in mechanical engineering applications.

Proficient in C++, Python, ROS, and hardware integration, including Pixhawk, Arduino, LiDAR, and vision sensors, effectively bridging theoretical research with real-world implementation. Certified in Applied Data Science: Leveraging AI for Effective Decision-Making from MIT Professional Education, demonstrating expertise in AI and data-driven solutions. An active contributor to the field through peer-reviewed publications, conference presentations, volunteering as a reviewer for journals and conferences, and teaching graduate courses. Committed to advancing AI, machine learning, and autonomous systems for real-world engineering applications.

Skills

CAD Softwares: Solidworks and AutoDesk Inventor
Programming: C, C++, Python, Robot Operating System (ROS)
Simulation: MATLAB, Simulink, Simscape
Source Control Management: Perforce and Git
Hardware: Pixhawk, Arduino, H-bridge motor Controllers, IMU sensors, Ultrasound sensors, Lidar and Vision sensors
Other (Related): Mathematical Modeling, Control system design in MATLAB/Simulink, Optimal Estimation of Dynamical Systems and System Identification, Machine Learning, Deep Learning

Work Experience

Senior Quality Engineer, Physical Modeling   Sept 2019 – Present
The MathWorks, Natick, Massachusetts

- **Develop & Maintain Test Infrastructure:** Design and enhance robust testing infrastructure for Simscape Multibody, Simscape Fluids, and Simscape Driveline products in the Physical Modeling area, ensuring reliability for mechanical engineering applications.

- **Comprehensive Software Testing:** Participate in every stage of feature development from inception to release, design test strategies, write unit, system and performance tests, and improve code coverage by identifying testing gaps.

- **Quality Assurance & Optimization:** Report bugs and validate bug fixes, create and refine testing tools, monitor product performance, and optimize test infrastructure efficiency.

- **Community & Team Engagement:** Collaborate with development and marketing teams to create shipping examples and develop content for hands-on workshops focused towards community mentoring via events like Grace Hopper Celebration and MATLAB Expo and mentor interns

Instructor for ME 5379, Unmanned Vehicle System Development   Jan 2019 – May 2019
Mechanical and Aerospace Engineering Department, The University of Texas at Arlington

Physical Modelling Quality Engineering Intern   Jan 2017 – Aug 2017
The MathWorks, Natick, Massachusetts

- Design and develop exhaustive and extensive automated test suites, monitor product quality metrics and provide feedback to the development team.

- Participate in design reviews and ensure feature testability, create test tools and enhance existing ones, report bugs and qualify bug fixes.

Graduate Teaching Assistant (Fall 2014, Fall 2015, Spring 2016, Fall 2016, Fall 2017 – Fall 2019)
Mechanical and Aerospace Engineering Department, The University of Texas at Arlington

Research Assistant (Spring 2014, Spring 2015, Summer 2016)
Aerospace Systems Laboratory, The University of Texas at Arlington

Research Experience

Aerospace Systems Laboratory, The University of Texas At Arlington	Sept 2013 – Aug 2019

Graduate Research Student
Supervisor: Dr. Kamesh Subbarao

Dissertation Topic : Nonlinear Control of Unmanned Aerial Vehicles with Cable Suspended Payloads

- **Mathematical Modeling:** Developed a comprehensive quadcopter model with a cable-suspended payload, incorporating aerodynamic drag, propulsion dynamics, and power consumption.

- **Nonlinear Control Design:** Implemented Passivity-Based Control (PBC) and Extended State Observer (ESO)-based Active Disturbance Rejection Control (ADRC) to ensure stable operation and mitigate payload oscillations in simulations.

- **Experimental Validation:** Evaluated the performance of ESO-based ADRC using a quadcopter platform, leveraging supervised learning to estimate nominal thrust for altitude control and thrust generated by the propellers based on real-time sensor data.

- **Multi-Agent System Control:** Applied a distributed ESO-based ADRC framework for coordinated control of multiple quadcopters carrying a cable-suspended payload.

Research Topic : Probabilistic UAS Reachability Map
The project was funded by National Science Foundation (S&AS) under the grant 1724248.

- **Mathematical Modeling & Analysis:** Developed a comprehensive model to calculate the range, endurance, and reachability domain of a UAS under both nominal and failure scenarios.

