Pushkar Dave

pushkardave.vnit@gmail.com | LinkedIn | Github

Experience

Multi-robot Systems Group, Czech Technical University **May 2023 – September 2023**
Research Intern *Under Dr. Martin Saska*

- Designed a state estimator to estimate the vertical position of the focal UAV in a swarm
- Integrated novel UVDAR localisation system and performed sensor fusion using Linear Kalman Filter

IvLabs, VNIT **July 2021 – October 2021**
Summer Intern

- Studied the architecture of Convolutional Neural Networks, Autoencoders and built an MNIST digit classifier using NumPy
- Developed and implemented the Image Denoising model on MNIST and FashionMNIST datasets using PyTorch

Education

Visvesvaraya National Institute of Technology **December 2020 – Present**
Bachelor of Technology in Electrical and Electronics Engineering (CGPA: 8.1/10) *Nagpur, India*

Nirmala Memorial Foundation Jr. College **2020**
Science Stream (HSC, Percentage: 93.38%) *Mumbai, India*

Children's Academy **2018**
Science Stream(ICSE, Percentage: 96.60%) *Mumbai, India*

Projects

Multi UAV Path Planning for Urban Air Mobility **August 2023 - Present**
Under Dr. Krishnama Raju S and Dr. Ashwin Dhabale

- Focusing on implementing multi UAV path planning algorithms to deploy collision-free minimum cost trajectories on drones in an urban environment as a part of my Bachelor's Thesis

Trajectory Tracking and Replication using UAV **January 2023 - March 2023**
[Code] *Under Dr. Shital Chiddarwar*

- Focused on developing a controller for achieving higher stability of a quadrotor while it traverses the trajectory of a moving object
- Implemented color segmentation for object tracking and simplified the path generated using RDP algorithm and B-spline interpolation

ESP32 WayFinder **February 2023 - April 2023**
[Code] *Under Dr. Bhooshan Rajpathak*

- Designed and implemented code to showcase dynamic animations synchronised with audio signals on ESP32, using MAX7219 LED Matrix for a navigation device
- Incorporated Waze navigation app to act as the primary audio signal source for transmission to the ESP32 based navigation device

Tethered Aerial Vehicle for Blind Navigation **December 2021 - May 2022**
[Code] *Under Dr. Shital Chiddarwar*

- Aimed to design and control a tethered aerial vehicle system to assist a blind person in navigation
- Modelled the tethered system as a damped spring mass system and implemented steady state, constant force and other control strategies

Cart Pole **January 2022 - March 2022**
[Code] *Under Dr. Shital Chiddarwar*

- Focused on controlling a cart pole system using PID and LQR controllers
- Implemented PID and LQR controllers on the system and optimised the results by using energy constraints with LQR to obtain minimum input force

Quadcopter Control **December 2021 - January 2022**
[Code] *Under Dr. Shital Chiddarwar*

- Mathematically modelled a quadrotor capable of dynamic maneuvers in MATLAB
- Implemented a PD control system for 2D and 3D motion and generated a minimum snap trajectory in simulation

Technical Skills

Languages: Python, C/C++, MATLAB, Markdown
Software Tools: Git, LaTeX, Multisim, ROS+Gazebo, Simulink
Libraries: NumPy, Matplotlib, OpenCV

Relevant Coursework

Degree Courses:

MAL101, MAL102: Single and Multivariable Calculus, Matrix Theory, Infinite Series and Ordinary Differential Equations [Link1,Link2]
MAL201: Integral Transforms and Partial Differential Equations [Link]
MAL205: Numerical Methods and Probability Theory [Link]
EEL202: Signals and Systems [Link]
EEP208: MATLAB Programming and Simulation [Link]
EEL305: Control Systems - I [Link]
EEL328: Optimization Techniques [Link]
EEL418: Control Systems - II [Link]
CSL210: Data Structures

Supporting Courses:

Aerial Robotics: University of Pennsylvania (Coursera) [Link]
Neural Networks and Deep Learning: DeepLearning.AI (Coursera) [Link]
Programming for Robotics - ROS: ETH Zurich [Link]

Achievements

Awarded a cash prize of INR 50K for India's Biggest Robotics Competition - **Robofest-Gujarat 3.0** [Link]

Recipient of the prestigious **ArtPark TopUp Fellowship** for the year 2023-24 [Link]

Extracurriculars

At VNIT:

- Vice-Chairman of IvLabs [Link], Robotics and AI Lab of VNIT, Nagpur
- Led an exhibhition of IvLabs' projects for alumni of VNIT at the Diamond Jubilee Celebrations
- Conducted workshops on Python and Image Processing under IEEE VNIT Student Branch with more than 100 students