Gourishankar Mahadeo Bansode

Tempe, AZ | +1-602-491-8770 | gourishankar@asu.edu | linkedin.com/in/gourishankarb | github.com/gourishankar27 | gshankar.me

Summary

Robotics-focused Software engineer with 2+ years of production C++ and Python experience building telemetry, diagnostics, and automation for mission-critical systems. Built ROS 2 navigation, sensor integration, and motor-control software for a physical Mecanum robot. Developed a spacecraft attitude estimator and integrated RGB-D perception with MoveIt 2 motion planning for robotic manipulation in simulation.

Technical Skills

Software: C++ (STL, RAII, threads), Python, NumPy, Linux, Bash, Git, CMake, colcon, Docker, GDB, CI/CD
Robotics: ROS 2 Jazzy, TF2, DDS,QoS, rosbag, MoveIt 2, OMPL, `ros2_control`, FK/IK, Jacobians, PID
Perception & Estimation: OpenCV, RGB-D, PCL, Open3D, LiDAR, IMU, Sensor Fusion, EKF
Simulation & ML: Gazebo Harmonic, Simulink, Isaac Sim, NVIDIA Warp, PyTorch, CUDA, TensorRT, Robot Learning
AI: ML Deployment in Robotic Systems, VLM, VLA, LLMs, Computer Vision, RAG for Robots, Reinforcement Learning

Experience

Research Assistant Jan. 2026 - Present
Arizona State University - Prof. Suren Jayasuriya, NASA project with Alphacore Inc. *Tempe, AZ*

- Built a spacecraft attitude estimator using speed- and brightness-aware star-centroid correction and weighted Wahba optimization. Validated it on 8.7M+ events across 372 experimental batches.
- Designed reproducible estimation experiments and documented NASA Phase I findings and Phase II experiment plans.

Software Engineer Dec. 2021 - June 2024
Tata Advanced Systems Limited *Mumbai, India*

- Led a 6-engineer team building C/C++ and Python backend services, data pipelines, APIs, and control-plane components for Integrated Electronic Warfare Systems.
- Designed a reusable Health Monitor SDK that standardized telemetry and fault diagnostics across multiple naval programs.
- Cut manual intervention by 75% in mission-critical workflows using deterministic control logic, Python automation, and log-driven validation.
- Improved Ballistic Logix data-processing efficiency by 60% by optimizing data cataloging, integrity checks, and analytics.

Selected Projects

Adaptive Robotic Manipulation via Differentiable Physics | C++17, Python, ROS 2, MoveIt 2, NVIDIA Warp

- Built an RGB-D perception and state-estimation pipeline with 3D point clouds and TF2, reaching at most 6 mm object-position RMSE across 120 held-out simulation scenarios spanning three object geometries.
- Used NVIDIA Warp for differentiable dynamics and system identification, cutting 100 ms trajectory prediction RMSE by 74.7% (0.456 to 0.115 mm) versus fixed-parameter physics.
- Combined MoveIt 2, OMPL, and `ros2_control` for closed-loop adaptive manipulation. Reached at least 90% goal success across 135 matched simulation trials with 15% lower target error than a tuned non-adaptive controller.
- Ran 600+ regression tests and 400+ independent simulation conditions covering sensor dropouts, controller failures, timing faults, collision monitoring, and recovery.

Mission-X CityCar - ROS 2 Autonomous Mobile Robot | Python, Gazebo Harmonic, Raspberry Pi, React

- Built a ROS 2 stack for a physical Raspberry Pi Mecanum robot and Gazebo simulation, implementing four-wheel inverse kinematics, velocity-command arbitration, and GPIO/PWM motor control.
- Implemented graph-based navigation using odometry and TF, with waypoint tracking, corner-speed control, stuck detection, recovery, and automatic replanning.
- Integrated camera, LiDAR, IMU, GPS, and ultrasonic interfaces. Added obstacle-aware speed limiting, emergency stop, and heartbeat monitoring, plus a React dashboard for teleoperation, mission planning, and live telemetry.

Autonomous Drone Navigation System | MATLAB/Simulink, C++, Python

- Evaluated EKF estimates against ground truth in a MATLAB/Simulink UAV model with camera, IMU, and LiDAR. Developed obstacle-aware 3D planning and trajectory tracking. Added rosbag replay and TF2 diagnostics.

Education

M.S. Robotics and Autonomous Systems (AI) - Arizona State University, GPA 3.84/4 Aug. 2024 - May 2026
B.Tech. Computer Science, Intelligent Systems - MIT-ADT University, Pune, GPA 7.96/10 Aug. 2017 - July 2021

Achievements

Smart India Hackathon Winner (MHRD, Government of India) | **National Innovation Contest Finalist** 2019 - 2021