

NAGESH ERANKI

(217) 298-6635

nag.eranki@gmail.com

www.linkedin.com/in/neranki

www.github.com/NageshEranki

Education

MS, Aerospace Engineering, University of Illinois at Urbana-Champaign

Jan 2022 - Dec 2024

Specialization: Controls and Dynamical Systems

BS, Mechanical Engineering, Mahindra University, India

Aug 2016 - Sep 2020

Skills

- Software: Python, C/C++, Embedded C, ROS2, OpenCV, Pytorch, Linux
- Design: 3D printing, AutoCAD, Solidworks
- Computational: MATLAB/Simulink, Ansys CFD/FEM, Machine Learning

Experience

Academic Hourly Assistant Coordinated Sciences Lab, University of Illinois at Urbana Champaign

Feb 2025 - June 2025

Ball manipulation with a monopedal hopping quadrotor

- Augmented a quadrotor with a 3D printed ultra-lightweight (3g) spring-loaded leg to enable hybrid hopping-flight locomotion
- Designed state-machine based ground controller to perform motion planning and online reference path generation
- Developed a gain scheduled control system with novel control allocation method to prioritize attitude control during free-fall
- Improved landing position prediction error to within 5cm MSE through a least squares fit for dynamic models

Graduate Research Assistant Coordinated Sciences Lab, University of Illinois at Urbana Champaign

Sep 2022 - Dec 2024

Position control of a quadrotor with limited information

- Developed novel state estimation algorithm based on motion capture feedback requiring 50% less data rates for position tracking
- Generalized control algorithm, tailored for different robots, based on model parameters from physical experiments
- Shortened hardware testing times (2 months) using model-in-loop and software-in-loop simulations
- Developed real-time application (FreeRTOS) in embedded C for the drones' STM32 microcontroller
- Demonstrated the use of the control architecture by simultaneously flying 2 drones using a single radio dongle

Graduate Teaching Assistant University of Illinois at Urbana Champaign

Jan 2023 - Dec 2024

- Led a team of 5 to plan curriculum and write starter code for a class of 150 senior undergraduate students
- Supervised 15 student projects to use different sensors for localization of mobile robots: ToF, RGB-D, optical flow
- Performed PCB-level debugging of STM32 boards and identified integration issues for SPI, I2C devices
- Calibrated cameras and established a standard operating procedure for motion capture system for the Aerospace department
- AE483 (Autonomous Systems Lab): Model-based control system and observer design for quadrotors
- ME446 (Robot Dynamics and Control): Forward/Inverse kinematics for 3-link robot, PID tuning for task-space, joint-space and feedback linearization control, path planning

Research Assistant Mahindra University, India

Nov 2020 - June 2021

- Derived models for ideal fluid flow generated by point vortices for mixing of fluids
- Identified ideal configurations of point vortices for maximum mixing efficiency
- Programmed efficient numerical simulation on Nvidia GPU cluster, avoiding computation-intensive CFD study

Research Intern IIT Madras, India

Jun 2019 - Aug 2019

- Simulated the supersonic, internal flow of a shock-tube using Ansys CFD to study temperature/pressure profiles
- Explored novel tube designs to encourage a more uniform pressure/temperature profile, a desired parameter for high temperature/pressure chemistry experiments

Projects

Machine Learning for Image classification

Nov 2024 - Dec 2024

Course project

- Implemented a Convolutional Neural Network to classify handwritten digits from MNIST and CIFAR-10 datasets
- Improved test accuracy to 92% using data augmentation techniques and fine-tuning hyperparameters

Design of gripper mechanism

Mar 2022 - Apr 2022

- Programmed MATLAB solution for FEM-based structural design optimization problem
- Fully specified the design for a 3D printed monolithic part for maximizing stiffness with minimal material requirements
- Won 4th place in design challenge, lifting 1.125 kg before yielding

Statistical Orbit Determination

Mar 2023 - May 2023

- Designed an Extended Kalman filter to estimate the state of satellites from Earth-based measurements of observation angles
- Resulting algorithm is capable of real-time identification of orbiting satellites from a look-up of NORAD two-line element sets

Achievements

- Earned scholarship of \$1200 for each year during undergraduate education
- Two-time special mention in the *List of Teachers ranked excellent by their students* for AE483 and ME446