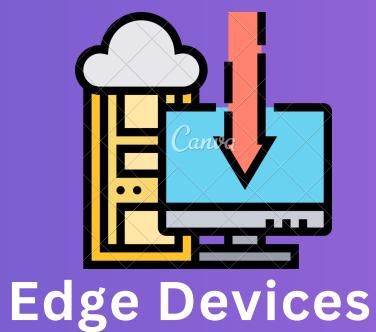
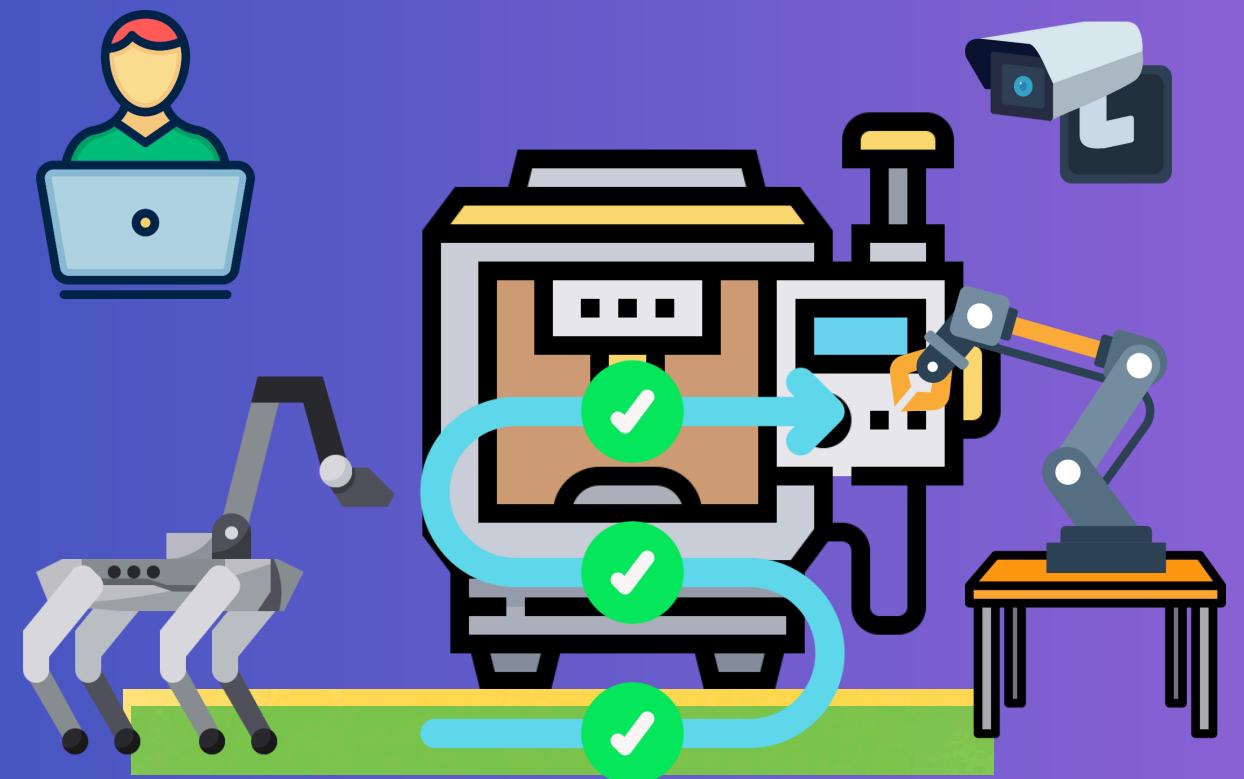
