

Sayantani Bhattacharya

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WORK EXPERIENCES

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

- Formulated **heuristic, graph-based & linear programming based** solutions for **multi-agent path-finding problems**.
- Developed the Behaviour tree, Task-Scheduler, Assignment and hardware client's TCP interface module of AMR fleet.
- 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++).
- **Built the MPV Fleet simulation configurator**, an internal tool for the Sales team, from scratch with the Product Team (Python, PyQt, Networkiz library) that **reduced the throughput calculation 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.
- Devised a Proof of Concept for AGV velocity profiling using Deep Q-Learning. (Python, PyTorch)
- Refactored codebase for reduced computation time to solve simulation lag issues for processing 50+ robots in fleet.
- Responsible for client demos for fleet system and remote site support.

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

- Designed **closed-loop force control algorithms** for serial and parallel **robot manipulators** using Sim-Mechanics.
- Implemented **forward & inverse dynamics** of robot manipulators using **Euler-Lagrangian equations** and designed Graphical User Interface for **dynamics simulations** in MATLAB App Designer for teaching and research purposes.

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

- Implemented and experimented with **Fourier and Wavelet Transform** for **Denoising time-series** received signal data.
- Devised a **novel** method to differentiate structural damages up to 100 µm difference. (Labview, MATLAB, Python)
- Implemented multiple **filters for image processing** for damage detection of diseased biological samples.

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**
Multiple damage detection using point contact excitation and detection method using signal processing techniques.
2. *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

- **Robotics Core:** Path planning, Dynamics, ML, DL, DRL, Optimisation, graph-theory, Motion Planning & Control, SLAM.
- **Programming:** C++, C, Python, Concurrency, Debugger, ROS2, TDD, Linux, Github, Gitlab, Docker, rabbitmq, MongoDB.
- **Libraries:** PyQt, PyTorch, Sympy, numpy, matplotlib, Modern robotics, LP solver, SLAM-Nav ROS pkgs.
- **Software Tools:** MATLAB, Simulink, Coppelia-Sim (V-Rep), AutoCAD, LABVIEW, Inventor, Unity Gym Env.

NANO-DEGREES

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

PROJECTS

- Multi-Hetro-Agent Exploration on Unitree GOs** (SLAM, ROS2, C++) - Ongoing
- A Fleet of Unitree (GO1 and GO2) capable of decentralised heterogeneous collaborative exploration in outdoor premises.
- Multi-Agent Reinforcement Learning in Table-Tennis** (Deep RL, Unity Gym, PyTorch)
- Formulated Deep-Deterministic-Policy-Gradient model to collaborate for max game time, while competing to win.