Gautham Sam

Hyderabad, India | +91 80882 29827 | gauthammsam57@gmail.com
linkedin.com/in/gautham-sam | github.com/gauthammsam57

PROFESSIONAL SUMMARY

I work on the software that makes robots useful: mobile robots, arms, the arm of a humanoid, and the devices and platforms around them. I trained as a mechanical engineer and have spent six years in robotics, first on care robots at Invento Robotics, now at Neural Foundry, where I was the first robotics engineer and work with a team of six.

AT A GLANCE

Years in robotics: 6 (since 2020) **Robot types:** Mobile robots, collaborative arms, humanoid arm, lab devices
Current team: 6 engineers **Pull requests:** 212 written, 345 reviewed for teammates
Main stack: ROS 2, Python, C++, embedded C

WHAT I WORK ON

Robotics architecture – Choosing robot platforms, system architecture, joining hardware and software, reusable platforms, several robots at once
Technical direction – Engineering standards, architecture and code reviews, technical specifications, mentoring, hiring, release practice
Automation – Lab automation, device orchestration, automation languages, workflow execution, recovery and fault handling
Systems – Embedded systems, ROS 2, distributed systems, simulation, teleoperation, cloud infrastructure, deployment

PROFESSIONAL EXPERIENCE

Neural Foundry **June 2024 – present**
Robotics Lead (joined as Senior Robotics Engineer) Hyderabad, India

- First robotics engineer at the company. The team is now six; I have been part of hiring each person, and built our take-home test, with its own simulator and scoring.
- First engineer on ALEX (Automated Lab Executor), a ROS 2 system that runs lab tasks with a collaborative robot arm. 482 commits to it in its first nine months; first stable release closed in early 2026.
- ALEX now has two generations of its automation language, workflow execution, device actions, telemetry, cancel, pause and resume, and it can pick a long lab protocol back up after a failure.
- With the team, brought around ten lab devices under robot control in a client's lab: syringe pumps, gravimetric liquid and solid dispensers, balances, a pipette station, a homogenizer, a sonicator. Each follows the same path from bare hardware to a scriptable action: firmware, control node, software abstraction, device management, workflow.
- Designed the ROS 2 client and the embedded client that connect robots and devices to URP, the company's robotics platform: a config-driven command server for arms, mobile robots and cameras; a telemetry and command registry; device logs as telemetry; authenticated MQTT over TLS. A new robot is brought on by configuration, not by a build of its own.
- Found the same control server written three times, for arms, mobile robots and audio-video, and merged them into one shared base without changing what they do.
- Designed a hardware abstraction for the embedded code, so the same application logic runs on a workstation simulator, an Arduino and an ESP32, and firmware can be tested without the hardware.
- Made it possible to run several robots at once: each robot's stack is isolated and has a virtual mode, so many can work against one platform and one simulation.
- Built safe-path planning for the arm (a multi-layer graph of safety points, searched with Dijkstra's algorithm) and fault recovery (runtime errors, reconnection, resuming a task partway).
- Designed the peer-to-peer link for RAVEN, the company's VR teleoperation of a robot arm. Tested Europe to India over a home connection at about 100 ms.
- Moved robot camera streaming from a custom WebRTC client to WHIP with a media server, so one published stream serves every viewer; added stereo camera support.
- Ran the move of the whole system to ROS 2 Jazzy: build environment, robot application, Doosan driver, development environment and automation language, across more than 200 files.
- Look after the project building the system's simulated twin in Isaac Sim, and have reviewed 65 of its pull requests.
- Plan two-week sprints, review code, write architecture documents, run releases from development to production.
- Support client work: site visits, robot selection (arms, SCARA, mobile robots from several vendors), audit responses, proposals.