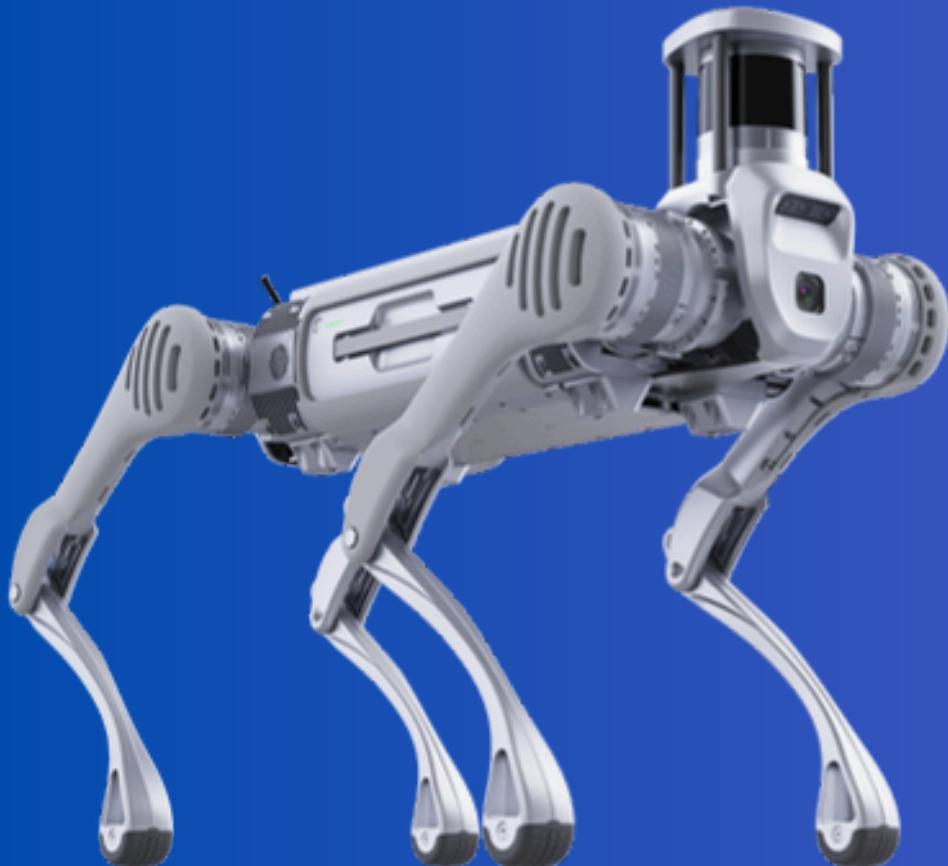
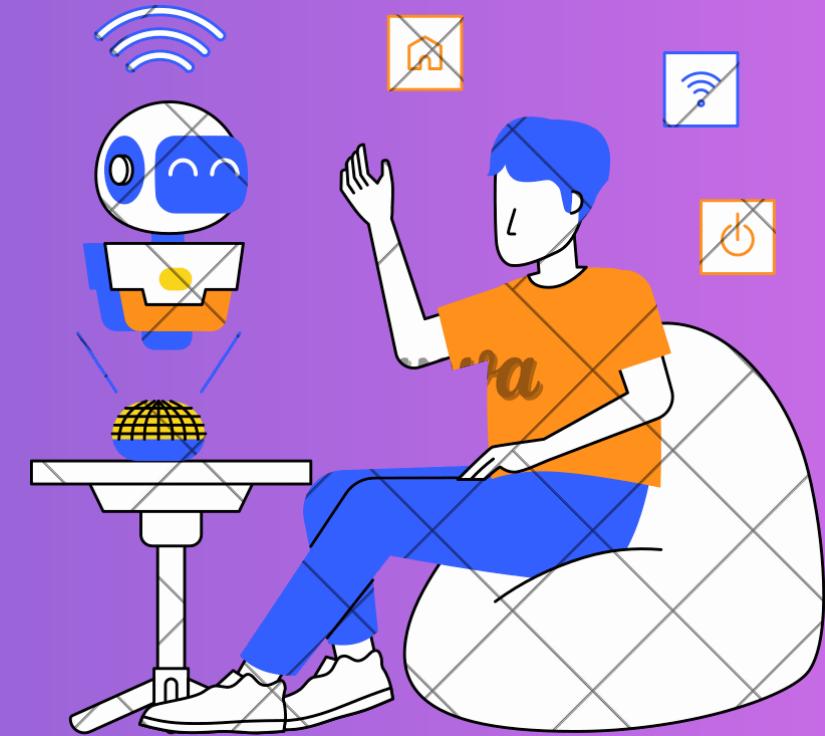