- **Analytical Range Estimation:** Derived and validated an analytical expression for quadcopter range in steady wind conditions by comparing it with simulation-based results.

Research Topic : Optimal Trajectory Design and Control of Unmanned Ground Vehicles
The project was funded by Air Force Research Lab under the AFRL award # FA945316-1-0058.

- **Path Planning & Trajectory Design:** Integrated an efficient path-planning algorithm with minimum jerk trajectory design for smooth and obstacle-free rover navigation.

- **Control & Tracking:** Developed a control framework ensuring accurate trajectory tracking with acceleration bounds, enhancing robustness in planetary exploration.

- **Experimental Integration:** Simplified real-world implementation by incorporating wheel speed dynamics into the control design for seamless deployment.

Masters Thesis : Dynamics and Control of Free-Flying Robots in Space
A concept of Smart Maintenance Inspection and Robotic Free-flyer (SMIRFF) was presented as a part of Masters thesis. SMIRFF is a compact free-flying robot with two 5 degrees of freedom robotic arm and uses cold gas thrusters to maneuver in space. The aim of the thesis was to construct a mathematical model, validate the model using SimMechanics toolbox of Simulink(MATLAB) and implement a quaternion feedback controller to control the orientation of the free-flyer when the arms are in motion.

Research Topic : Design and control of a 3D printed 5DOF Robotic Arm
Designed and fabricated a 5-DOF robotic arm using a 3D printer. The System Identification Toolbox in MATLAB was used to estimate the joint actuator parameters of the robotic arm. Using the actuator's mathematical model, a PID controller was designed and implemented to track the desired joint trajectory.

Education

Doctorate of Philosophy (Ph.D) in Mechanical Engineering	Jun 2015 – Aug 2019
The University of Texas At Arlington, Arlington, Texas, USA	
Master Of Science (M.S.) in Mechanical Engineering	Aug 2013 – May 2015
The University of Texas At Arlington, Arlington, Texas, USA	
Bachelor of Engineering (B.E) in Mechanical Engineering	Aug 2009 – May 2013
K.J.Somaiya College of Engineering, Mumbai University, Mumbai, India	

CERTIFICATES

Applied Data Science Program: Leveraging AI for Effective Decision-Making Oct 2024
MIT Professional Education

Graduate Certificate in Unmanned Vehicle Systems Dec 2019
Department of Mechanical and Aerospace Engineering
The University of Texas At Arlington

ACADEMIC HONORS & AWARDS

Lawrence W. Stephens Endowment Scholarship Aug 2019
College of Engineering The University of Texas at Arlington

Summer Dissertation Fellowship Apr 2019
Office of Graduate Studies, The University of Texas at Arlington

Mechanical and Aerospace Engineering STEM Fellowship Jan 2019
The University of Texas at Arlington

First Place in Graduate Division in NASA's Revolutionary Aerospace Systems Concepts and Academic Linkages Forum Jun 2014
Sponsored by National Institute of Aerospace

ACADEMIC PROJECTS

Capstone Project: Malaria Detection using Deep Learning Oct 2024
Course: Applied Data Science Program: Leveraging AI for Effective Decision-Making

Elective Project: Street View Housing Number Digit Recognition using CNNs Oct 2024
Course: Applied Data Science Program: Leveraging AI for Effective Decision-Making

Waypoint Navigation and Obstacle Avoidance of an UGV Jan 2016 – May 2016
Course: ME 5379, Unmanned Vehicle Systems Development

Design and Fabrication of Mobile Robotic System Aug 2012 – Apr 2013
Course: Final Year Bachelor of Engineering Project

Design and Fabrication of Step Climbing Robot Aug 2011 – Apr 2012
Robocon 2012 Robotics competition

PEER-REVIEWED PUBLICATIONS

Journal Papers:

- A. R. Godbole and K. Subbarao,"Nonlinear Control of Unmanned Aerial Vehicles with Cable Suspended Payloads," in Journal of Aerospace Science, and Technology (Elsevier),vol.93, p.105299, 2019, doi: https://doi.org/10.1016/j.ast.2019.07.032.

