ASHISH SUKUMAR

+1 (508) 502-8692   asukumar1@wpi.edu

github.com/Yami1106   Portfolio: yamiportfolio.netlify.app

PROFESSIONAL SUMMARY

Robotics Engineer specializing in motion planning, task and motion planning (TAMP), and kinodynamic control. Experienced in C++ and Python development for high-DOF robotic systems, sampling-based planning, and SLAM-based navigation architectures.

TECHNICAL SKILLS

Planning: RRT, RRT*, PRM, PRM*, RRTConnect, AO-RRT, EST, KPIECE1, SST
Robotics: ROS2, OMPL, PDDL, Pyperplan, SLAM, Gmapping
Control: Kinodynamic Planning, Dynamic Systems Modeling
Programming: C++, Python
Simulation: Gazebo, Genesis
Systems: Linux, Git

EDUCATION

M.S. Robotics Engineering   2025–Present
Worcester Polytechnic Institute   GPA: 4.00/4.00
    B.Tech Computer Science and Engineering   2021–2025
SRM Institute of Science and Technology   CGPA: 9.54/10

PROJECTS

Task and Motion Planning Framework (7-DOF Manipulator)
- Built full TAMP pipeline: PDDL symbolic planning $\rightarrow$ OMPL motion planning $\rightarrow$ Genesis simulation
- Implemented predicate extraction (ON, CLEAR, HOLDING, HANDEMPTY) with closed-loop re-planning
- Achieved 100% task completion across structured tower-building scenarios
- Developed collision-free motion primitives with attached-object handling

    High-Dimensional Sampling-Based Planning
- Implemented PRM, PRM*, and RRTConnect in 7-DOF configuration space $^2\times S^1\times S$
- Designed custom self-collision checker for articulated chain robot
- Solved narrow-passage planning in 20 seconds using optimized RRTConnect parameters
- Benchmarked Uniform, Gaussian, Obstacle-Based, and Bridge sampling strategies

    Kinodynamic Planning (Control-Constrained Systems)
- Implemented AO-RRT for 4D car system with dynamic constraints
- Compared KPIECE1, SST, EST on pendulum and car models
- Analyzed trade-offs between convergence speed and path optimality

    Custom RTP Planner (C++)
- Implemented Rapidly-exploring Tree Planner from scratch
- Designed collision detection for point and square robots with rotation
- Evaluated on 10-link and 20-link manipulators (233 states for 20-link system)

EXPERIENCE

Junior Project Technical Assistant – e-Yantra IIT Bombay   2024–2025
- Developed robotics simulations and embedded control modules
- Conducted workshops on motion planning and embedded robotics