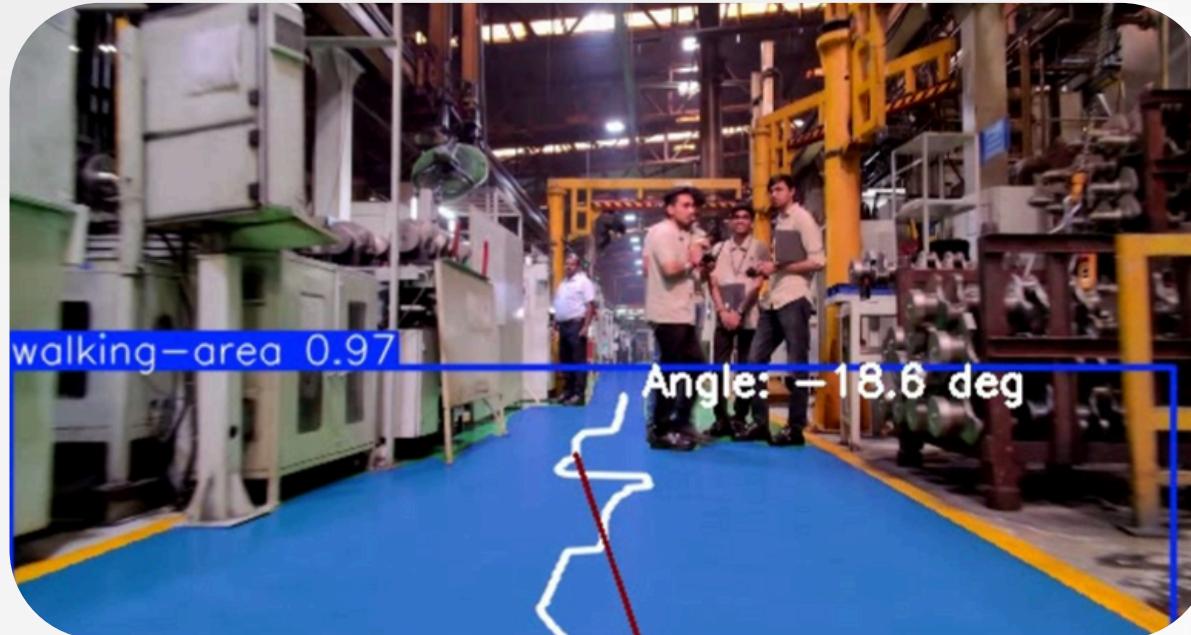
# REAL-TIME AUTONOMOUS NAVIGATION AND INTEROPERABLE CONTROL SYSTEMS FOR FACTORY-DEPLOYED LEGGED AND WHEELED ROBOTS



