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› HIWONDER JetRover Robot Car User Manual (Standard Kit with Jetson Nano 4GB)

HIWONDER JetRover Standard Kit & Jetson Nano 4GB

HIWONDER JetRover Robot Car User Manual

Model: JetRover Standard Kit & Jetson Nano 4GB

Brand: HIWONDER

1. INTRODUCTION

The HIWONDER JetRover is a professional robotic platform designed for ROS1 & ROS2 learning and development. Powered by a Jetson controller, it supports Robot Operating System (ROS) and integrates mainstream deep learning frameworks, MediaPipe development, and YOLO model training. This manual provides essential information for assembly, setup, operation, and maintenance of your JetRover robot car.



Figure 1.1: HIWONDER JetRover Robot Car

2. WHAT'S IN THE BOX

The JetRover Standard Kit includes the following components:

- Hiwonder JetRover ROS Robot (pre-assembled)
- Robotic Arm
- 12.6V 2A Charger
- Card Reader
- Wireless Controller
- 3D Depth Camera
- Type-C Cable (800mm)
- Camera Bracket
- Colored Blocks (30x30mm)

- Tags (30x30mm)
- Accessory Bag
- User Manual



Figure 2.1: JetRover Standard Packing List

3. SETUP

3.1 Initial Assembly and Connections

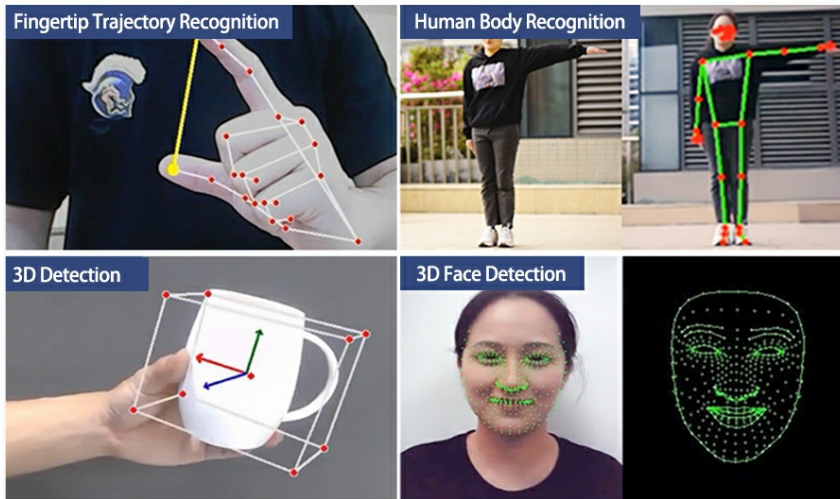
The JetRover comes largely pre-assembled. Ensure all components listed in the packing list are present. Connect the 3D depth camera and Lidar to the designated ports on the robot. Power on the Jetson Nano 4GB board and ensure all cables are securely connected.



Figure 3.1: 3D Depth Camera Installation

3.2 Software Installation and Configuration

The JetRover operates on Ubuntu 18.04 LTS and ROS Melodic. For Jetson Nano 4GB, ROS2 is supported using Docker container technology. Refer to the provided documentation for detailed steps on setting up the ROS environment, installing necessary libraries, and configuring the robot's software.



MediaPipe Development, Upgraded AI Interaction

Using the MediaPipe development framework, JetRover can perform fingertip detection, human body recognition, 3D object recognition, face detection, and more.

Figure 3.2: ROS System Overview

4. OPERATING INSTRUCTIONS

4.1 Control Methods

The JetRover offers multiple control methods:

- **WonderAi App:** Compatible with iOS and Android systems for intuitive control.
- **Wireless Handle:** For direct physical control.
- **Robot Operating System (ROS):** For advanced programming and control.
- **Keyboard:** For basic movement and function control via a connected computer.

4.2 SLAM Mapping and Navigation

The JetRover is equipped with a 3D depth camera and Lidar for Simultaneous Localization and Mapping (SLAM). It supports various algorithms like gmapping, hector, karto, and cartographer for precise multi-point navigation, TEB path planning, and dynamic obstacle avoidance.

