Yahboom roboduino v2

Yahboom AI Smart Robot Kit

MODEL: ROBODUINO V2 INSTRUCTION MANUAL

1. Introduction and Overview

The Yahboom AI Smart Robot Kit, Roboduino V2, is an educational platform designed for STEM programming education. This kit features an omnidirectional robot car equipped with Mecanum wheels, an ESP32 WiFi camera for FPV video, and compatibility with UNO R3 motherboards. It supports various programming methods and offers a range of interactive functions for learning about robotics, AI, and programming.
The robot is capable of 360-degree omnidirectional movement, real-time video transmission, and AI visual recognition tasks such as color detection, face detection, and QR code recognition. It is suitable for users aged 10 years and up, including beginners, hobbyists, and educators.

2. Product Components

The Roboduino V2 kit includes the following main components:

- Robot chassis and Mecanum wheels
- Main control board (compatible with Uno)
- Expansion board
- ESP32 WiFi camera module
- Ultrasonic module
- 3-channel tracking module
- Infrared remote control
- TT motors
- Lithium Ion battery (7.4V, 2000mAh)
- Necessary wiring and fasteners

Figure 2.1: Exploded view showing the main control board, expansion board, WiFi camera, ultrasonic module, Mecanum wheels, battery, and TT motors.

Figure 2.2: Detailed diagram of the expansion board, highlighting interfaces for RGB lights, buzzer, infrared reception, IIC, 4-channel motor port, 4-channel servo port, WiFi camera, and GPIO pins.

3. Assembly Instructions

The Roboduino V2 kit is designed for straightforward assembly. All wiring utilizes anti-reverse interfaces to prevent incorrect connections. Follow the detailed step-by-step online tutorials and videos provided by Yahboom to successfully assemble your robot car.

1. Unpack all components and verify against the parts list.
2. Begin by attaching the TT motors to the chassis, followed by the Mecanum wheels.
3. Mount the main control board and expansion board onto the chassis.
4. Connect the ultrasonic module, 3-channel tracking module, and ESP32 WiFi camera module using the provided cables. Ensure all connections are secure and correctly oriented using the anti-reverse interfaces.
5. Install the battery and connect it to the power interface on the expansion board.
6. Perform a visual check to ensure all components are properly installed and connected before proceeding to setup.

