Hiwonder

APP

BiliBili

课程资料(提取码:cdy9)

Tutorial Google Drive

YouTube

Shenzhen Hiwonder Technology Co., Ltd.

www.hiwonder.com

support@hiwonder.com

ROS Educational Robot

JetAuto & JetAuto Pro

User Manual

Product Introduction

JetAuto is an entry-level ROS robot car tailored for ROS education. It is loaded with NVIDIA Jetson Nano, high-performance encoder motor, rotatable pan-tilt, Lidar, 3D depth camera and 7-inch LCD screen, which opens up more functionalities. Robot motion control, mapping and navigation, path planning, tracking and obstacle avoidance, autonomous driving, human feature recognition, somatosensory interaction and voice interaction all can be achieved! Additionally, combing with AI vision robotic arm, it is able to navigate to transport, recognize to sort objects, ect.
More detailed learning materials can be downloaded by scanning the QR code on right.

Download Materials

Statements:

1. When receive robot package, turn to page 3 of user manual and check packing list to tally items received. If parts are missing, contact us via email, support@hiwonder.com.
2. Pictures in manual are for reference only. Please refer to your JetAuto/ JetAuto Pro on hand.
3. This manual takes JetAuto advanced kit as example. Instructions are also applicable to other robot kits.

Product Demo Video

Notes:

1. Keep your face and eyes away from robot during operation to avoid injury.
2. Keep an eye on edge to protect robot from falling. It is recommended to operate on the ground.
3. For users who purchased JetAuto Pro, do not put your finger within joint motion zone of robotic arm, otherwise its joints will be damaged.
4. Continuous running for long time will heat up servos. Only when servos cool down after a "rest", will they work again.
5. Never let sharp objects touch lens to protect it from scratches or damage.
6. To prevent damage to Jetson Nano expansion board and its components, avoid any contact between metal objects or liquids and the board.

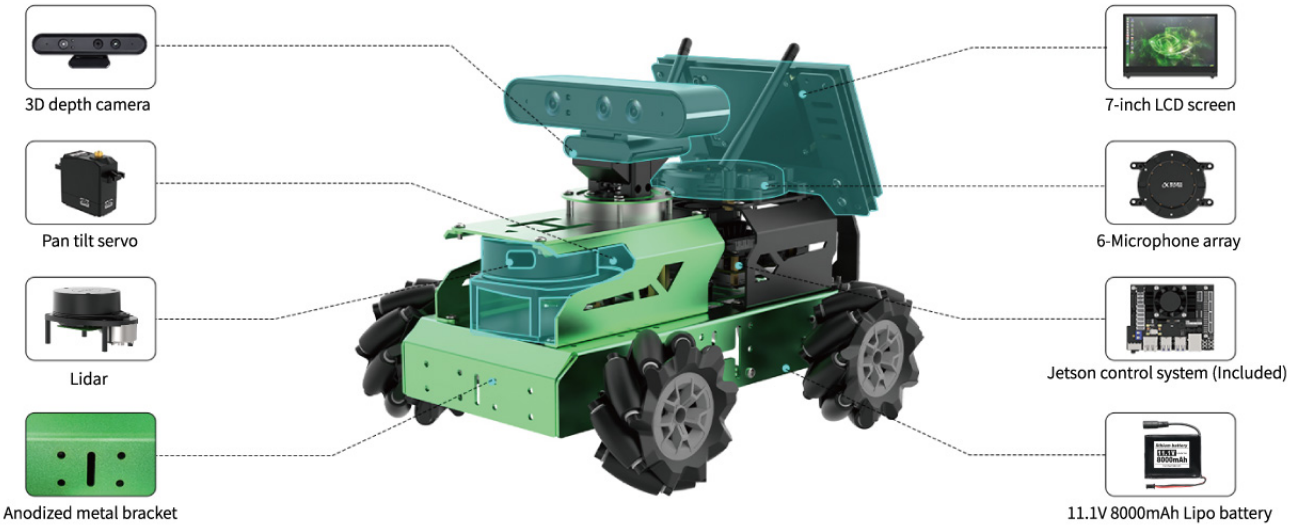
Guide to Battery Safety:

For delivery safety, Lipo battery is not fully charged. Please fully charge battery before the first operation.
1. Charge battery with the provided charger. Turn off the robot and never use it while charging.
2. Indicator on charger changes green when it connects to battery but not plugged into a power outlet. Indicator turns red when charging, and turns green once fully charged.
3. Do not directly connect the charger to DC power port of Jetson Nano board, otherwise the board will be burned.

4. Unplug charger in time to avoid overcharging.
5. If battery voltage drops below 10V, the buzzer will sound an alarm. To prevent any damage or malfunction, please charge the battery promptly.
6. In case robot won't be used in a long period of time, please fully charge battery first, then disconnect battery wires.
7. Always keep battery in cool and dry environment, otherwise battery lifespan gets shortened. Never intentionally hit, throw or step on your Lipo battery.
8. Do not use battery in areas with strong static electricity or magnetic fields, as this lead to damage to battery.
9. Do not insert battery into socket and connect battery terminals with metal objects.
10. Over-discharge makes battery fail to be charged and broken. If robot won't be used in a long period of time, please fully charge battery.
11. It is strictly prohibited to modify, weld, or convert battery charger or Lipo battery.
12. Keep battery away from high temperature and liquid to prevent overheating, fire and damp, which result in function decline.

Warning tip: please strictly follow the guide. Our company is not responsible for any product damage, economic losses and accident caused by improper use.

JetAuto Structure



JetAuto Pro Structure

JetAuto Packing List

◆Starter Kit

 (Include Lidar and Jetson Nano, assembled)	 Antenna	 12.6V 2A charger	 Card reader	 Wireless handle	 Screwdriver

◆Standard Kit

 (Include Lidar and Jetson Nano, assembled)	 Antenna	 12.6V 2A charger	 Card reader	 Wireless handle	 3D depth camera	 Tags (6.5 * 6.5cm) Blocks (3 * 3cm)	Screwdriver	 Screw bag

◆Advanced Kit

 (Include Lidar and Jetson Nano, assembled)	 Antenna	 12.6V 2A charger	 Card reader	 Wireless handle	 3D depth camera	 Tags (6.5 * 6.5cm) Blocks (3 * 3cm)	Screwdriver	 Screw bag
 Sound card Speaker (Installed within the car)	 7-inch LCD screen	 Screen bracket	 6-Microphone array (Installed)					

JetAuto Pro Packing List

◆Standard Kit

 (Include Lidar and Jetson Nano, assembled)	 Antenna	 12.6V 2A charger	 Card reader	 Wireless handle	 3D depth camera	 Tags (6.5 * 6.5cm) Blocks (3 * 3cm)	 7-inch LCD screen	 Screen bracket
 Fixed stand (beam+ columns)	 Camera bracket	 Vision robotic arm (Assembled)	 Screw bag	 Tools				

◆Advanced Kit

 (Include Lidar and Jetson Nano, assembled)	 Antenna	 12.6V 2A charger	 Card reader	 Wireless handle	 3D depth camera	 Tags (6.5 * 6.5cm) Blocks (3 * 3cm)	 7-inch LCD screen	 Screen bracket
 Fixed stand (beam+ columns)	 Camera bracket	 Vision robotic arm (Assembled)	 Screw bag	 Tools	 6-Microphone array (Installed)	 Sound card Speaker (Installed within the car)		

Accessories Assembly

To ensure product is delivered in good condition, some accessories are not attached to the robot. Please note that you need to install these accessories on robot upon receiving the package.

