Sayantani Bhattacharya

Portfolio | Github | Mail ID | Linkedin

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 assignmen**t 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.