

Sayantani Bhattacharya

[Mail ID](#) | [Linkedin](#)

WORK EXPERIENCES

Addverb — Robotics Engineer (Full Time) Aug' 22 – Jun' 24

- Worked on **heuristic, graph-based, and linear programming** based solutions for **multi-agent path finding problems**.
- Developed an end-to-end module using **MIPL (mixed integer linear programming)** for obstacle avoidance and priority based **robot-task assignment** for MPV (Mobile picking vehicle) Fleet (C++) and integrated it with fleet stack.
- **Built the MPV Fleet simulation configurator** from scratch with the Product Management Team. (Python, PyQt, Networkiz library) — an internal tool for the Sales team, which **reduced the process time from 2 days to three hours**.
- Developed modules for velocity profiling, simulated the Warehouse Control System's pipeline, Topological feature extraction, Path-follower, Bezier curves, Motion Model, and Behaviour tree in AGV (Automated Guided Vehicle) fleet.
- Developed Proof of Concept for AGV velocity profiling using Deep Q-Learning. (Python, PyTorch)
- Refactored the codebase for enhanced performance and reduced computation time to solve the simulation lag issue for more than 50 robot fleet. Responsible for client demos for the fleet system and remote site support.

IIT Delhi & IIT Dhanbad — Robotics Research Internship July 21' – Apr'22

- Designed and simulated **closed-loop force control algorithms** for **serial robot manipulators** using Sim-Mechanics.
- Solved and designed an algorithm for **forward & inverse dynamics** of open and closed-chain robot manipulators using the **Euler-Lagrangian method** and ODE* solvers and cross-validated the kinematic plots using the ReDySim software.
- Designed a **Graphical User Interface** for dynamic simulation in App Designer for teaching and research purposes.

Uit-The Arctic University of Norway — Hardware Research Internship Jan 21' – July 21'

- Developed a **novel non-destructive method** to differentiate between structural damages up to 100 µm difference.
- Designed multiple **filters for Image processing** for damage detection of diseased biological samples. Visualized the acoustic microscopy data in LABVIEW and MATLAB. Developed a GUI by establishing a TCP connection between both.
- Worked on multiple **Denoising techniques** like **Fourier and Wavelet Transform** on the time-series received signal data.

PUBLICATIONS

1. Conflict-Free Node-to-Robot Scheduling for Lifelong Operation in a Warehouse with Narrow-Corridor Environment.
Published in IEEE Conference on **Decision and Control (CDC) 2023** - [Link](#) **Affiliation:** Addverb **Second author**
2. *Multiple damage detection using point contact excitation and detection method using signal processing techniques*
Published in **MDPI sensors**. - [Journal Link](#) **Affiliation:** Arctic University **First author**
3. *Presented in Symposium of Ultrasonic Electric Japan* - [Proceeding Link](#) **First author**

EDUCATION

| Degree | Institute | Year |
|-------------------------------|---|-----------|
| Master of Science in Robotics | Northwestern University | 2024-2025 |
| Bachelor of Technology | Indian Institute of Technology, ISM Dhanbad | 2018-2022 |

SKILLS

- **Software:** MATLAB, Simulink, Coppelia-Sim (V-Rep), AutoCAD, LABVIEW, Inventor, Unity ML Agents.
- **Core:** Path planning, Dynamics, Motion Planning and Control, Machine learning, Reinforcement learning, Graph-theory.
- **Technical:** ROS2, C++, C, Python, Concurrency, Debugger, Linux, Github, Gitlab, rabbitmq, MongoDB, Docker.
- **Libraries:** PyQt, PyTorch, Sympy, numpy, matplotlib, Modern robotics, LP solver.

NANO-DEGREES

- C++ Developer Nanodegree [Certificate](#)
- Deep Reinforcement Learning Nanodegree [Certificate](#)

HACKATHONS & PROJECTS

- Multi-Agent Reinforcement Learning in Table-Tennis**
- Implemented multi-agent Deep Deterministic Policy Gradient method to train two rackets & ball in Unity's environment.
- Automatic Sniper** -Finalist in Samsung Innovation Challenge (IIT Dhanbad)
- Built an autonomous target shooting gun, to replace shooter and sniper roles, to ensure safety of highly trained officers.