Kit Version	Accessories to be Installed
JetAuto starter kit	Antenna
JetAuto standard kit	3D depth camera, antenna
JetAuto advanced kit	3D depth camera, antenna, 7-inch LCD screen
JetAuto Pro standard/ advanced kit	3D depth camera, antenna, 7-inch LCD screen, vision robotic arm

Assembly Tutorial

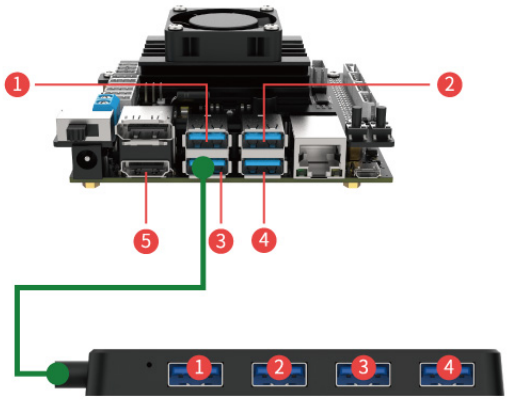
Notes:

1. Assembly instructions take JetAuto advanced kit and JetAuto Pro as example. They are also applicable to other robot kits.
2. The 3D depth camera and 7-inch LCD screen are positioned differently on JetAuto Pro compared to JetAuto advanced kit.
3. Please strictly install accessories according to the given pictures.
4. Wireless handle receiver has been inserted to robot.
5. As robot has lots of modules, please connect wires to right ports as pictured. Proper wiring not only makes the connections tidy, but also facilitates future accessories expansion.

1. Accessories Assembly for JetAuto Advanced Kit

1.1 Ports Distribution

Please refer to the table below and connect each accessory to its corresponding port on Jetson Nano board.
If any of the listed accessories are not included in your kit, please ignore the corresponding port number.



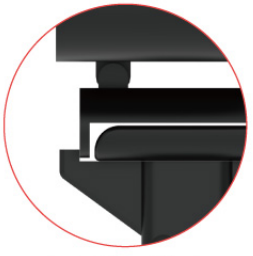
No.	Accessory
1	DIY expansion
2	3D depth camera
3	USB hub
4	Lidar
5	HDMI cable of 7-inch LCD screen (Not included in JetAuto starter and standard kit)

Refer to the table below and connect each accessory to corresponding port on USB hub. If some of them are already connected to respective ports, you can proceed to connect remaining accessories.

No.	Accessory
1	Handle USB receiver
2	Power cable of 7-inch LCD screen (Not included in JetAuto starter and standard kit)
3	6-Microphone array (Only for JetAuto advanced kit and JetAuto Pro advanced kit)
4	Sound card + speaker (Only for JetAuto advanced kit and JetAuto Pro advanced kit)

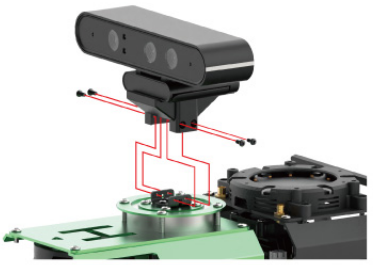
1.2 Install 3D Depth Camera

1. Snap the front of 3D depth camera into the protruded slot on bracket.



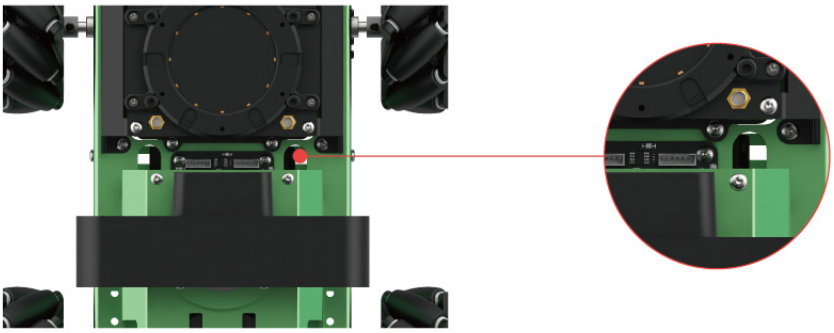
Installation Effect

2 Align camera bracket's holes with those on 3D depth camera. Then secure these two components together with M3*6 round head machine screws.
Note: the lens is facing the front of robot.

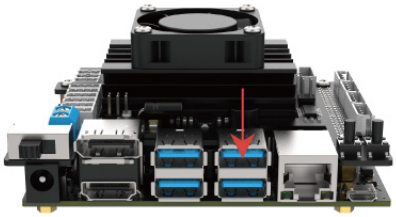


Installation Effect

3 Pass the cable of 3D depth camera through the hole shown in the below picture.



4 Connect the cable of 3D depth camera to No.2 port on Jetson Nano board.



1.3 Install Antenna

Rotate the antenna clockwise to fix it in place.
Note: after securing the antenna, you may gently flex it downwards.

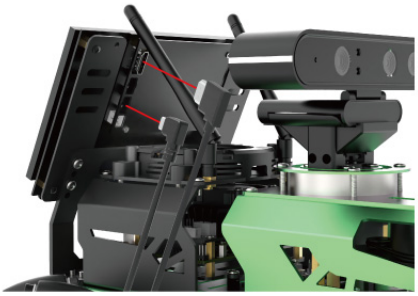
Installation Effect

1.4 Install 7-inch LCD Screen (Only for JetAuto advanced kit)

1. Attach the 7-inch LCD screen to screen bracket at the back of car with M4*6 machine screws.

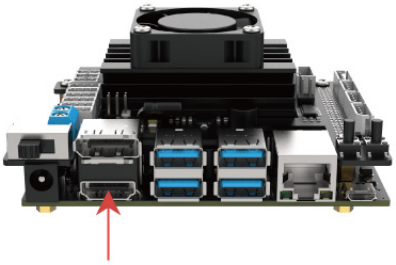
Installation Effect

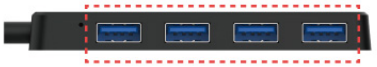
2. Connect HDMI cable to HDMI interface on the 7-inch LCD screen, and connect power cable to CTOUCH port.
Note: 7-inch LCD screen doesn't support touch control if the cable is not connected to CTOUCH port.



