Prateek Priyaranjan Pradhan

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Educational Qualifications

Year	Degree	Institution (Board)	Performance
2020-Ongoing	PhD (AE)	Indian Institute of Technology, Kanpur	9.78/10
2019	B.Tech (EE)	National Institute of Technology, Rourkela	8.50/10
2014	Senior Secondary	Saraswati Vidya Mandir, Berhampur (CHSE)	81.17%
2012	Secondary	Saraswati Vidya Mandir, Angul (BSE)	92.67 %

Publications

- U.K. Sahu, **P. P. Pradhan**, A. Mishra, B. Subudhi, "Vision-Based Tip Position Control of a Single-Link Robot Manipulator," *SUSCOM-2019*, Mar 2019
- **P. P. Pradhan**, A. Sen, M. Kothari, K. Rajawat, "Distributed Optimisation under a Weight-unbalanced Digraph ," *ICARA-2023* ,Feb 2023
- **P. P. Pradhan**, A. Sen, M. Kothari, "Distributed Optimisation Framework for Circumnavigation of Multiple UAVs Around a Target," *LCSS CDC 2023*
- **P. P. Pradhan**, M. Kothari, K. Rajawat, "A Predictive Algorithm for Leader-follower Structure in Swarm of Multi-UAV System," *AIAA SciTech 2024*: January 2024.
- H. Sandhu, **P.P. Pradhan**, K. Rajawat, M. Kothari, "Optimal Trajectory Generation and Tracking for UAV with Non-convex Obstacles and Constrained Energy": *AIAA SciTech 2024*: January 2024.
- **P.P. Pradhan**, M. Kothari, "Optimal Trajectory Generation and Tracking for A Biplane Quad-rotor During The Transition Mode": Manuscript Under Preparation

Work Experience

Intelligent Guidance and Control Laboratory *IIT Kanpur*
PhD Research Scholar, Prof. Mangal Kothari Sep 2020 - Ongoing

- **Objective:** Development of fully autonomous swarm of UAVs system.
- **Approach:** Software simulation on Gazebo as well as practical implementation in both indoor (using motion capture (MoCap) system) and outdoor environment.
- **Impact:** It can be implemented in military surveillance, rescue operations, and explorations of unexplored terrains.

Autonomous Vehicle Laboratory *IISc - Bangalore*
Project Assistant, Prof. Ashwini Ratnoo July 2019 - August 2020

- **Objective:** Trajectory planning of multiple quadcoptors
- Implemented complementary filter as well as the kalman filter for estimating the states of the UAVs
- Implemented the algorithms in an indoor MoCap system.
- **Result:** Achieved realtime path planning & trajectory generation in 3D.

Centre for Mechatronics *Hochshule Bochum, Germany*
Research Intern, Prof. Markus Lemmen May 2018 - July 2018

- **Objective:** Control and stabilization of an inverted pendulum
- **Approach:** Worked on identification of system and unknown parameters and controlling the under-actuated system.
- **Results:** Stabilized the inverted pendulum using PID and LQR controllers

Projects

Visual Servo Control of Multilink Robot Arm
B.Tech Final Year Project Aug'2018-Apr'2019

- Tried Controlling the multiple links of the robot through a vision based feedback system as a camera attached to the tip of the end effector continuously tries to detect and track the object.
- Published a paper in *International Conference on Sustainable Computing in Science, Technology and Management (SUSCOM)*, Feb-2019

Control and Hardware implementation of quadcoptor
Product Development Project Aug'2017 - Nov'2017

- Worked Under the guidance of Prof. Asim Kumar Naskar of Elecrical department, NIT, Rourkela
- Studied dynamics of unmanned aerial vehicle and designed a simple and suitable controller for controlling its angle and position.

Power-train System Design for Formula Student Car
Member, Team Roadrunner

- Team Roadrunner of NIT Rourkela is a team of few dedicated and passionate engineering minds aiming to design and manufacture Formula Racing Cars from scratch which takes part in international level competitions.
- Was involved in **power-train system design** for the vehicle.
- Won the best design award for Formula Bharat 2017.

Skills

Languages: C, C++, Python, MatLab
Simulation Env.: ROS, Gazebo, Simulink, Solidworks
Utilities: LaTeX, Git, OpenCV

Positions of Responsibility

- **Mentor**, *Student Counselling Centre* :
  As a mentor i guide few students who really need the help to be acquainted with the college culture at the initial phase of college life.
- **Director**, *Pantomime(Dramatic Society) NIT Rourkela* :
  Directed, acted and helped in script writing for various stage-plays ans street-plays during my B.Tech life.
- **Member**, *Team Roadrunner* :
  Power-train system designer for formula student car.

Awards and Accolades

- **Best presentation award** in 9^{th} International Conference on Automation, Robotics and Applications **(ICARA 2023)** held at NYU, Abu Dhabi during 9-12 February 2023.
- **Academic excellence award** for perfect SGPA at IIT Kanpur during the academic session 2020-21 (spring).

Relevant Courses

Classical Control	Basics of Modern Control	Nonlinear Systems	Optimal Control and RL
Optimization Techniques for Engg.	Convex Optimization	Computer Networks	Digital Control
Data Structures & Algoithms	Multi-agent Systems	Robotics	Computer Vision