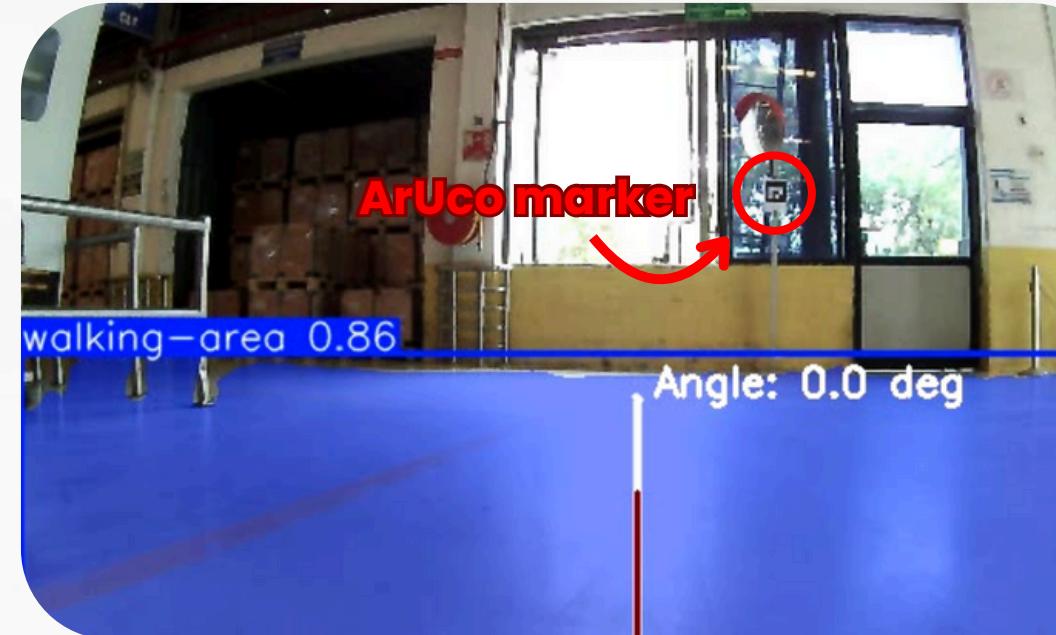
AI Vision



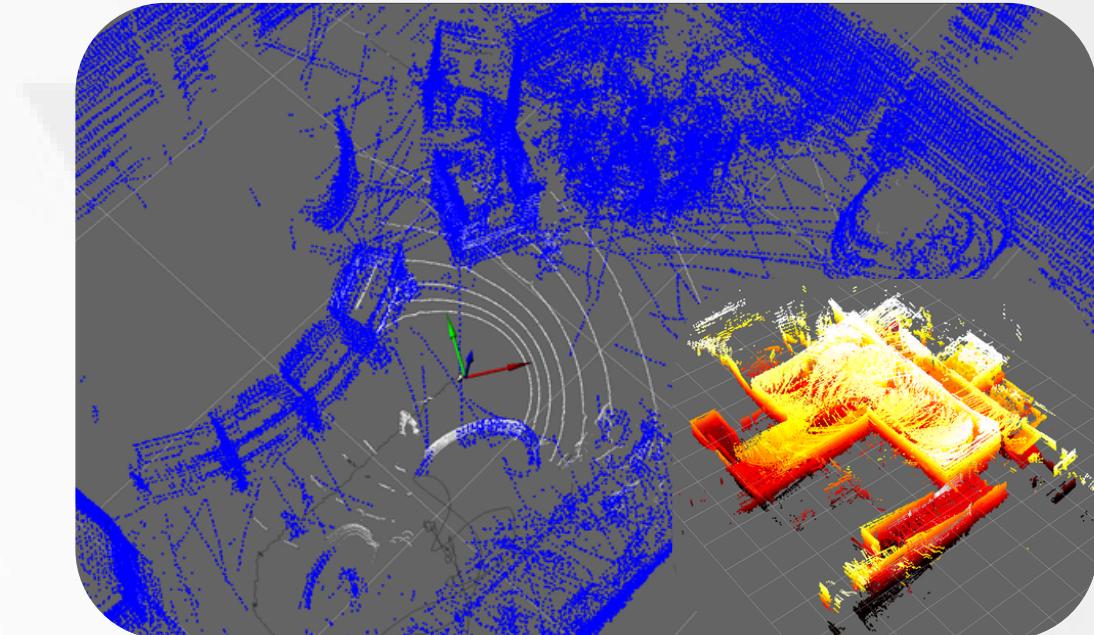
# ROBOT AS SUPERVISOR – INDOOR/OUTDOOR FACTORY ENVIRONMENT AUTONOMOUS MAPPING, LOCALIZATION & NAVIGATION



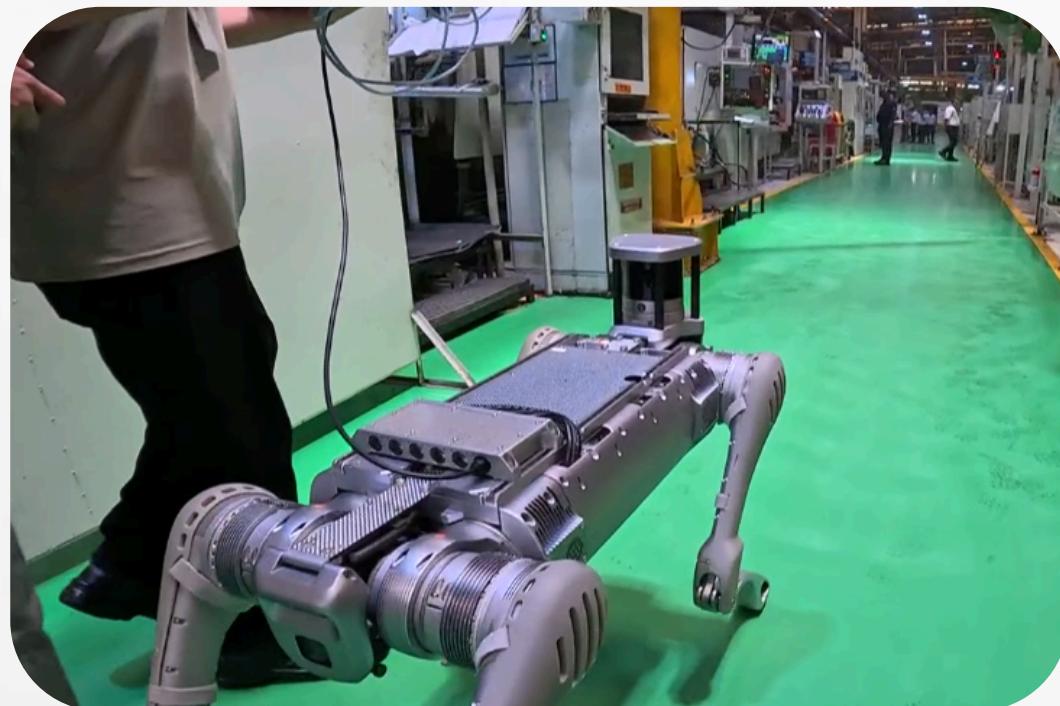
**Fig. 1.** Angle Calculation on Segmented Walking Path