Installation Effect

3. Connect HDMI cable to No.5 port on Jetson Nano and power cable to any port on USB hub.

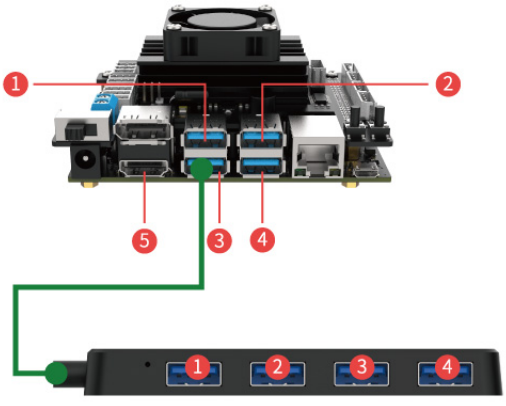




2. Accessories Assembly for JetAuto Pro Kit

2.1 Ports Distribution

Please refer to the table below and connect each accessory to its corresponding port on Jetson Nano board.



No.	Accessory
1	Monocular camera on vision robotic arm
2	3D depth camera
3	USB hub
4	Lidar
5	HDMI cable of 7-inch LCD screen

Refer to the table below and connect each accessory to corresponding port on USB hub. If some of them are already connected to respective ports, you can proceed to connect remaining accessories.

No.	Accessory
1	Handle USB receiver
2	Power cable of 7-inch LCD screen
3	6-Microphone array (Only for JetAuto advanced kit and JetAuto Pro advanced kit)
4	Sound card + speaker (Only for JetAuto advanced kit and JetAuto Pro advanced kit)

2.2 Install Fixed Stand

1. Use M6*6 round head machine screws to attach two columns onto the corner braces at the back of robot.

Installation Effect

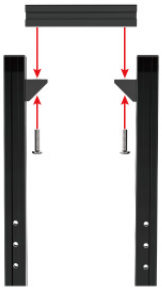
2. Fasten two columns onto the chassis with M5*20 round machine screws.

Installation Effect

3. Attach corner brace to the top of each column using M5*20 round head machine screws.

Installation Effect

4. Fix the beam to corner braces with M5*20 round head machine screws.



Installation Effect

5. Secure columns and beam together with M6*25 round head machine screws.

Installation Effect

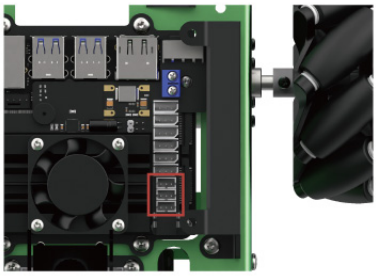
2.3 Install Vision Robotic Arm

1. Attach the robotic arm to pan tilt with M3*6 round head machine screws.
   Note: gripper should face towards the front of the car.

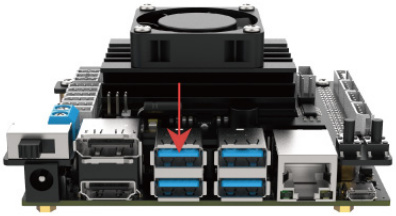
Installation Effect

Gripper Orientation

2. Connect servo wires to expansion board.
   Note: we recommend removing the controller protection shell for easier access. Please be careful when disassembling the shell to avoid damaging the antenna attached to it.



3. Connect USB cable of monocular camera to No.1 port of Jetson Nano board.

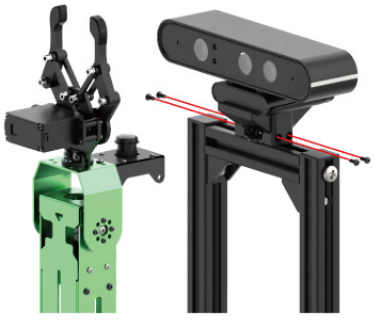


2.4 Install 3D Depth Camera

1. Install the camera bracket on the beam with M3*15 round head machine screws.

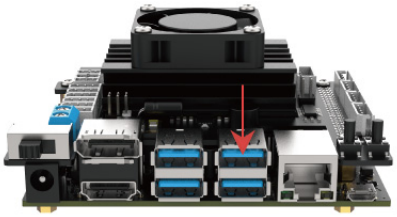
Installation Effect

2. Mount 3D depth camera onto camera bracket with M3*6 round head screws.



Installation Effect

3. Connect USB cable of 3D depth camera to No.2 port on Jetson Nano board.



2.5 Install 7-inch LCD Screen

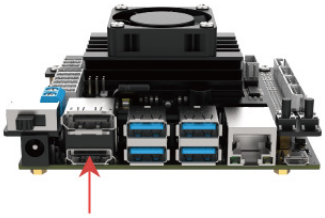
1. Install 7-inch LCD screen to columns with M4*20 round machine screws.

Installation Effect

2. Connect HDMI cable to HDMI interface on the 7-inch LCD screen, and connect power cable to CTOUCH port.
Note: 7-inch LCD screen doesn't support touch control if the cable is not connected to CTOUCH port.

Installation Effect

3. Connect HDMI cable to No.5 port on Jetson Nano and power cable to any port on USB hub.



2.6 Install Antenna

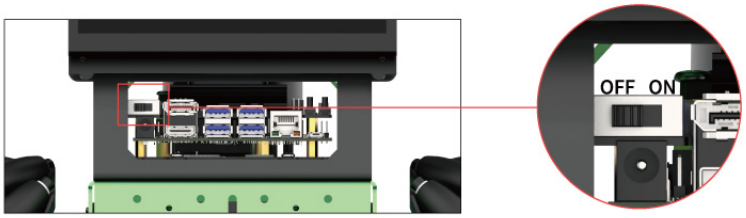
Rotate the antenna clockwise to fix it in place.
Note: after securing the antenna, you may gently flex it downwards.

Installation Effect

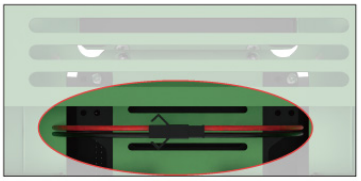
Charge and Start Robot

1. Charge Robot

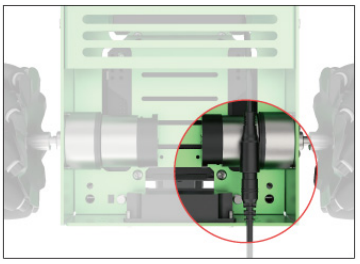
1. Turn off the switch on expansion board.



2. Connect the battery wires ensuring that each wire matches its corresponding color.



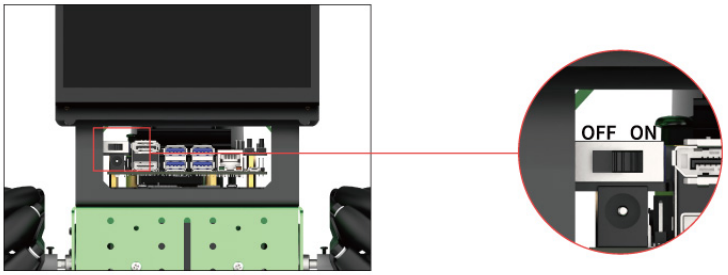
3. Connect the special charger to DC port of the battery.



