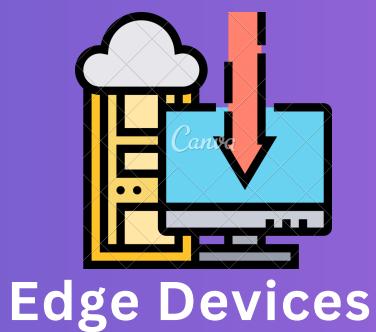
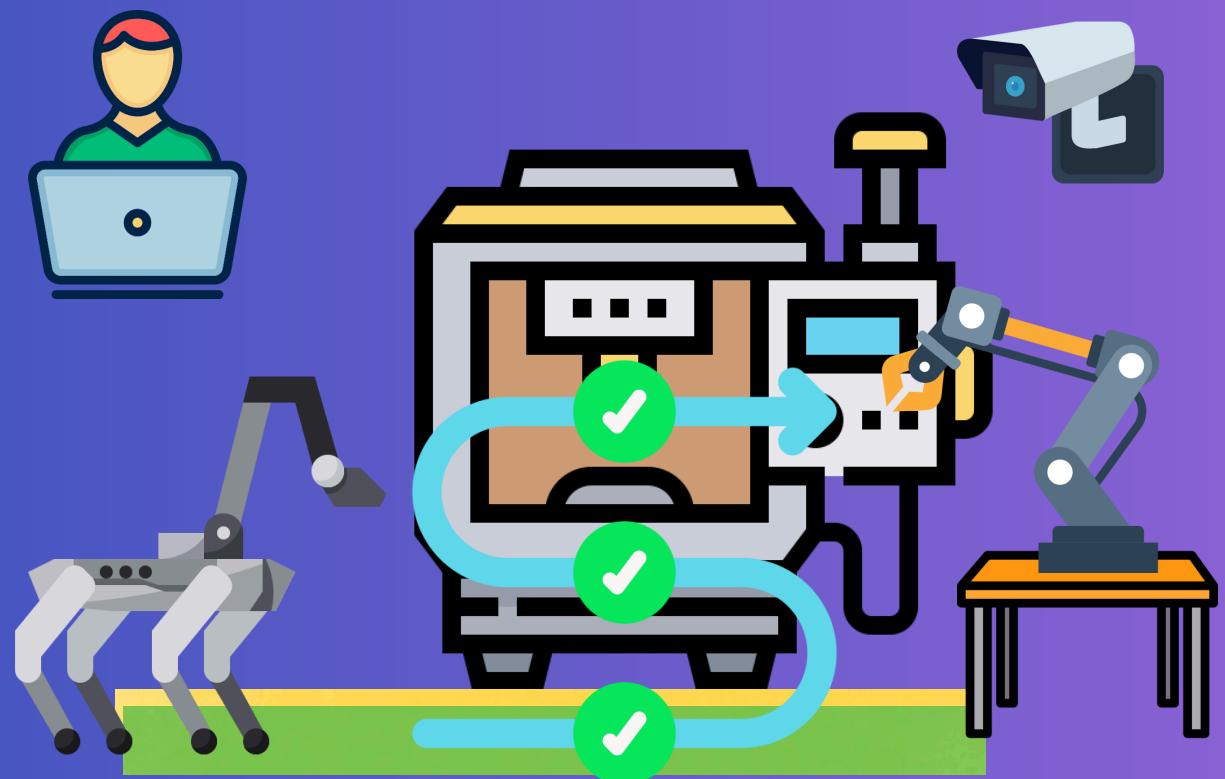