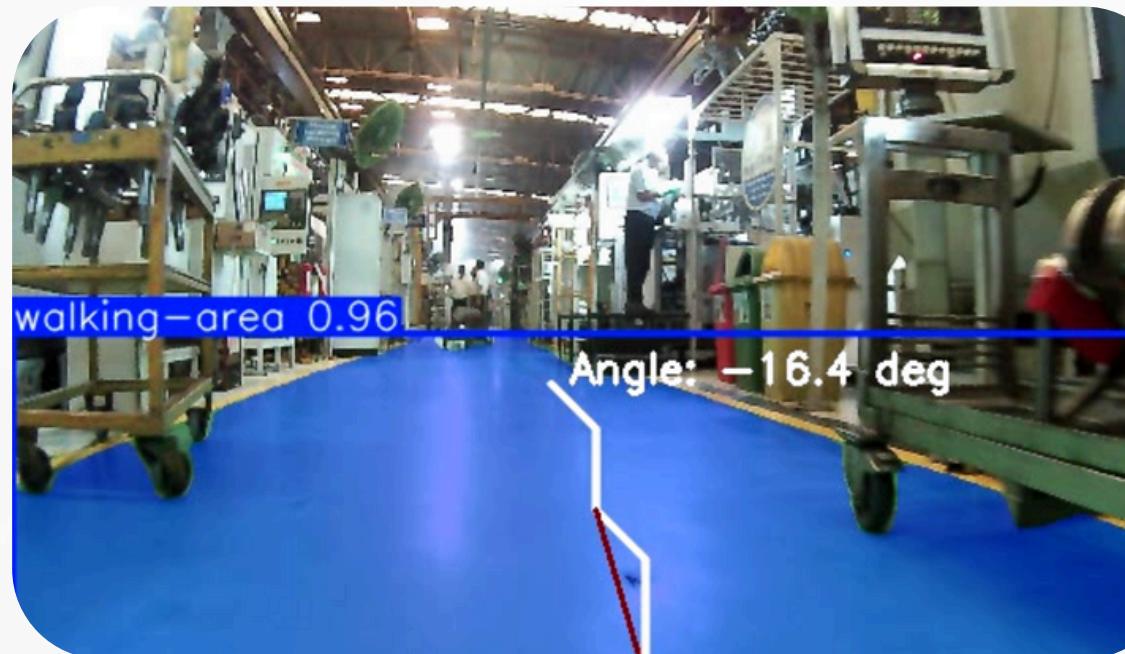
**Fig. 3.** ArUco Marker  
3D Pose Estimation for navigation



