DPRG Monthly Meeting - Maker's Pet Robot Kit – 3/28/2026

Video

https://www.youtube.com/watch?v=Xd35oKK9_4g

Key Discussion Points

Overview

- The Maker's Pet is an inexpensive, small differential drive robot kit designed to map environments using SLAM and navigate autonomously.
- To keep costs low, it offloads heavy processing to a local PC over Wi-Fi instead of using an expensive onboard computer like a Raspberry Pi.

Hardware Specifications

- **Microcontroller:** Uses an ESP32 microcontroller, specifically the ESP32-E for better Wi-Fi performance, though the ESP32-S3 is also supported as a more powerful upgrade.
- **Chassis:** Features a 12 cm diameter base with 43 mm wheels that have rubber rings for reliable traction and odometry. All chassis components are 3D printed.
- **Motors:** Employs small N20 motors with encoders. The custom motor board uses Texas Instruments drivers and allows selectable 12V or 24V power to ensure smooth, low-speed mapping with plenty of torque.
- **Power:** Powered by 6 AA batteries or 2 lithium cells. It includes efficient DC-to-DC converters to manage power for the motors, the ESP32, and the LIDAR.
- **Sensors:** Relies entirely on a 2D LIDAR and wheel encoders. An IMU is intentionally omitted because streaming its data over Wi-Fi could cause communication issues, and the mapping software functions perfectly well relying on just the reliable wheel traction.

LIDAR Integration

- The kit's firmware natively supports over 25 different 2D LIDAR models by simply editing an Arduino configuration file.
- The creator highly recommends the LD Robot LD14P model because it is lightweight, consumes less power, and is perfectly balanced so it does not wobble on the small robot base.

Software Architecture

- **Firmware:** Open-source and built using the Arduino IDE to remain beginner-friendly and tap into a large community.
- **ROS 2 Integration:** Supports ROS 2 Humble, Iron, and Jazzy releases.
- **Communication:** Runs micro-ROS on the ESP32 to stream raw LIDAR and odometry data over a 2.4 GHz Wi-Fi connection to a local Ubuntu PC via UDP.
- **PC Environment:** Recommends running the ROS 2 environment in Docker containers to eliminate versioning issues and guarantee compatibility.
- **Features:** Offers out-of-the-box support for Google Cartographer for mapping, Nav2 for navigation, Frontier Exploration for autonomous map discovery, and Gazebo for 3D simulations.

Future Expansions & Community Modifications

- **Robot App Platform:** The creator is building an "App Store" platform for ROS 2 robots, allowing users to safely download and run untrusted third-party apps, such as hide-and-seek games.
- **LeRobot Integration:** Efforts are underway to interface the Maker's Pet platform with LeRobot, an open-source DIY AI manipulation framework with a huge community.
- **User Modifications:** Dallas Personal Robotics Group members have modified the kit by adding magnetic mounts for the LIDAR and enclosure, along with a simplified 4-pin LIDAR connector. Members also discussed integrating a MAIX camera module for inexpensive object recognition over a serial connection.