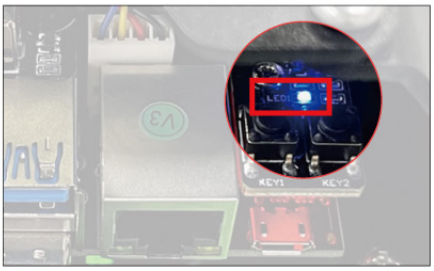
4. Red indicator means robot is being charged. It will turn green after robot is fully charged. It takes about 4 hours to fully charge the battery. Please unplug the charger in time once battery is fully charged to avoid overcharging.

2. Start Robot

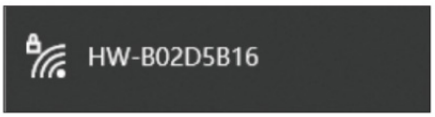
1. Turn on the switch on expansion board.



2 After 20-30s, LED1 on expansion board flashes blue. When buzzer emits a beep, this means both ROS configuration and device are ready for use.



3 After robot boots up successfully, robot is default to AP direct connection mode and generates a WiFi starting with "HW". The initial WiFi password is "hiwonder".



4 7-inch LCD screen will display the robot system desktop after robot completes booting up. Please note that 7-inch LCD screen is only included in JetAuto advanced kit and two JetAuto Pro kits.

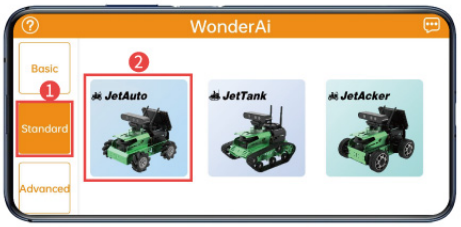
Quick User Experience

1. APP Installation and Connection

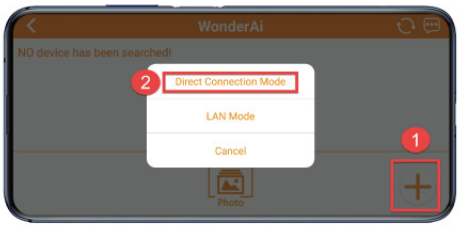
Please scan QR code on right to download WonderAi APP. iOS system version must be 9.0 or higher, and Android system version must be 5.0 or higher. For Android system, make sure all APP permissions are turned on in settings, otherwise APP functions will be limited.

Download APP

1 Open "WonderAi" APP, then Tap "Standard->JetAuto". (For users who purchased JetAuto Pro, tap "Advanced-> JetAuto Pro".)



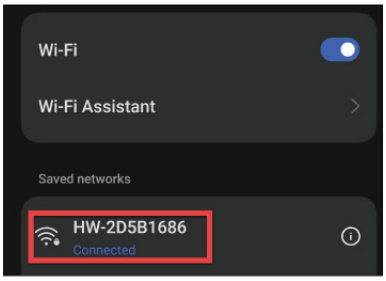
2 Tap "+" button at lower right corner, and select "Direct Connection Mode".



3 Follow hints to join the WiFi generated by robot in settings.

4 Wi-Fi name starts with “HW”, and password is “hiwonder”.

Note: for iOS device, please don't return to APP until icon appears, otherwise robot cannot be searched by APP. If no robot can be searched, tap to refresh.



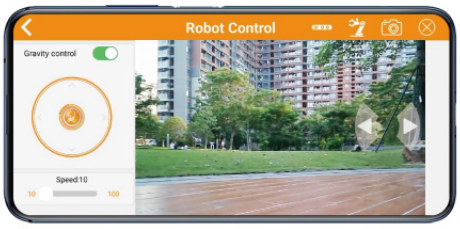
5 Go back to APP. Tap robot icon to enter mode selection interface.

Note: If you are informed of “No Internet. Whether to keep connection”, just select “keep connected”.

2. APP Control

Robot Control

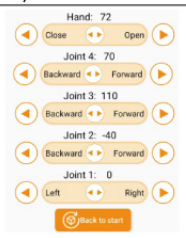
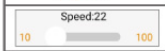
1. Tap “Robot Control” icon to enter control interface. Game interface is divided into two parts. On left is game control area, and on right is live camera feed.



APP Control Demo Video

If the connected device is JetAuto Pro, the robot control interface will have additional functionalities such as camera switching and robotic arm control.

2. Below is a list of detailed functions of the corresponding icons. You can click on icons to control the robot.

Icon	Function	Icon	Function
	Start/ stop gravity control.		Switch camera model between 3D depth camera and monocular camera. (Exclusive function for JetAuto Pro kit)
	Drag the central button to control robot to move in all directions.		Access the robotic arm control interface. (Exclusive function for JetAuto Pro kit) 
	Adjust robot speed from 10 to 100.		
	Control robot to turn left or right.		
	Live camera feed. Tap arrow buttons to move camera pan tilt.		

3. After turning on “Gravity Control” mode, hold your phone horizontally with the screen facing upwards. Then tilt your phone forward, backward, right and left to allow robot to move in the same direction.

Phone Direction	Robot Movement
	
Tilt forward	Go forward
Tilt backward	Go backward
Tilt left	Move left
Tilt right	Move right

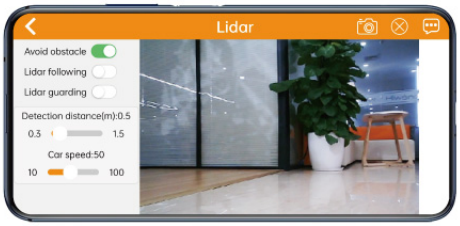
Lidar

Notes:

1. Place the robot in a spacious area to allow for adequate movement.
2. To achieve better game experience, please place the "obstacle" in front of robot and avoid placing it to the sides.

Tap to enter game interface, and the interface is separated into two parts.

1. On left, you can start the game and adjust parameters.
2. On right is the live camera feed.



There are three Lidar games including avoid obstacle, Lidar following and Lidar guarding.

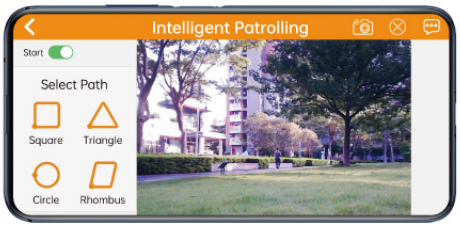
- Avoid obstacle
  1. Turn on “Avoid obstacle” mode. Then robot will keep going forward.
  2. When detecting obstacle, it will turn automatically to avoid obstacle.
- Lidar following
  1. Turn on “Lidar following” mode.
  2. When detecting obstacle, it will adjust its posture to keep a certain distance from obstacle.
- Lidar guarding
  1. Turn on “Lidar guarding” mode.
  2. It will adjust its body to face obstacle when detecting obstacle.

Intelligent Patrolling

Notes:

1. This game cannot be applied to JetAuto Pro.
2. Place the robot in a spacious area to allow for adequate movement.

Tap to enter the game interface. Click "Start" button to start the game. For example, click on "Square" pattern. The robot will start moving along a square path with its current position as the origin.