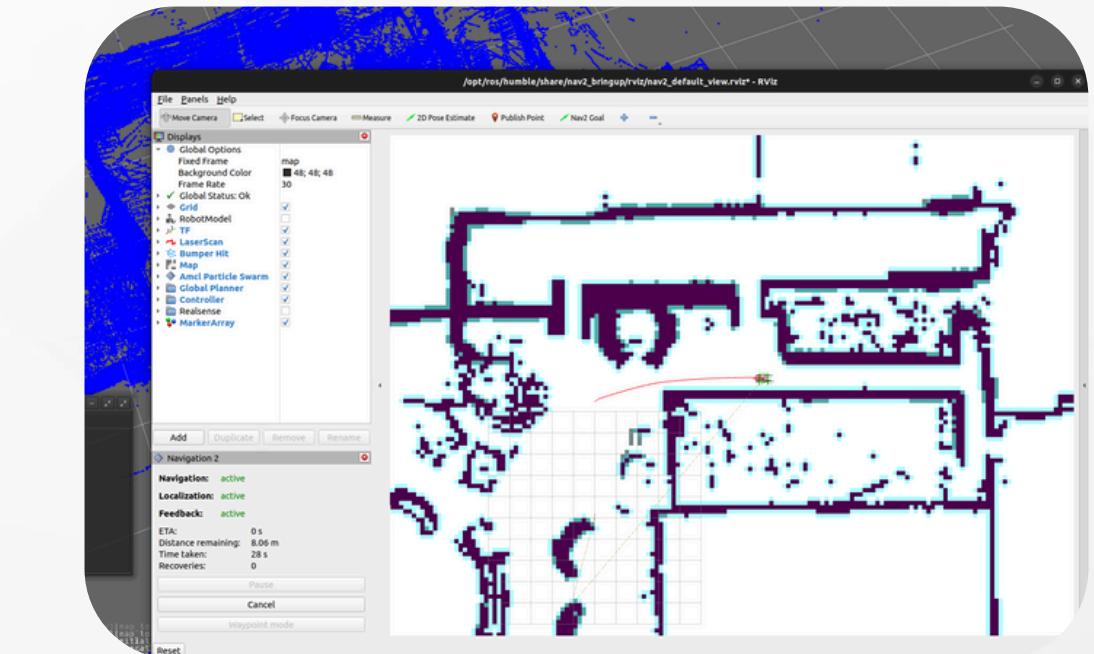
**Fig. 5.** 3D Mapping and Localization using  
LiDAR Inertial Odometry



