Rachit Singhvi

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Education

Masters of Science in Mechanical Engineering — Graduation: May '22, GPA: 4.04/4.00
Planjery Family Foundation Scholar | ***University of Iowa*** — *Iowa City, IA*

Bachelor of Science in Aerospace Engineering — Graduation: Dec '19
Dean's List Spring 2016 | ***University of Illinois Urbana Champaign*** — *Champaign, IL*

Technical Skills and Coursework

Coursework: Linear/Nonlinear Control Theory and Optimization, Multi-body Kinematics and Dynamics, Classical Feedback Control Theory, Aerospace Mechanics and Dynamics, Artificial Intelligence and Machine Learning
Languages/OS: Linux, Python, Matlab/Simulink
Frameworks (proficient): Gazebo, ROS, Git, CAD, ProAnalyst, XFLR5

Experience

Cooperative Autonomous Systems Lab, Graduate Research Assistant — August 2020 – Present
Cooperative Autonomous Systems, PI: Dr. Venanzio Cichella — *Iowa City, IA*

- Designed and developed an iterative receding horizon optimization algorithm for long/complex trajectories requiring high order polynomial approximation.
- Improved the BeBOT library to include composite Bernstein polynomials for approximation of trajectories requiring high order approximation for computational ease in optimization.
- Implemented Bernstein polynomial based trajectory generation and tracking using ROS-Python/Simulink on Quanser QCar autonomous driving platform
- Participated in research weekly team presentations to enable collaboration among lab members on projects such as avalanche search and rescue and autonomous racing along with bi-weekly interest based publication review.

Human Centered Autonomy Lab, Research Assistant — Sep. 2019 – Dec 2020
University of Illinois, PI: Dr. Katherine Rose-Driggs Campbell — *Champaign, IL*

- Developed Kalman filter based PID controller for testing on turtlebot2 using ROS.
- Implemented a waypoint navigation controller on Turtlebot2i to create a testbed for adaptive stress testing for rigorous validation of autonomous vehicles in safety critical situations.

President, Illinois Club Tennis — April 2017 – April 2018
University of Illinois, Urbana Champaign — *Champaign, IL*

- Managed a cohort of 100 students to hold weekly practices, budgeting, and coordination with UIUC Athletics Management.
- Led the club to the National Championships in Florida to a record-breaking run into the top 6 club teams of the nation (among over 600 schools).

Projects

Click Beetle Project, BAMLab, PI: Dr. Aimy Wissa | *Python, ProAnalyst* — June 2019 – Aug 2019

- Performed dynamical analysis using video based trajectory tracking on 3 species of click beetles augmenting the understanding of their self-righting (legless jumping) mechanism.
- Designed and manufactured launch mechanism to simulate the take-off and airborne stages of the beetles' jump.

FIRE Location Observation and Classficatiob Cubesat | *GNC* — Jan 2019 – May 2019

- Proposed a 3U cubesat for Fire location, observation and classification and presented the proposal to officials from NASA for preliminary design review.
- Followed a weekly schedule of meeting and presentations using organization tools such as Gantt charts, quad charts and subsystem worksheets leading up to sub-systems reviews and finally and preliminary design review
- Led the guidance navigation and controls team to a top 3 finish in the class among 20 teams