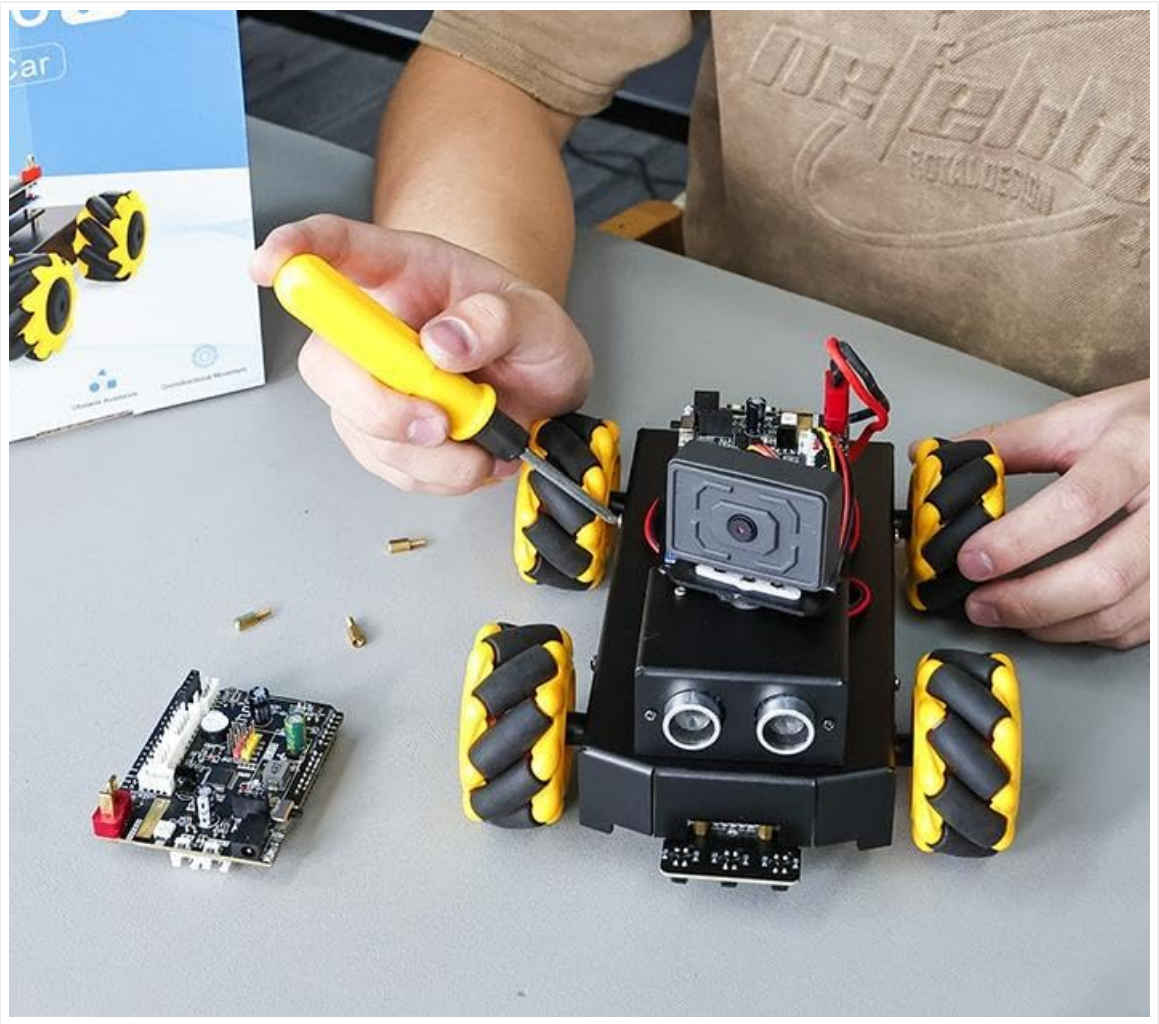

Figure 3.1: A user assembling the robot car, demonstrating the hands-on building process.

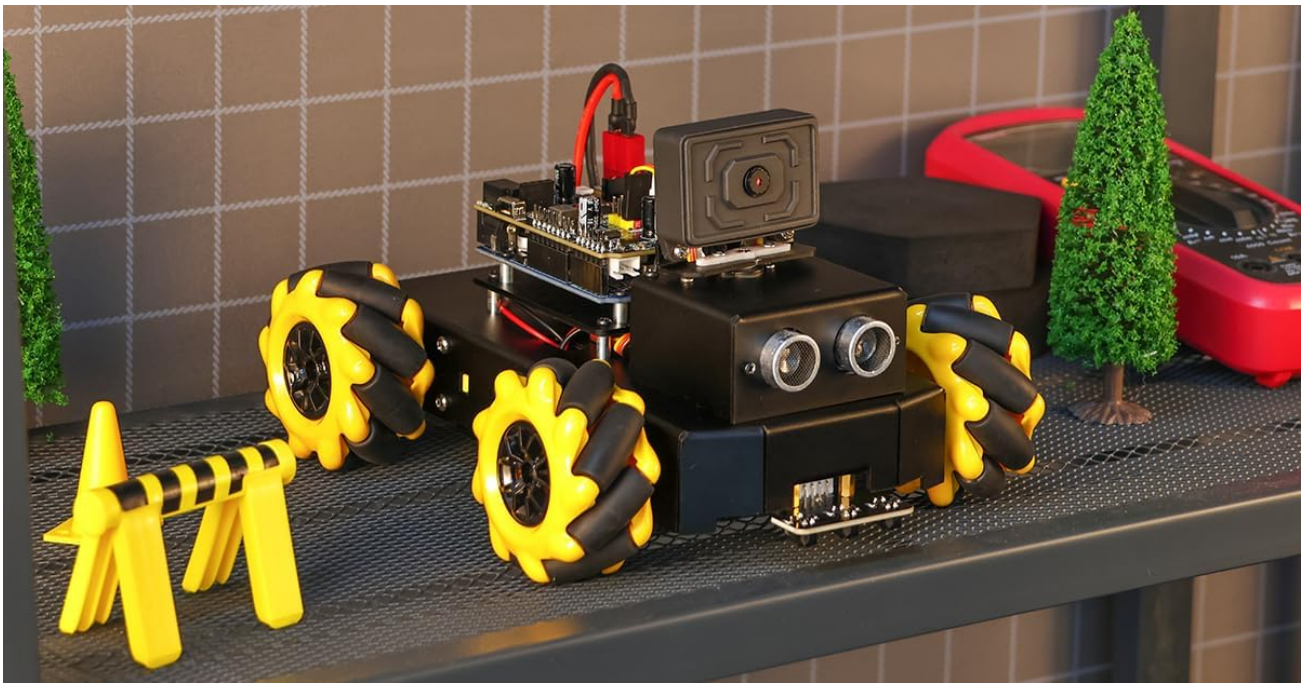

Figure 3.2: The fully assembled Roboduino V2 robot, ready for operation.

4. Setup and Programming

The Roboduino V2 offers versatile programming options and app-based control.