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Video 4.1: ROS2 & ROS1 AI robot car with Lidar, autonomous driving, SLAM mapping & navigation.

③ SLAMTEC A1/ EAI G4 Lidar

Lidar model	Ranging radius	Ranging frequency	Scanning frequency	Angle resolution	Sampling frequency	Communication rate	Ranging accuracy
 EAI G4	0.12m-16m	1000mA	5Hz-12Hz	0.2°	9k	230400bps	2.0%(1m < distance ≤ 8m); 2cm(distance ≤ 1m)
 SLAMTEC A1	0.15m-12m	100mA	5.5Hz-10Hz	1°	8k	115200bps	1% of the range (≤ 3m); 2% of the range (3 - 5m); 2.5% of the range (5 - 12m)



Figure 4.2: AI-Driven 3D SLAM Mapping & Navigation

4.3 AI Vision and Voice Control

The JetRover integrates multimodal models with ChatGPT, enhancing its perception, reasoning, and actuation capabilities. It supports 3D vision, a 6-microphone array for voice interaction, and AI vision for object detection, tracking, and scene understanding.

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Video 4.3: AI voice control smart robot car with 6DOF robot arm.

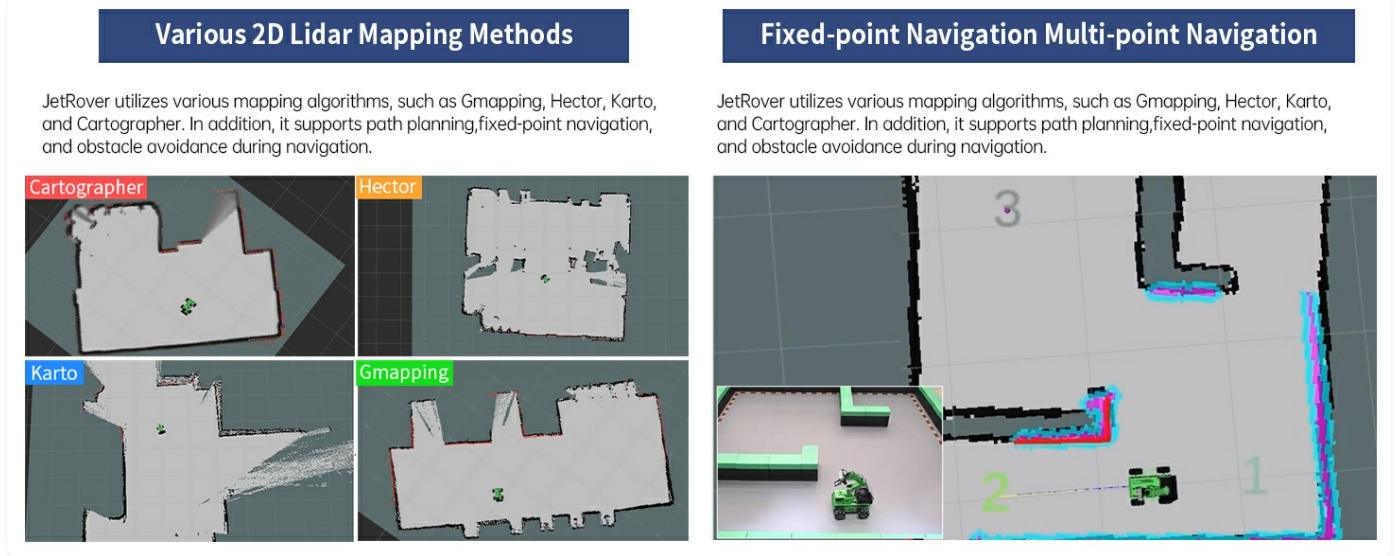


Figure 4.4: AI Vision and Voice Interaction

4.4 6DOF Robotic Arm Operations

The JetRover includes a 6DOF vision robot arm with intelligent serial bus servos. An HD camera at the end of the arm provides a first-person perspective for tasks like object grasping and smart sorting.

