Kavin M. Govindarajan

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Experience

CORE LAB | Undergraduate Research Assistant Jun 2019 - Present

Renewably-Powered Robotics
- Developing persistent planning algorithms for renewably-powered vehicles in spatiotemporally-varying environments
- Conducting field-test campaign to validate planning and control algorithms on a solar-powered autonomous surface vessel
- Designed and built composite control surfaces and electronics modules for an autonomous sailing drone

Technologies/Skills: MATLAB, Simulink, Julia, ROS, Solidworks, Git

DARPA Manta Ray
- Developed and implemented control system software for underwater energy-harvesting kite
- Conducted field-test campaign to validate performance of energy-harvesting kite

Technologies/Skills: C, C++, Python, ROS, Linux (Ubuntu), Git

Liquid Rocketry Lab | CFO & Structures Engineer Sep 2020 - Present
- Managing financial and legal responsibilities for the organization
- Developing dynamic model to derive optimal design parameters and design flight control system
- Designing components for guidance, navigation, and control (GNC) of rocket

Technologies/Skills: MATLAB, Java, Siemens NX, JIRA, Confluence, Git

Education

North Carolina State University Aug. 2020 - Present (GPA: 3.93/4.0)

BS Aerospace Engineering, BS Applied Mathematics

Awards/Honors Park Scholar, Dean's List (All Semesters)

Coursework Dynamics and Multivariable Controls, Mechatronics, Aerospace Vehicle Performance, Engineering Dynamics, Aerodynamics I, Methods of Applied Mathematics, Real Analysis, Linear Algebra, Applied Differential Equations, Partial Differential Equations

Publications

Govindarajan, Kavin, Ben Haydon, Kirti Mishra, et al. (2022). "Coverage-Maximizing Solar-Powered Autonomous Surface Vehicle Control for Persistent Gulf Stream Observation". In: *2022 American Control Conference (ACC)*, pp. 3675–3681. DOI: 10.23919/ACC53348.2022.9867746.

Govindarajan, Kavin et al. (In Press). "Predictive Velocity Trajectory Control for a Persistently Operating Solar-Powered Autonomous Surface Vessel". In: *2023 American Control Conference (ACC)*.

Skills

Programming/Software C, C++, MATLAB, Simulink, Java, Python, Julia, Linux (Ubuntu, Raspbian), Git, JIRA, Confluence, Microsoft Office, LaTeX

Computer-Aided Design Solidworks, Siemens NX, Autodesk Fusion 360, OnShape, GrabCAD

Other Experience

InspireNC | Director Jul 2018 - Present

- Managing operations and community impact of the InspireNC non-profit organization
- Organized multiple community development events and skills-training workshops
- Established working relationships with corporate partners to fund and expand community impact

NASA L'Space MCA | GNC & Power Systems Engineer May 2021 - Aug 2021

- Developed lunar rover concept for the sampling of possible ice water reservoirs on lunar south pole
- Developed preliminary design review and presented concept to NASA engineers for review
- Designed GNC and power systems for lunar rover concept

Technologies/Skills: MATLAB, Simulink, Solidworks

Projects

Information-Based Path-Planning Link to More Info

Implemented a persistent path-planning algorithm using a preliminary metric of coverage. This served as the initial step for my research work.
Technologies/Skills: MATLAB, Simulink, Solidworks

Computer-Vision Aided Robotics Link to More Info

Developed computer vision systems for autonomous target identification and control of a ball launching mechanism on FRC 6908's 2020 Robot: Cookie Monster.
Technologies/Skills: Java, Python, Computer Vision

Activities

RoboBoat

Designing and building an autonomous robotic surface vehicle to compete in the RoboBoat competition. Heading development of software/controls tech stack using ROS and Ardupilot software integrated with PixHawk hardware. Additionally, currently designing the hull using CAD software. This hull will then be manufactured using composite construction techniques.

FIRST Robotics Competition Mentor

Mentoring FRC 6908: Infuzed. Served as team lead during high school. Currently focused on guiding students with the engineering design process and implementation of higher-level autonomous control systems for a competition robot.