Aniruddha "Ani" Perumalla
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 State College, Pennsylvania, U.S.   i U.S. Citizen, DOD Secret Clearance (2017-18)

I am a doctoral student in the Department of Aerospace Engineering at Pennsylvania State University, University Park. My interests include the intersection of computer vision, image processing, and aerospace engineering, particularly in vision techniques for unmanned aerial vehicles (UAVs).

🎓 EDUCATION

08.2019-	**Doctor of Philosophy in Aerospace Engineering**	Pennsylvania State University (PSU), University Park	Advisor : Prof. Eric N. Johnson	**GPA** : 3.97
08.2015-05.2019	**Bachelor of Science in Aerospace Engineering**	University of Maryland, College Park	**GPA** : 3.827

📖 PUBLICATIONS

2021	A. Perumalla, A. Taha Koru. "Network topology identification using supervised pattern recognition neural networks." Proceedings of the 13th International Conference on Agents and Artificial Intelligence (ICAART 2021). DOI : 10.5220/0010231902580264
2019	K. Amasyali, M. Olama, A. Perumalla. "Machine Learning-based Approach to Predict the Aggregate Flexibility of HVAC Systems." 2020 IEEE Power & Energy Society Innovative Smart Grid Technologies Conference (ISGT). DOI : 10.1109/ISGT45199.2020.9087695

💼 PROFESSIONAL EXPERIENCE

August 2019
June 2019

INTERN | **Oak Ridge National Laboratory (ORNL)** | Oak Ridge, Tennessee, U.S.
- ❯ Simulated the application of a control scheme based on model-free control to building HVAC systems
- ❯ Trained neural networks to predict the efficiency of such a control scheme for a given set of environmental parameters (power supply and external temperature)

Matlab | Python | Machine learning | Neural networks

August 2018
June 2018

TEST ENGINEERING INTERN | **Ursa Major Technologies** | Berthoud, Colorado, U.S.
- ❯ Designed system that used controller to automate measurements of flow coefficient for a variety of valves used in Ursa Major's "Hadley" rocket engine
- ❯ Completed flow quality testing of valves used in rocket engines using digital flowmeters and pressure transducers

Python | Rocket engine design

August 2017
June 2017

PATHWAYS INTERN | **Naval Air Systems Command (NAVAIR)** | Patuxent River, Maryland, U.S.
- ❯ Investigated why test pilot training aircraft were requiring longer distances to land than the distances expected in the corresponding flight manual data
- ❯ Developed MATLAB scripts to calculate and generate time series plots of flight parameters for given descent conditions

Matlab | Excel | Flight performance

March 2018
October 2016

RECORDS MANAGEMENT ASSISTANT | **UMD Office of International Affairs** | College Park, Maryland, U.S.
- ❯ Created a detailed inventory of files and converted files from paper to digital format
- ❯ Under limited resources, developed a new digital organizational system to completely reorganize a large, outdated, and heterogeneous collection of paper records

File organization

August 2016
June 2016

DATA ANALYSIS INTERN | **Techwave, Inc.** | Hyderabad, India
- ❯ Applied data analysis techniques (e.g., Tableau visualization and machine learning) to generate insights about a collection of telecom data
- ❯ Used ARIMA modeling, ANOVA, and logistic regression (in R) to analyze influence of rainfall and gold prices on GDP
- ❯ Examined patterns in Dallas crime data through the application of k-means clustering

File organization

⌨ PROJECTS

Fall 2021
Spring 2021
OPTIMAL INTRUDER COLLISION AVOIDANCE FOR UAVs | PSU | Graduate Research
- ❯ Developed algorithm for minimum-control UAV collision avoidance in obstacle-rich environment and/or head-on collision in airspaces, adhering to international guidelines for safe avoidance maneuvers
- ❯ Algorithm was tested in collaboration with UtopiaCompression Corp. in high-fidelity simulation in Microsoft AirSim

UAV collision avoidance | Guidance, Navigation, Control | Optimal control | Linear systems theory | Matlab

Fall 2020
Fall 2019
NETWORK TOPOLOGY IDENTIFICATION | PSU | Graduate Research
- ❯ Developed algorithm to identify topology of unknown connected network of UAVs based on observations of UAV motion
- ❯ Trained neural networks to identify most connected node of unknown large network (7-9 nodes) with ∼65% success rate

Graph theory | Neural networks | Matlab

Fall 2019
AUTONOMOUS VEHICLE IMAGE PROCESSING & NAVIGATION | UMD | Undergraduate Course : ENAE380
- ❯ Using Python, programmed autonomous robotic vehicle to use mounted camera to capture, interpret, and navigate to images placed on an obstacle course
- ❯ Used OpenCV for the vehicle to recognize patterns drawn on walls of a maze and navigate based on the pattern detected, and for the vehicle to recognize the color of obstacles ahead, steer around them, and display the color on an LED
- ❯ Learned about fundamental image processing and computer vision topics, including the generalized Hough transform, Fourier transform, Canny edge detection, Sobel operator, and a variety of filtering methods

Python | Robotics | Autonomous navigation | OpenCV | Image processing | Computer vision

Fall 2017
HYPERSONIC VEHICLE IMAGE PROCESSING | UMD | Undergraduate Course : ENAE311H
- ❯ Analyzed schlieren video footage of vehicle in hypersonic wind tunnel to find vehicle's equations of motion
- ❯ Computed equations of motion by using the Python interface to OpenCV's corner detection algorithms to track position of corners of vehicle throughout motion
- ❯ Learned about fundamental image processing and computer vision topics, including the generalized Hough transform, Fourier transform, Canny edge detection, Sobel operator, and a variety of filtering methods

Python | OpenCV | Image processing | Computer vision | Aerodynamics | Wind tunnel

Spring 2016
OVER-SAND VEHICLE DESIGN | UMD | Undergraduate Course : ENES100
- ❯ Learned robotic programming using Arduino, and programmed autonomous navigation of rover through a sand obstacle course and programmed rover's measurement of pH of a chemical spill on the course

Python | Arduino | Robotics

Fall 2015
MAV MAGNETIC ACTUATOR | UMD | Undergraduate Course : ENAE100
- ❯ Member of team that modeled and experimentally characterized force and moment requirements for commercial magnetic actuators

Python | Arduino | Robotics

☱ SKILLS

Computer-Aided Design	Siemens NX, Autodesk Inventor
Matlab	Simulink, Controls Toolbox, Neural Network Toolbox
Machine learning	Neural networks, Reinforcement learning, Regression
Control theory	Linear systems theory, Optimal control, Dynamic programming, Estimation, System identification
Video editing	Won nationwide competition (C-SPAN StudentCam) for video edited using iMovie
Data science	ℝ ("Tidy" programming, `ggplot2`), 🐍 Python (`matplotlib`, `seaborn`); well-versed in data science visualization techniques
Git	⬤ Github, 🦊 Gitlab

</> PROGRAMMING LANGUAGES

Matlab	⬤⬤⬤⬤⬤
🐍 Python	⬤⬤⬤⬤⬤
ℝ	⬤⬤⬤⬤⬤
C/C++	⬤⬤⬤○○