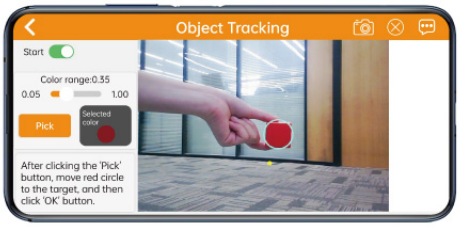


Object Tracking

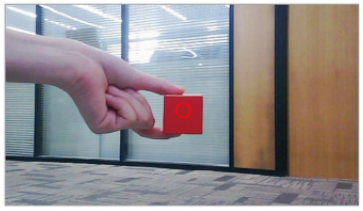
Notes:

1. For optimal tracking performance, it is recommended to slightly lower the camera and move the object on the ground, so that the robot can chase it more effectively.
2. Make sure to remove any objects with colors same as the target to avoid any interference with the game.

1. Tap to enter game interface.

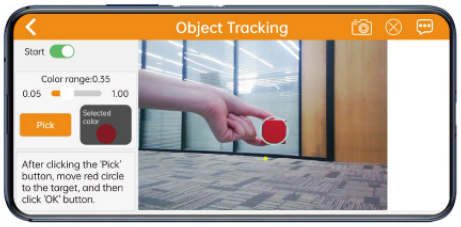


2. Tap “pick”, then drag red circle on live camera feed to the target to pick color.



3. Tap “ok” button. The color you pick will display at the right box.

4. Tap “Start” button. Then move object, and robot will move with it.



Line Following

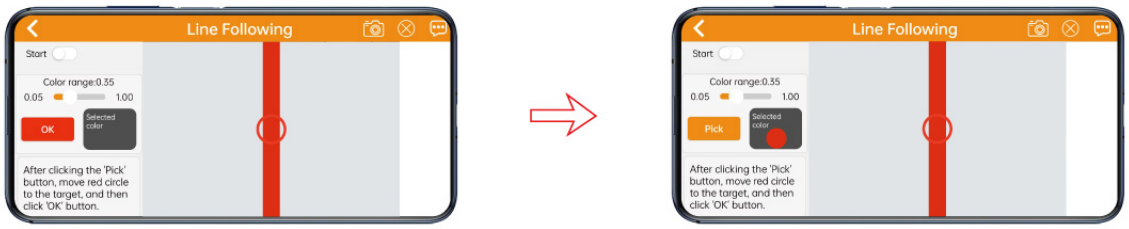
Notes:

1. Lower camera slightly before operation.
2. Paste tape on the ground to set a path, and put robot on it before starting the game.
3. Make sure to remove any objects with colors same as the target to avoid any interference with the game.

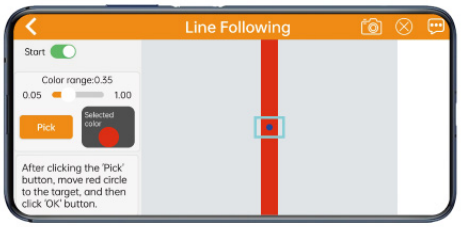
1. Tap on “Line Following” icon to enter the game.

2. Take red path as example. Click “pick”, then drag red circle on live camera feed to the path to pick color.

3. Click “OK” button. The color you pick will display on the right box.

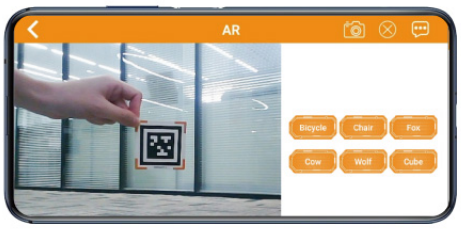


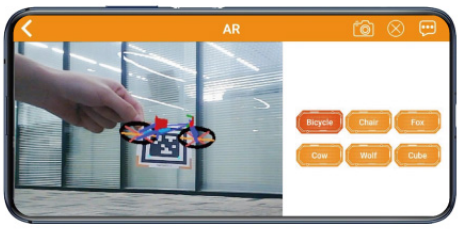
4. Click “Start” button, then robot will move along the path.



AR

Tap on “AR” icon to enter the game. Hold one of the included tags in front of the camera, and select a 3D image, such as "Bicycle". The 3D bicycle image will then be superimposed onto the tag.





FAQ

Q1: Why does the robot not work after turning on power switch?

A1: Check whether battery wire is connected.
For shipping safety, battery wire is disconnected. Before charging and operating robot, you need to connect battery wire following the instruction in “Start and Charge Robot->1.Charge Robot”.

Q2: Why can Android APP connect to robot Wi-Fi, but cannot search for the robot?

A2: 1. Check whether all necessary permissions are granted to the APP.
2. Ensure mobile data is turned off, and location service is turned on.
3. Reconnect to the device WiFi, then return to APP. Tap to refresh.

Q3: Why can’t 7-inch LCD screen support touch control?

A3: Check whether power cable of screen is connected to “CTOUCH” port. Only when it is connected to “CTOUCH” port, screen supports touch control.

Q4: Why there is no live camera feed on the APP?

A4: Accidental touching while operating the robot may cause the camera cable to become loose, resulting in no live camera feed on the app. Please ensure that the camera cable is securely connected or try re-plugging it before using the robot.

Q5: Why can you move servos on vision robotic arm after JetAuto Pro is started?

A5: 1. Please check whether servo wires are secured.
2. Control each servo separately to see whether it can rotate normally through “Robot Control” on APP.

Q6: Why does the buzzer on the robot emit a "beep" sound after the robot has been working for a while?

A6: The robot has low-voltage alarm. When the voltage drops below 10V, its buzzer will emit a “beep” to remind you of charging the robot.

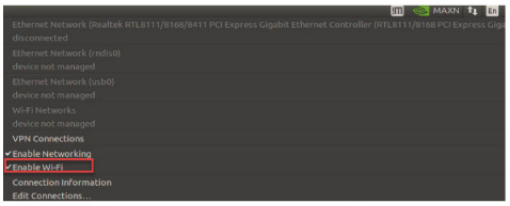
Q7: Why the robot might not perform well in object tracking or line following tasks?

A7: 1. The size of the color picking circle should be set appropriately. If it is too large, it may mistakenly select the color of objects other than the target. Conversely, if it is too small, it may not capture the color of the target accurately.
2. It is important to ensure that there are no objects with colors similar to the target object around.
3. When experiencing the object tracking game, it is recommended to move the object on the ground to allow the robot to track it more effectively.

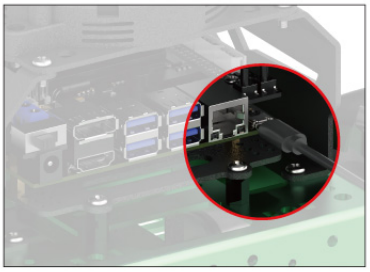
Q8: Why can't we control the robot through the APP or wireless handle?

A8: Please confirm that the installation and connectivity of APP are correct and that the handle receiver is properly inserted into the robot. Additionally, you will need to enable the APP auto-start service by referring to the PDF file provided in the QR code below. This service includes the handle control function, so it is important to ensure that it is properly enabled.

