

Sayantani Bhattacharya

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EDUCATION

Northwestern University	Master of Science in Robotics	2024-2025
Indian Institute of Technology (IIT) Dhanbad	Bachelor of Technology in ME	2018-2022

SKILLS

- **Robotics:** ROS 2, SLAM, Perception, DSP, Navigation, Manipulation, Motion Planning & Control, Path planning, Optimization.
- **Machine Learning:** PyTorch, Supervised, Unsupervised, Neural-Networks, Transformers, Reinforcement Learning.
- **Programming:** C++, C, Python, Graph Theory, Concurrency, gdb, TDD, Linux, Git, CMake, Behavior tree, Docker, CI/CD.
- **Libraries:** sympy, OpenCV, ROS-MCP, Nav2, RTABMap, g2o, MoveIt, Slam-Toolbox, LP solver, Unitree GOs & Camera SDKs.
- **Software Tools:** Weights & Biases, Isaac Sim, Unity Gym, Coppelias-Sim (V-Rep), AMPL, MATLAB, LABVIEW, MongoDB.

WORK EXPERIENCE

Laki Robotics — Founding Robotics Engineer | San Francisco, CA, USA Aug' 25 - Present

- Building the core robotics stack for MVP multi-robot mapping & collective intelligence system for field deployment.
- Architected a modular, hardware-agnostic platform, enabling integration of quadrupeds, UGVs, drones & sensor stacks.
- Designed real-time state estimation & fault detection pipeline fusing multiple sensor sources for reliable autonomy.
- Established CI pipelines, polyglot build systems & cross-layer communication for ROS2, C++, Python & network middleware.

SeNSE Lab — Graduate Robotics Researcher | Evanston, IL, USA Apr' 25 - Dec' 25

- Developed Bio-Inspired perception & control system for Underwater ROV using whisker sensing and ArduSub on Pixhawk.
- Implemented 6D pose tracking of whisker ends and joystick teleop of ROV over MavLINK using BlueOS Interface and ROS 2.
- Analysed & iteratively refined raw sensor data to obtain robust high-fidelity inputs for perception modelling.
- Developed a novel autonomous decision model to detect underwater motion with seal inspired whisker sensing alone.

Addverb — Robotics Engineer | Delhi, India Aug' 22 - Jun' 24

- Developed Behavior tree, Task-Scheduler, Assignment and TCP interface of warehouse material handling robot fleet in C++.
- Formulated heuristic, graph-based & linear programming based solutions for multi-agent path-finding problems of AMRs.
- Built modules for physics emulator of real fleet system i.e. Robot Motion, State Machine & WCS with C++ and lp solver.
- Published in IEEE Conference on Decision and Control (CDC) 2023 for Lifelong Conflict Free Node to Robot Scheduling.
- Led client demos, remote site support & throughput optimization for fleets of up to 160 AGVs /AMRs.

PROJECTS

Collaborative Exploration and Mapping by Quadruped Fleet (Visual SLAM, LIDAR SLAM, Navigation, ROS 2, C++, Unitree Go1 & Go2)

- Developed SLAM pipeline using ZED SDK & Visual-Inertial data for Unitree Go1 and RTABMap & LiDAR data for Go2.
- Developed Autonomous Navigation ROS packages using frontier exploration and high level control for Go2 SDK.
- Applied deskewing, voxel filtering, and point cloud clustering techniques to improve occupancy grid accuracy.

Franka Arm playing Mini Golf (ROS 2, Motion Planning, MoveIt, Computer Vision, Python)

- Implemented Cartesian path planning trajectories for Franka using MoveGroup API to strike a golf ball towards the hole.
- Developed ROS 2 node to synchronize ball & target detection from vision pipeline with real-time trajectory generation.

Feedback Control of KUKA Omnidirectional Mobile Manipulator (V-REP, Motion Planning & Control)

- Generated trajectory for a 5-DOF KUKA robot arm to perform pick-and-place tasks in CoppeliaSim.
- Simulated kinematics of the omnidirectional robot with odometry equations to determine its next configuration.
- Implemented and tuned a feed forward PI controller to minimize error between the current and desired robot states.

Multi-Agent Reinforcement Learning in Table-Tennis (MARL, Unity Gym, PyTorch)

- Designed multi-agent DDPG that learns emergent cooperative behaviors for extended rallies, while competing to win.
- Trained actor-critic system from scratch for decentralized decision making in dynamic continuous-action environment.

Pen Grasping Robot (OpenCV, Computer Vision, Manipulation, PyTorch, Camera-Calibration, Python)

- Programmed PincherX100 Arm to detect, calibrate, manipulate and grasp a pen using a RealSense depth camera.

F1 Ghost Riding using Visual Pose Graph Estimation from Scratch (C++, Computer Vision, SLAM, ROS2, Concurrency, OpenCV, g2o)

- Extracting RGBD features via ORB and SIFT techniques, and estimating relative pose using feature matching with OpenCV.
- Implemented PnP RANSAC based stereo motion estimation to construct pose-graph and g2o library to optimize it.