- A. Godbole, K. Subbarao, A. Dogan, and B. Huff, "Semi-analytical range and endurance computation of battery-powered multi-copter unmanned aerial systems under steady wind conditions," in Proceedings of the Institution of Mechanical Engineers, Part G: Journal of Aerospace Engineering, April, 2019. [Online]. Available: https://doi.org/10.1177/0954410019842714

Conference Papers:

- Khan H.R., Godbole A., Subbarao K., "Simulation and Control of an Extra-Vehicular Space Robot for Debris Capture and Removal in LEO", 2023 AAS/AIAA Astrodynamics Specialist Conference, August 2023, Big Sky, MT, USA

- Khan H.R., Godbole A., Subbarao K., "Extra Vehicular Operations and Payload Transportation in Microgravity with a Cooperative Free-flyer Robot", 33rd AAS/AIAA Space Flight Mechanics Meeting, January 2023, Austin, TX, USA

- A. R. Godbole, K. Subbarao, A. Dogan and B. Huff, "Range and Endurance Characterization of a Quadcopter subject to Steady Wind", 2018 International Conference on Unmanned Aircraft Systems (ICUAS), Dallas, TX, 2018, pp. 1279-1287. doi: 10.1109/ICUAS.2018.8453388

- A. R. Godbole and K. Subbarao, "Mathematical Modeling and Control of an Unmanned Aerial System with a Cable Suspended Payload", 2018 IEEE 14th International Conference on Control and Automation (ICCA), Anchorage, AK, 2018, pp. 570-575. doi: 10.1109/ICCA.2018.8444279

- Godbole A., Murali V.N.V., Quillen P., Subbarao K., "Optimal Trajectory Design and Control of a Planetary Exploration Rover", 27th AAS/AIAA Space Flight Mechanics Meeting, February 2017, San Antonio, TX, USA

PRESENTATIONS

Oral Presentations:

- Upadhyay, H., Godbole, A.R., MATLAB Expo 2024, "Model Autonomous Navigation of a Mars Rover", Natick, USA (November 13, 2024)

- Godbole, A.R., Lanka, C., Ramani, K., Upadhyay, H., MATLAB Expo 2023, "Model Autonomous Navigation of a Mars Rover", Natick, USA (May 10, 2023)

- Godbole, A.R., Ramani, K., Nambi, S., Gavilan, M., MATLAB Expo 2021, "Mission Planning of a Quadcopter Using a Digital Twin", Natick, USA (May 4-5, 2021)

- Godbole, A.R., Annual Celebration of Excellence by Students (ACES) Symposium 2014, "SMIRFF: Smart Maintenance Inspection and Repair Free-Flyer", University of Texas at Arlington, USA (March 26, 2014)

Poster Presentations:

- Godbole, A.R., Martinez, A., Subbarao K., Texas System Day, "Extended State Observer (ESO) based Control of Quadcopters with Cable Suspended Payloads and System Identification", Texas A&M University, College Station, TX, USA (April 5, 2019)

- Godbole, A.R., Subbarao K., Texas Systems Day, "Nonlinear Extended State Observer based Stabilization and Control of Multi-copters with Cable Slung Payloads", University of Texas at Dallas, Dallas, TX, USA (April 6, 2018)

VOLUNTEER EXPERIENCE

Reviewer, Journal Paper

ASME Journal of Dynamic Systems Measurement and Control	July 2025 – Present
Journal of Aerospace Science and Technology (Elsevier)	July 2025 – Present
IEEE Robotics and Automation Letters (RA-L)	Sept 2021

Reviewer, Conference Paper

5th International conference on Electrical, Computer and Energy Technologies	Feb 2021
63rd IEEE Conference on Decision and Control (CDC 2024)	Apr 2024
2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)	Apr 2022
14th IEEE International Conference on Control & Automation (ICCA 2018)	Feb 2018

TA, Workshops

AI takes Autonomous Navigation to Mars and Beyond, GHC 2022	Sept 2022

Judge

Annual Celebration of Excellence by Students (ACES) Symposium 2016, Undergraduate Poster Session Judge, University of Texas at Arlington	Mar 2016

EXTRA CURRICULAR ACTIVITIES

Team Member, MathWorks Cricket Club	Jun 2023 – Present
Music Coordinator for Fine Arts Society Of India	Sept 2014 – May 2015

The University of Texas at Arlington

Head of Mechanical Team, Team KJSCE ROBOCON	Aug 2012 – Jun 2013
Co-founder of team KJSCE ROBOCON	Aug 2010

K.J.Somaiya College of Engineering, Mumbai University