Q9: How can we resolve the issue of the computer being unable to detect the robot's hotspot after disabling "Enable Wi-Fi" on the robot's system desktop?



A9: 1. Connect Jetson Nano and computer through USB cable.
2. Access the robot system desktop using the fixed IP.
3. Refresh the Wi-Fi list on both your phone and computer to check whether the robot's Wi-Fi is available.



For detailed instructions on how to access the robot using the fixed IP, please scan the QR code below to get the related material.

Q10: How can we enable the robot to connect to the external internet?

A10: To allow the robot to access the external internet, you will need to configure the robot to STA LAN mode by following the instructions accessible through the QR code below.

产品介绍

JetAuto是幻尔科技面向ROS教育场景开发的入门型ROS轮式机器人，它搭载了NVIDA Jetson Nano、高性能磁编码电机、旋转云台、激光雷达、3D深度相机、7寸液晶显示屏等高性能硬件配置，不仅可实现机器人运动控制、建图导航、路径规划、追踪避障、自主驾驶、人体特征识别、体感交互、语音交互等应用，还可在底盘的基础上增加AI视觉机械臂，使机器人轮式移动与机械臂抓取结合，实现导航搬运、自主识别分拣等功能。

更详细的课程资料请扫描课程资料二维码获取，可自行查阅进行进阶学习。

使用声明：

1.收到产品后，请按照本册“产品清单”逐一核对。如有问题，请通过图片+文字的形式联系客服为您处理。

2.本册示意图仅供参考，请以实物为准。

3.本册以JetAuto旗舰版为例进行说明，内容也一致适用于其它配置、以及JetAuto专业开发版（JetAuto Pro）绝大部分内容。

产品介绍视频

注意事项：

1. 机器人在运动时，请将机器人远离您的脸、眼睛，避免误伤。
2. 机器人在运动时，谨防从高处边缘跌落，建议在地面操作。
3. 如购买了机器人专业开发版，当使用时，请勿将手指放在机械臂关节活动范围，造成关节损坏。
4. 机械臂持续运行时间过长，舵机会发热，需要让机械臂“休息”，直至舵机冷却，方可继续运行。
5. 请勿使用尖锐物品戳碰摄像头镜头，以免造成摄像头损坏。
6. 请勿在通电情况下，使用金属物品或者液体接触扩展板及板上元件，否则可能导致产品损坏。

课程资料（提取码：cdy9）

电池使用规范：

锂电池由于运输中不能充满，初次使用，请先给电池充电。

1.请使用套件附带的专用充电器为机器人充电。电池充电时请关闭扩展板上开关，请勿对电池边充电边使用。

2.充电器在没有接上电源的情况下连接电池，其指示灯显示绿色。充电中充电器指示灯为红色，当充满指示灯会再次变为绿色。

3.请勿将充电器直接插到Jetson主板的DC电源接口，如下图所示，否则可能会烧坏主板。

4.充电完成后应及时拔掉充电线，避免过充损坏电池。

5.为了确保机器人运行效果的稳定，当电池电压小于10V时（扩展板蜂鸣器会发出‘滴滴’报警声），此时需要先进行充电，再进行对应阶段的操作。

6.若预计长时间不使用机器人，请将电池充至满电，并将电池对接线与电源线断开。

7.电池需存储于阴凉干燥的环境中，以免电池寿命因过热、受潮等情况而减短。请勿敲击、抛掷或踩踏电池。

8.请勿在强静电或强磁场的环境下使用电池，此操作容易使电池的安全保护装置受到破坏。

9.请勿将电池接入电源插座，请勿使用金属物体连通电池的正负极。

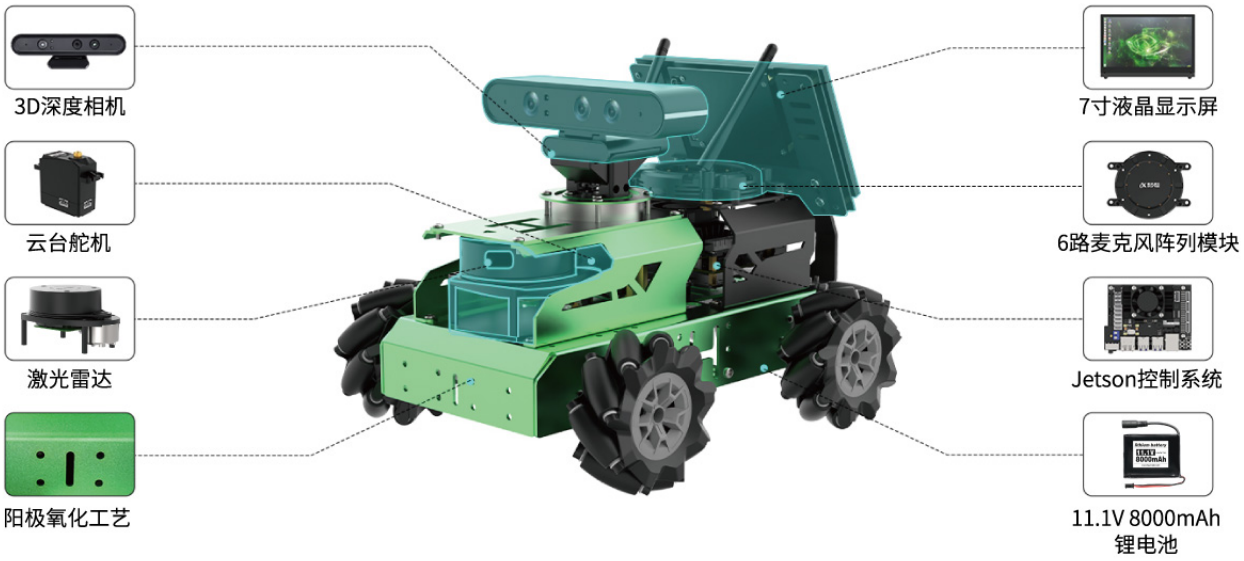
10.锂电池本身特性为过度放电会充不进去电，可能会导致电池报废。若长期不使用电池，请先将电池充满电。

11.严禁私自改装、焊接、修改电池充电器或锂电池。

12.电池储存远离高温和各类液体，防止过热、起火或受潮导致功能衰退、减小。

郑重声明：因未按照上述“注意事项及电池使用规范”规范使用而造成的产品损坏、经济损失及安全事故等后果，我司不承担任何相关责任。

JetAuto产品结构



JetAuto Pro产品结构

JetAuto产品清单

◆入门版

 JetAuto机器人 (整机发货,含雷达)	 天线	 12.6V 2A充电器	 读卡器	 无线手柄	 十字螺丝刀

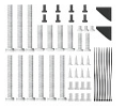
◆标准版

 JetAuto机器人 (整机发货,含雷达)	 天线	 12.6V 2A充电器	 读卡器	 无线手柄	 3D深度相机 (含固定支架)	 6.5*6.5cm标签卡片	 3*3cm彩色方块
十字螺丝刀	 备用螺丝包						