**Fig. 2.** Testing with Unitree B2 on Factory Shop Floor



**Fig. 4.** Variable inflation based on depth infused  
with obstacle avoidance navigation

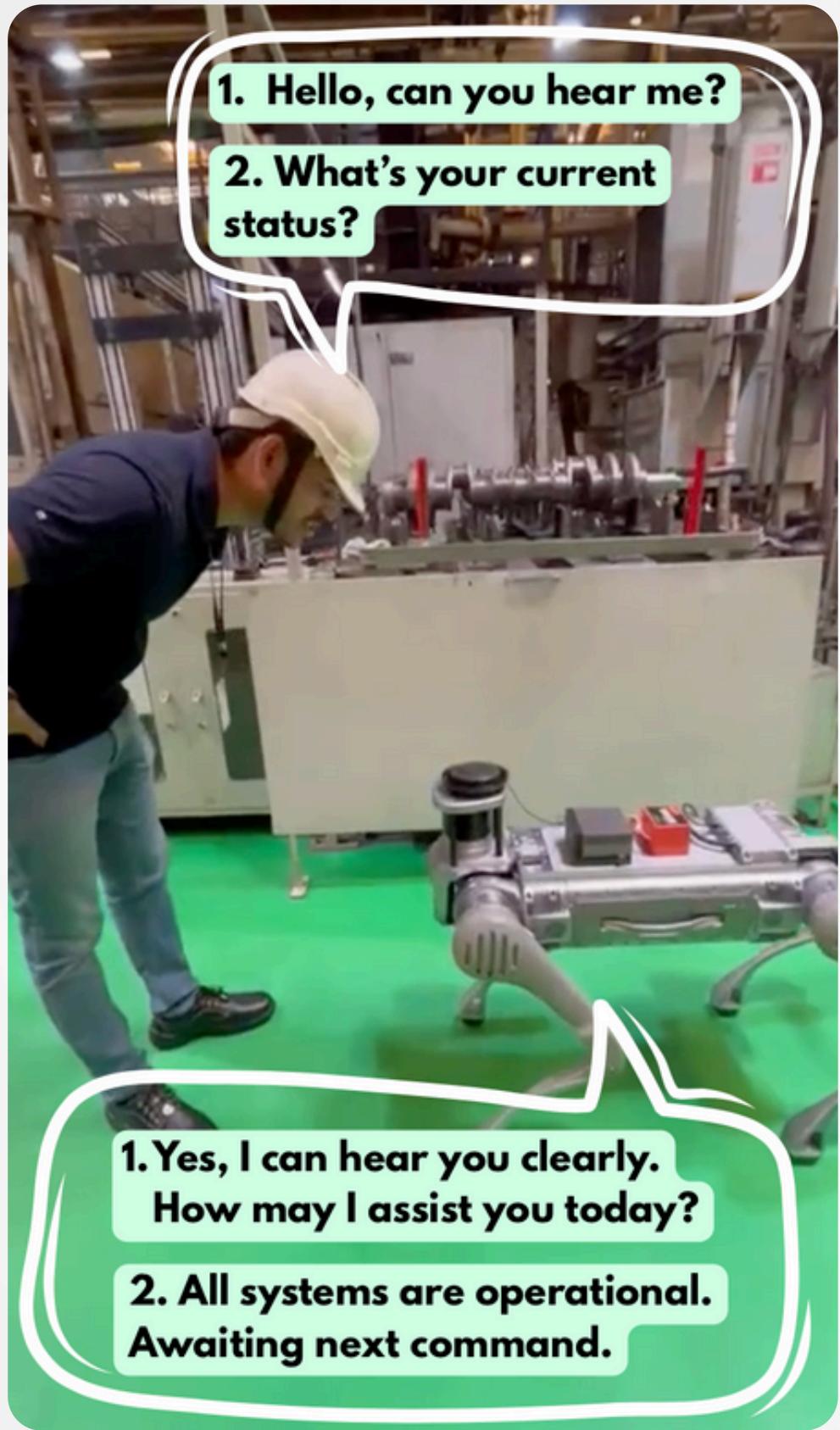


**Fig. 6.** Nav2 integration with 3D localization for  
global/local planner usage in navigation



# ROBOT AS SUPERVISOR - INDOOR/OUTDOOR FACTORY ENVIRONMENT

## ROBOT FLEET MANAGEMENT SOFTWARE AND COMMUNICATION



QuadLink | Kalyani - Chromium  
localhost:3000/scheduler

Available Tasks

- Stand Up
- Stretch
- HelloStreet
- Visualize
- Start Object Detection
- Stop Object Detection
- Speak
- Nav2 Home
- Nav2 Board
- Nav2 Robotic Arm

Notepad++  
Short Mission

Mission Scheduler

- Stand Up
- Nav2 Board
- Visualize
- Nav2 Home

Select Timer: 1 second  
Select Message: I am at stand by

Dev Mode

Robot Fleet Management Software | KSMS Technologies Solution Pvt. Ltd. | ektssquad00778

Robot Control Centre

Select the vehicle you want to control from this control centre. Get live information from the robot here.

B2 Industrial - 70B0-CE12-1WD2-54RR

Device Information

Robot Name:	B2	Robot Type:	Quadruped	Robot Model:	B2 Industrial	Manufacturer:	Unitee
Vehicle Unique ID:	ektsquad00778	Serial Number:	70B0-CE12-1WD2-54RR	Firmware Version:	V 1.1.1	Software Version:	OSDK V 0.0.1
Status:	Online	Stake Holder:	Sreeram A	Assigned Team:	Robotics	Registered At:	2025/04/24

Indicators

Robot Online	Online	MQTT Connection	Connected	Internal Vision Status	Live	External Vision Status	Live
Robot Online	Online	MQTT Connection	Connected	Internal Vision Status	Live	External Vision Status	Live

Controller Pad

Linear Speed: 0.00 m/s 0.00 m/s 0.00 m/s  
Angular Speed: 0.00 rad/s 0.00 rad/s 0.00 rad/s

Vision Navigation

Navigation States & Indicators
Navigation State: Initial Navigation Mode: IDLE Vision Interrupt State: Halt ArUco Vision Info: None Process ArUco ID: None Distance to Target: None Lateral Offset: None Detected ArUco IDs: [17]

Inertial Measurement Info

Orientation
Roll: 0.00° Pitch: 0.00° Yaw: 99.05°

Angular Velocity

Dir X:	0.01 rad/sec
Dir Y:	0.00 rad/sec
Dir Z:	0.00 rad/sec

Linear Acceleration

Dir X:	0.03 m/s²
Dir Y:	0.09 m/s²
Dir Z:	9.81 m/s²

Command Panel

Navigation Command Center

- Start Mission
- Pause Mission
- Resume Mission
- Cancel Mission
- Load CL1 Mission
- Load CL2 Mission
- Load CL1/CL2 Patrolling Mission