4.1. Programming with Official IDE

The kit is compatible with official IDEs, such as the Arduino IDE, allowing for local programming using C++. Yahboom provides programming code examples to assist users in getting started. Refer to the online tutorials for detailed instructions on setting up your development environment and uploading code to the robot.

4.2. Mobile App Control and FPV Video

The built-in ESP32 WiFi camera module enables real-time FPV (First Person View) video streaming to your mobile phone. Download the dedicated Yahboom CAM APP to control the robot and view its perspective. The app allows for remote control of car movement and camera PTZ (Pan-Tilt-Zoom) rotation.

Figure 4.1: The robot being controlled via a mobile application, showing the FPV video feed.

Figure 4.2: Demonstrating both Python programming capabilities and mobile app control for the robot.

4.3. Onboard IIC Interface

The onboard IIC interface supports extended color recognition, digital tube displays, and other modules, enabling more advanced and interesting functions. This allows for further customization and expansion of the robot's capabilities.

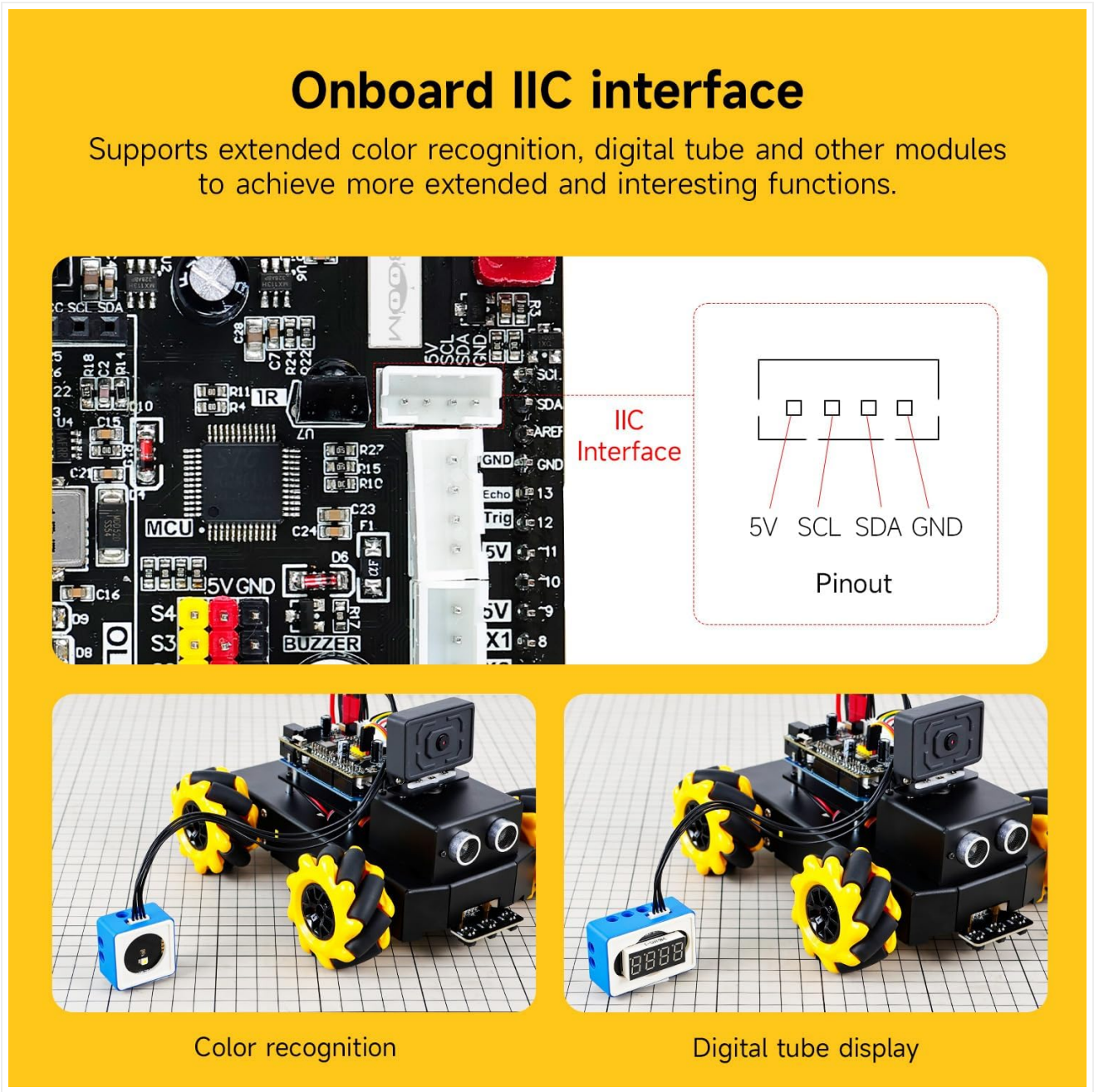

Figure 4.3: The IIC interface pinout and examples of connecting external modules for color recognition and digital display.