◆旗舰版

 JetAuto机器人 (整机发货,含雷达)	 天线	 12.6V 2A充电器	 读卡器	 无线手柄	 3D深度相机 (含固定支架)	 6.5*6.5cm标签卡片	 3*3cm彩色方块
 7寸液晶显示屏	 液晶屏支架	 十字螺丝刀	 备用螺丝包				

◆专业开发版(JetAuto Pro)

 JetAuto机器人 (整机发货,含雷达)	 天线	 12.6V 2A充电器	 读卡器	 无线手柄	 3D深度相机 (含固定支架)	 6.5*6.5cm标签卡片	 3*3cm彩色方块
 7寸液晶显示屏	 液晶屏支架	 型材(横梁+立柱)	 深度相机连接件	 视觉机械臂(成品)	 螺丝刀	 备用螺丝包	

◆语音麦克风阵列(选配)

 6路麦克风阵列模块	 扬声器	 声卡	 连接线

上述模块购买后会安装到车体上

配件安装教程

出于运输途中对产品的保护，部分配件需要用户拿到手后自行装配，在装配后方可进行后续体验。具体所对应的安装配件可参考下表：

版本名称	所需安装的配件
入门版	天线
标准版	3D深度相机、天线
旗舰版	3D深度相机、天线、7寸液晶显示屏
专业开发版（JetAuto Pro）	3D深度相机、天线、7寸液晶显示屏、视觉机械臂

课程资料（提取码：cdy9）

注意：

1.本册会以旗舰版和专业开发版（JetAuto Pro）分别为例进行示范，入门版、标准版亦可参考旗舰版的部分配件安装教程。

2.专业开发版所安装的3D深度相机、7寸液晶显示屏与旗舰版安装的位置不同，需参考其对应的教程。

3.安装时，请严格参照安装步骤的示例图片，切勿装反。

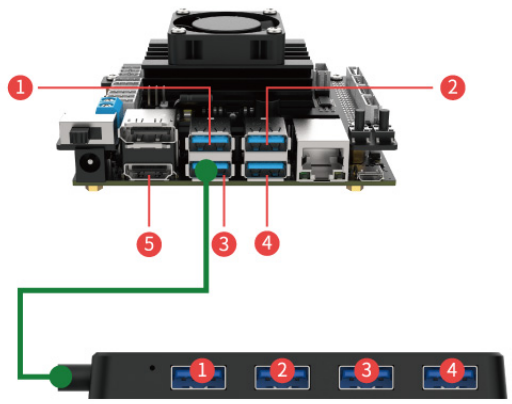
4.手柄接收器在出厂时，已安装至机器人上。

5.由于机器人所用模块较多，建议用户严格参考教程中的接口位置，以便更合理及美观地布线，同时也便于后期开发的延伸拓展。

1.旗舰版配件安装教程

1.1接口说明

下图为旗舰版各模块所连接Jetson主板的接口序号，可参照下表标准进行接线。（如购买的套餐未包含相关模块可跳过该接口）



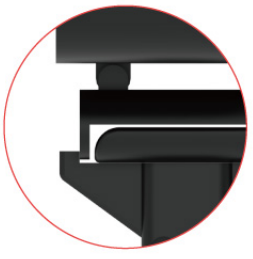
序号	接入模块
1	自定义拓展开发
2	3D深度相机
3	集线器
4	激光雷达
5	7寸液晶显示屏HDMI线（入门版、标准版不含）

集线器接入模块，可参考下表：（如已接入，请确认即可）

序号	接入模块
1	USB手柄接收器
2	7寸液晶显示屏电源线（入门版、标准版不含）
3	6路麦克风阵列模块（选配）
4	声卡+扬声器（选配）

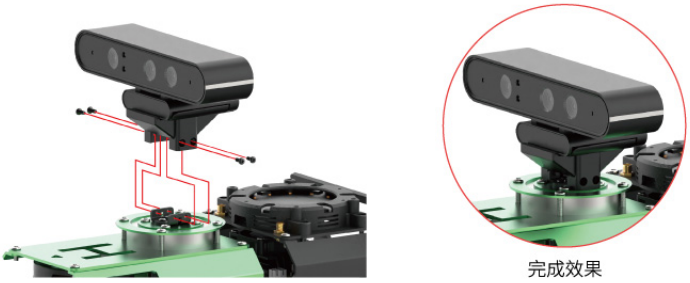
1.2安装3D深度相机

1 将3D深度相机的前侧扣入支架凸起的孔槽。

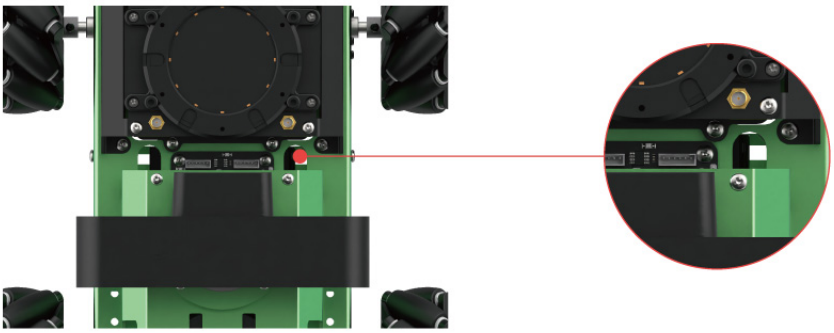


完成效果

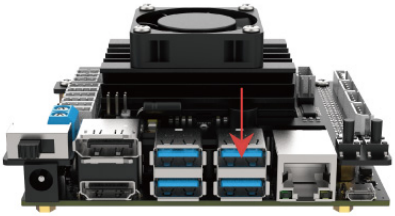
2 将3D深度相机同深度相机连接件孔位对齐，用M3*6圆头机械螺丝固定。
注意：3D深度相机镜头应朝下图所示方向安装。


完成效果

3 将3D深度相机连接线穿入下方的椭圆孔中。



4 将3D深度相机穿出的连接线接到Jetson主板②号接口。



1.3安装天线

拿出天线，顺时针拧紧即可。安装效果如下图所示：
温馨提示：天线在拧紧后，可轻微向下弯折。


完成效果

1.4安装7寸液晶显示屏

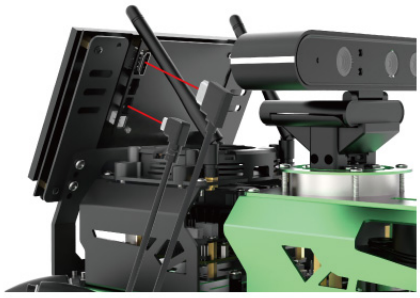
温馨提示：如未购买旗舰版的用户，则可跳过本小节步骤。

1 使用M4*6圆头机械螺丝，将屏幕固定在屏幕支架上。

完成效果

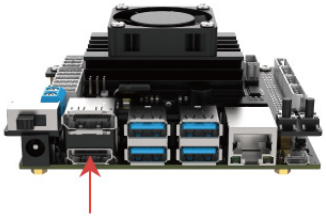
2 将HDMI线接到屏幕上的HDMI接口，电源线要接到屏幕上的CTOUCH接口。如图所示：