REAL-TIME AUTONOMOUS NAVIGATION AND INTEROPERABLE CONTROL SYSTEMS FOR FACTORY-DEPLOYED LEGGED AND WHEELED ROBOTS



AI Vision



ROBOT AS SUPERVISOR – INDOOR/OUTDOOR FACTORY ENVIRONMENT

AUTONOMOUS MAPPING, LOCALIZATION & NAVIGATION

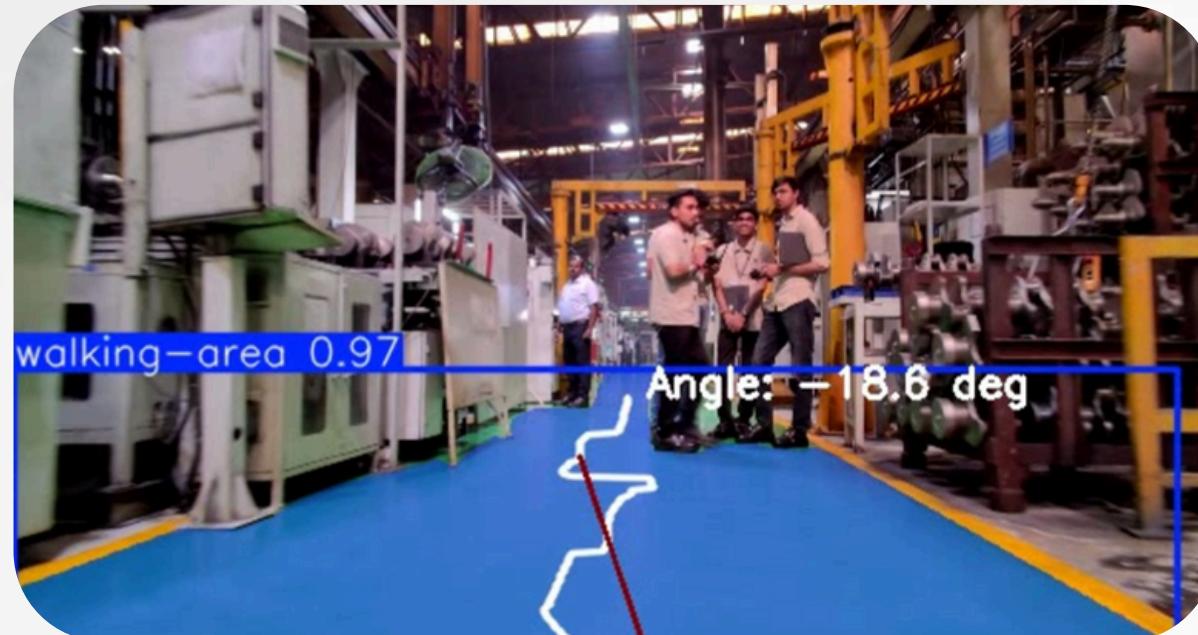


Fig. 1. Angle Calculation on Segmented Walking Path

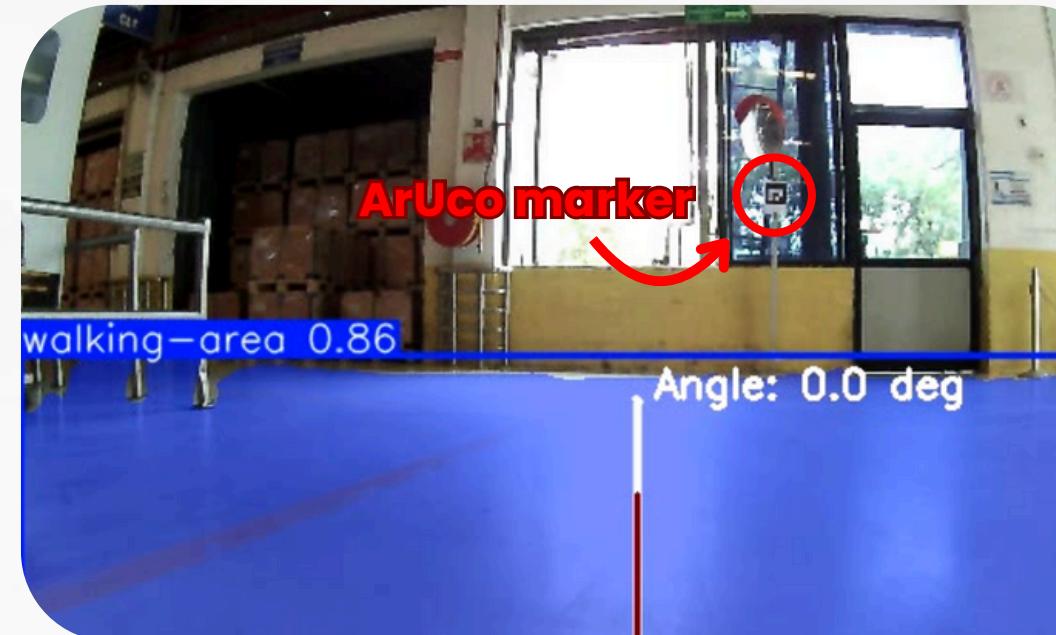


Fig. 3. ArUco Marker
3D Pose Estimation for navigation