5. Operating Instructions

The Roboduino V2 offers a variety of operational modes and functions.

5.1. Omnidirectional Movement

Equipped with 60mm Mecanum wheels, the robot can achieve 360-degree omnidirectional movement. This includes moving forward, backward, sideways, and diagonally, allowing for flexible navigation even on complex terrains.

Figure 5.1: Examples of Mecanum wheel movement, including straight, lateral, diagonal, and rotational motions.

5.2. Camera Functions

The ESP32 WiFi camera module supports horizontal rotation in the range of 35° to 145°, enhancing the flexibility of APP video remote control. The camera also enables AI visual recognition features.

5.3. Multiple Function Display

The robot can perform various functions based on its integrated sensors and programming:

- **Mecanum Wheel Motion Control:** Precise control over omnidirectional movement.
- **Car Patrol:** Programmed routes for autonomous navigation.
- **RGB Light Control:** Customizable RGB LED indicators.
- **Ultrasonic Follow:** Maintains a set distance from an object.
- **Ultrasonic Obstacle Avoidance:** Detects and navigates around obstacles.
- **Buzzer Music Playback:** Plays programmed melodies.
- **Line Tracking:** Follows a designated line path.
- **Line Patrol and Obstacle Avoidance:** Combines line following with obstacle detection.

- **Infrared Remote Control:** Control the robot using an infrared remote.
- **AI Visual Recognition:** Includes cat/dog detection, face detection/following, QR code command execution, and color following.

Figure 5.2: Visual examples of the robot performing various functions like Mecanum wheel motion, car patrol, ultrasonic follow, obstacle avoidance, line tracking, and infrared remote control.

5.4. Instructional Video

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Video 5.1: An instructional video providing an overview or assembly guide for the Yahboom AI Smart Robot Kit. This video demonstrates key features and operational aspects of the robot.

6. Maintenance

To ensure the longevity and optimal performance of your Roboduino V2 robot, follow these maintenance guidelines:

- **Cleaning:** Regularly clean the robot's chassis and wheels to remove dust and debris. Use a soft, dry cloth. Avoid using liquids directly on electronic components.

- **Connections:** Periodically check all wiring connections to ensure they are secure. Loose connections can lead to erratic behavior or component failure.
- **Battery Care:** Store the Lithium Ion battery in a cool, dry place. Do not overcharge or fully discharge the battery. If storing for extended periods, charge it to approximately 50% capacity.
- **Component Inspection:** Inspect Mecanum wheels and motors for any signs of wear or damage. Replace components as necessary.

7. Troubleshooting

If you encounter issues with your Roboduino V2 robot, consider the following troubleshooting steps:

- **Robot Not Powering On:** Ensure the battery is fully charged and properly connected. Check the power switch on the expansion board.
- **Movement Issues:** Verify that all motor connections are secure. Check if the Mecanum wheels are free from obstructions. Re-upload the movement code to ensure it's correctly loaded.
- **Camera Not Working/No FPV:** Ensure the ESP32 WiFi camera module is correctly connected. Check your mobile device's WiFi connection to the robot's hotspot. Restart the Yahboom CAM APP.
- **Programming Errors:** Double-check your code for syntax errors. Ensure the correct board and port are selected in your IDE. Refer to Yahboom's online tutorials and community forums for common programming issues.
- **Sensor Malfunctions:** Ensure ultrasonic and tracking modules are clean and properly connected. Test individual sensor functions with example code if available.

For persistent technical problems, Yahboom is committed to providing excellent after-sales service and technical support. Please refer to the contact information provided with your product or on the official Yahboom website for assistance.

8. Specifications

Feature	Specification
Product Dimensions	3 x 3 x 2.2 inches
Item Weight	1.1 pounds
Item Model Number	roboduino v2
Manufacturer Recommended Age	10 years and up
Batteries	1 Lithium Ion battery required (included)
Main Control Board	Compatible with Uno R3
Camera Module	ESP32 WiFi Camera with PTZ (35°-145° horizontal rotation)
Movement Type	Omnidirectional (Mecanum wheels)

9. Warranty and Support

Yahboom is dedicated to providing high-quality products and excellent customer service. While specific warranty details may vary, Yahboom is committed to offering after-sales service and technical support for the Roboduino V2

AI Smart Robot Kit.
If you require technical assistance, have questions about assembly, programming, or operation, please contact Yahboom support through their official website or the contact information provided in your product packaging. Timely assistance will be provided for any technical issues you may encounter.