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Video 4.5: 3D Grasping with AI Vision 6DOF Robotic Arm.



Figure 4.6: 6DOF Robotic Arm

5. MAINTENANCE

- **Cleaning:** Regularly clean the robot's chassis, wheels, and sensors with a soft, dry cloth. Avoid using liquids directly on electronic components.
- **Battery Care:** Ensure the Lithium Ion battery is charged using the provided charger. Do not overcharge or completely drain the battery. Store the robot in a cool, dry place when not in use.
- **Software Updates:** Periodically check the HIWONDER official website or community forums for software and firmware updates to ensure optimal performance and access to new features.
- **Component Inspection:** Regularly inspect all mechanical and electrical connections for any signs of wear or damage.

Tighten any loose screws.

6. TROUBLESHOOTING

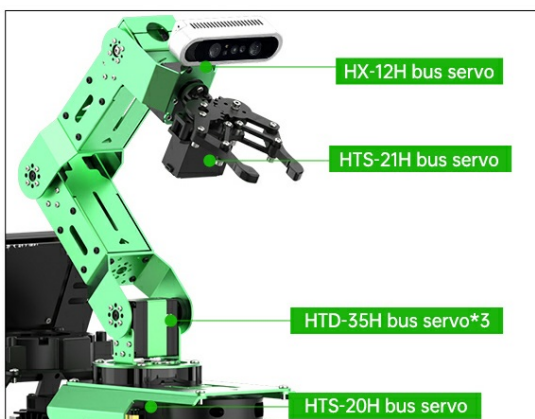
- **Robot not powering on:** Check battery charge level and ensure all power connections are secure.
- **Control issues:** Verify that the control method (app, wireless handle, keyboard) is correctly paired and configured. Ensure the robot is within range for wireless controls.
- **Navigation errors:** Recalibrate Lidar and 3D depth camera. Ensure the environment is suitable for SLAM (e.g., sufficient features for mapping).
- **Robotic arm not responding:** Check servo connections and power supply to the arm. Verify software commands are correctly sent.
- **Software crashes/errors:** Ensure all software dependencies are met and the operating system is up to date. Consult ROS logs for specific error messages.

For further assistance, refer to the detailed online documentation or contact HIWONDER customer support.

7. SPECIFICATIONS

Feature	Detail
Product Dimensions	16.14 x 12.6 x 13.78 inches
Item Weight	12.07 pounds
Batteries	1 Lithium Ion battery required (included)
Recommended Age	15 years and up
Manufacturer	Hiwonder
Host Controller	ROS Controller (Jetson)
Sub Controller	STM32 Robot Controller
Operating System	Ubuntu 18.04 LTS + ROS Melodic

2 Vision Robot Arm and Serial Bus Servo



Servo model				
	HTD-35H bus servo	HX-12H bus servo	HTS-21H bus servo	HTS-20H bus servo
Product weight	64g	36.3g	63g	58g
Dimensions (mm)	51.1x20.14x40	35.19x26.19x27.2	40*20*40.5	40*20*40.5
Operating voltage	9-12.6V	9-12.6V	9-12.6V	9-12.6V
Moving speed	0.18sec / 60° 11.1V	0.2sec / 60° 11.1V	0.16sec / 60° 11.1V	0.18sec / 60° 11.1V
Stall torque	35kg.cm 11.1V	12kg.cm 11.1V	21kg.cm 11.1V	20kg.cm 11.1V
Rotation range	0~240°			
Control method	UART serial port command			
Communication baud rate	115200			
Protection	stall protection and overtemperature protection			
Parameter feedback	temperature, voltage, position			
Gear Category	Metal Gear			

Figure 7.1: JetRover Host and Sub Controllers

8. WARRANTY AND SUPPORT

The HIWONDER JetRover Robot Car comes with a standard manufacturer's warranty. Please refer to the warranty card included in your package for specific terms and conditions. For technical support, product inquiries, or warranty claims, please visit the official HIWONDER website or contact their customer service team directly.