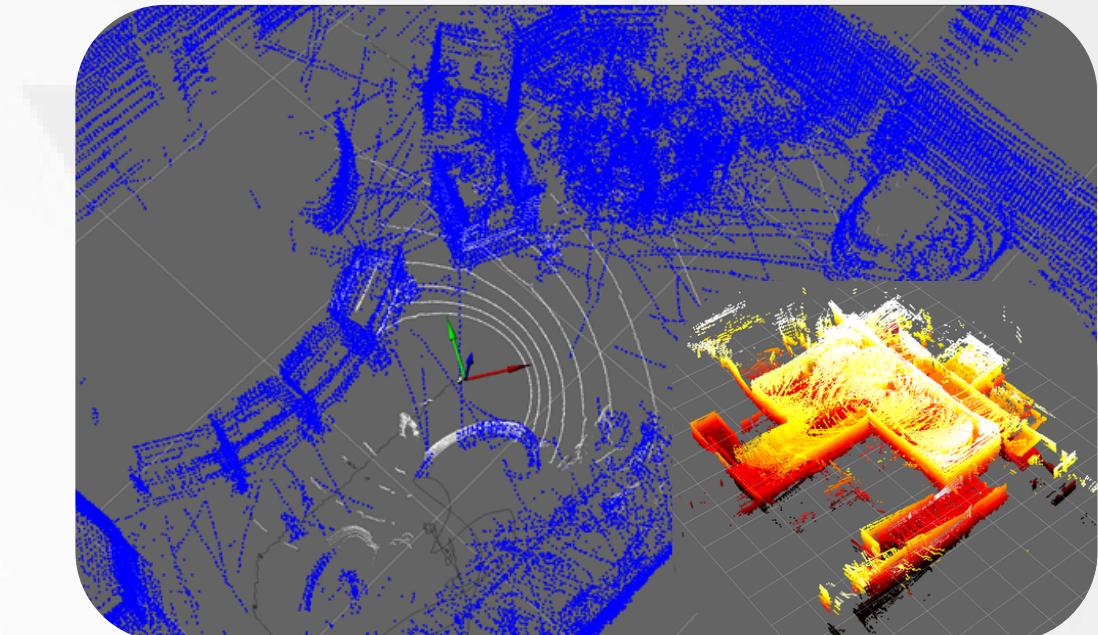


Fig. 5. 3D Mapping and Localization using
LiDAR Inertial Odometry

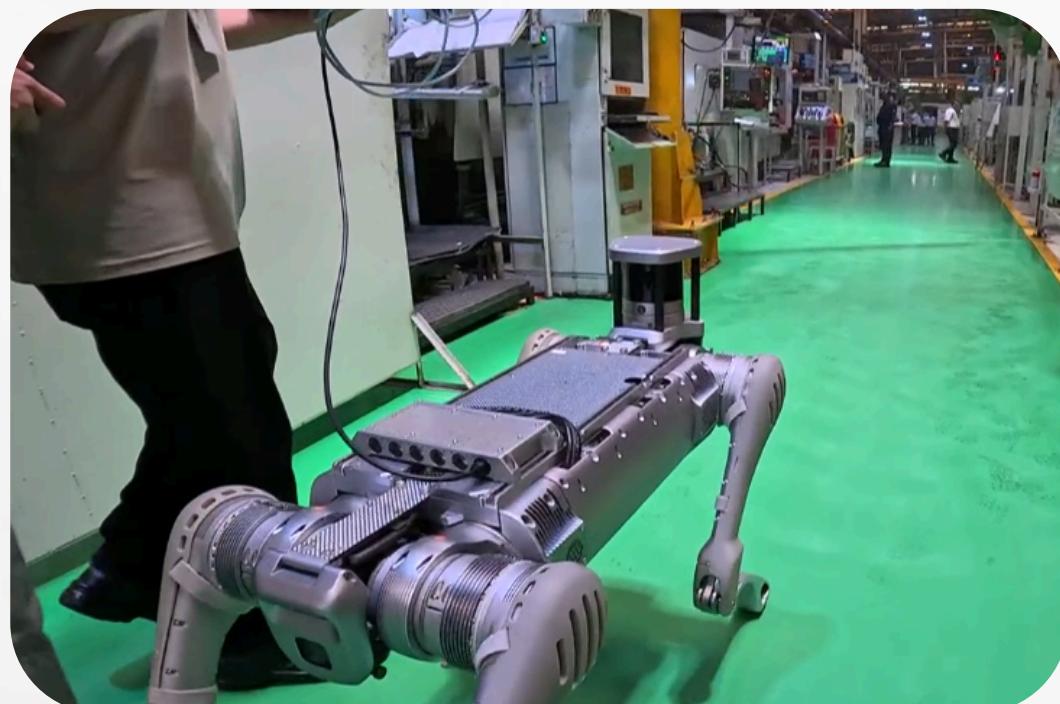


Fig. 2. Testing with Unitree B2 on Factory Shop Floor

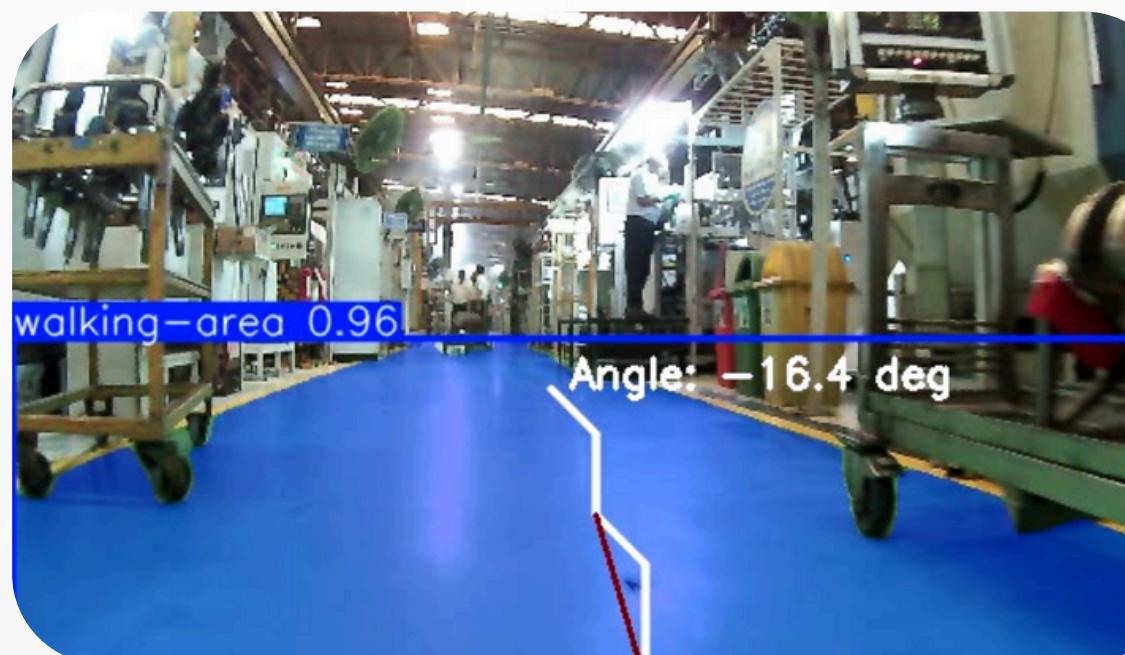


Fig. 4. Variable inflation based on depth infused
with obstacle avoidance navigation

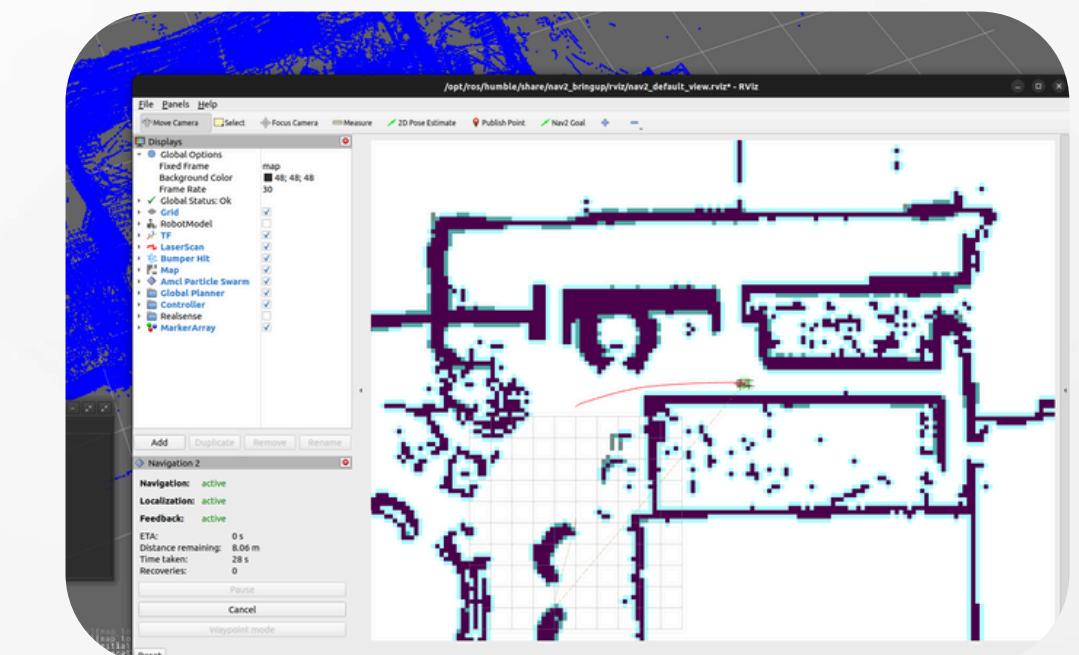


Fig. 6. Nav2 integration with 3D localization for
global/local planner usage in navigation



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
- Nav2 Air Setup
- Nav2 Screen
- Nav2 Vending Machine
- Nav2 Poids
- Nav2 Tree
- Nav2 Main Door
- UBI Status Check
- UBI Resolve Anomaly

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

Robot Control Centre

Robot Name: B2

Robot Type: Quadruped

Robot Model: B2 Industrial

Manufacturer: Unitree

Vehicle Unique ID: ektssquad00778

Serial Number: 70B0-CE12-1WD2-54RR

Firmware Version: V 1.1.1

Software Version: OSDK V 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

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
- Process ArUco ID: None
- Distance to Target: None
- Lateral Offset: None
- Detected ArUco IDs: [17]

Command Panel

Navigation Command Center

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