Invento Robotics (Mitra Robot) **January 2023 – May 2024**
Senior Software Engineer Bangalore, India

- Built joystick teleoperation for the robot fleet over ROS Bridge, with vibration feedback when the robot nears an obstacle.
- Built a Python WebSocket server and client for robot-to-portal communication, tested to over 1,000 concurrent connections.
- Worked with the chief architect on the image and video pipelines for Mitra AI (FastAPI, Celery with Redis, Milvus vector search).
- Mapped and deployed robots at customer sites, including mapping one site remotely from another country.

- In the care portal, did most of the work on the live map after the founder started it: robot position and lidar on a canvas, sending navigation points, a path layer, saved patrols.
- Wrote the first version of a React Native interface app for the robot: speech, camera, video and option screens driven by defined flows.
- Set up a relay server so robots on site networks could be reached remotely, and a logging service (FastAPI, Elasticsearch).
- With the team, built a person-following and gesture-response behaviour, and a personalised daily flow of news, music and exercise for seniors.
- Built recording and cleaning tools for BodyLangRec, a public gesture dataset (35 gestures, 39 participants, 22 of them over 70).
- Moved server infrastructure from Google Cloud to AWS with no downtime.
- Built bots for a machine learning course: question answering, quizzes, onboarding.

Invento Robotics (Mitra Robot) **October 2020 – December 2022**
Software Engineer Bangalore, India

- With the team, rebuilt an inherited ROS 1 navigation stack and migrated it to ROS 2 and Nav2. Wrote path-tracking controllers (pure pursuit, Stanley). The robot later ran 1,000 km autonomously without an incident, as the company announced.
- Wrote autonomous docking using ArUco markers; trained teammates and customers on it.
- Added a fleet patrol feature.
- Worked on the takeover page of the fleet web app: driving by gamepad and keyboard, chat, robot controls.
- Prototyped the control system for a humanoid arm and hands: Arduino motor control, I2C, power measurement.
- Worked on the robot's iOS app in Swift: the socket link to the fleet, Wi-Fi setup over Bluetooth, text-to-speech voices with caching, VoIP calling.
- Built tools for preparing the robot's conversation content.

Invento Robotics (Mitra Robot) **August – September 2020**
Software Engineer Intern Bangalore, India

- Robot URDF model and Gazebo simulation; test procedures for the navigation stack; first draft of the technical manual.

Earlier internships

- Spatez Technology, Thrissur · December 2019 – January 2020
- Innovians Technologies, Noida · June – August 2019

TECHNICAL SKILLS

Languages: Python, C++, embedded C, Bash, JavaScript, Swift
Robotics: ROS 2 (Humble, Jazzy), Nav2, MoveIt 2, rosbridge, URDF
Simulation: Isaac Sim, Gazebo
Robots and hardware: Doosan collaborative arms, mobile robot bases, ZED and RealSense cameras, ESP32, Arduino
Device protocols: RS485, RS232, Modbus, UART, I2C, TCP/IP, RTSP
Messaging and streaming: MQTT, WebSocket, WebRTC, WHIP
Backend and cloud: FastAPI, Celery, Redis, Elasticsearch, Docker, AWS, Google Cloud
AI and vision: OpenCV, tools built on language models, vector search (Milvus)
Team practice: Sprint planning, code review, architecture documents, hiring

OPEN SOURCE

MoveIt 2: fix to the simulated Panda servo configuration (merged, 2025).
Doosan `doosan-robot2`: variable fix (merged, 2026).

PUBLICATIONS AND DATA

"Low Cost FGC Electric Wheelchair", RSP Science Hub: a gesture-controlled wheelchair built at college.
BodyLangRec: A Gesture Dataset (Kaggle), contributor.

COURSES AND PRIZES

NPTEL Robotics, Elite Silver: kinematics, dynamics, motion and trajectory planning.
Paper presentations: first prize at CSI College of Engineering, second prize at Vellalar College of Engineering.

COMMUNITY

ROSCon India 2025, Pune.

EDUCATION

B.E. Mechanical Engineering, CSI College of Engineering (Anna University), 2016 – 2020. CGPA 6.7 / 10.