注意：如果未连接至CTOUCH接口，屏幕将无法实现触控功能。



完成效果

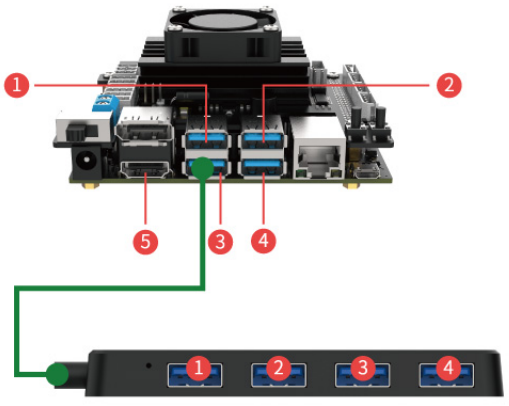
3 将HDMI和电源线另一端分别连至Jetson主板的⑤号接口、底部集线器的任意一个接口上。



2.JetAuto专业开发版（JetAuto Pro）

2.1接口说明

下图为专业开发版各模块所连接Jetson主板的接口序号，请按照下表标准进行对应连接。



序号	接入模块
1	连接视觉机械臂上的单目相机
2	3D深度相机
3	集线器
4	激光雷达
5	7寸液晶显示屏HDMI线

集线器接入模块，可参考下表：（如已接入，请确认即可）

序号	接入模块
1	USB手柄接收器
2	7寸液晶显示屏电源线
3	6路麦克风阵列模块（选配）
4	声卡+扬声器（选配）

2.2 拼装型材及安装至车体

1. 将立柱通过M6*6圆头机械螺丝固定在底盘上。

完成效果

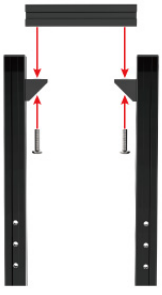
2. 将立柱通过M5*20圆头机械螺丝固定在角码上。

完成效果

3. 将角码通过M5*20圆头机械螺丝固定在立柱的最上面，另一侧安装方法同理。

完成效果

4. 将横梁通过M5*20圆头机械螺丝固定在角码上。



完成效果

5. 将立柱和横梁通过M6*25圆头机械螺丝固定。

完成效果

2.3 安装视觉机械臂

1. 将机械臂同云台U架，通过M3*6圆头机械螺丝固定在云台上。

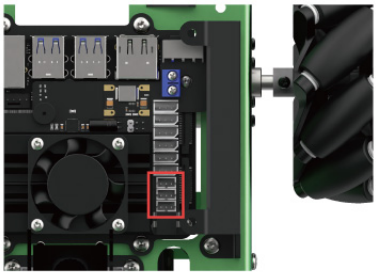
   注意：固定时注意机械爪的位置，机械爪应朝向车头。

完成效果

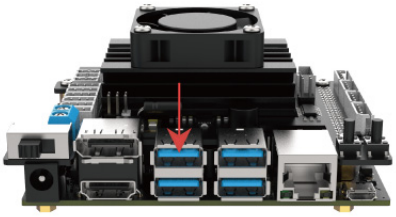
机械爪朝向效果

2. 把舵机线接到扩展板的任意一个舵机接口上。

   注意：建议将上盖拆下会方便插线，但需要注意盖子内装有天线，拆下来的时候要谨慎小心，避免扯断天线。



3. 把机械臂上的单目相机USB线接到Jetson主板的①号接口。

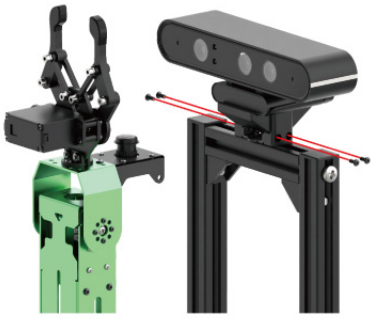


2.4 安装3D深度相机

1. 取出深度相机连接件，通过M3*15圆头机械螺丝固定在横梁上。

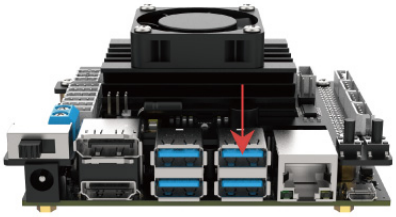
完成效果

2. 将3D深度相机通过M3*6圆头机械螺丝固定在深度相机连接件上。



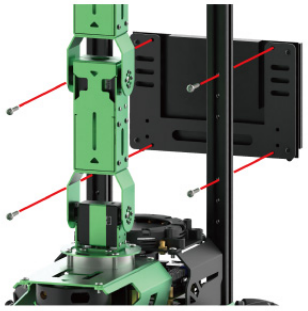
完成效果

❸ 将3D深度相机USB线连接至Jetson主板的②号接口。



2.5 安装7寸液晶显示屏

❶ 使用M4*20圆头机械螺丝将屏幕安装到立柱上，如下图所示：



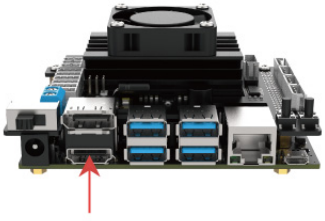
完成效果

❷ 将HDMI线接到屏幕上的HDMI接口，电源线要接到屏幕上的CTOUCH接口。如图所示：

注意：如果未连接至CTOUCH接口，屏幕将无法实现触控功能。

完成效果

❸ 将HDMI和电源线另一端分别连至Jetson主板的⑤号接口、底部集线器的任意一个接口上。



2.6 安装天线

拿出天线，顺时针拧紧即可。安装效果如下图所示：

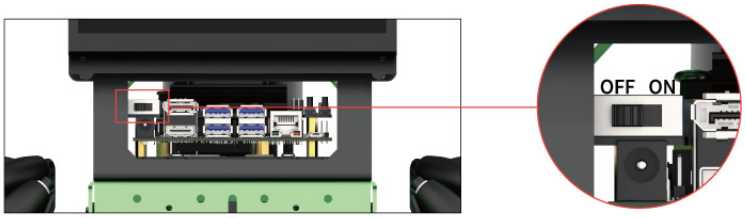
温馨提示：天线在拧紧后，可轻微向下弯折。

完成效果

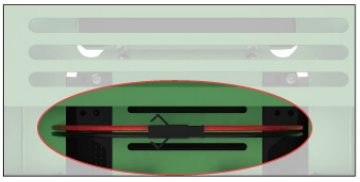
首次开机

1.充电及使用前说明

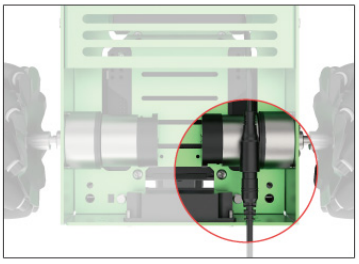
1. 确保将扩展板的开关推至“OFF”挡。



2. 查看机器人底部，将电池对接线以红对红、黑对黑的形式连接。



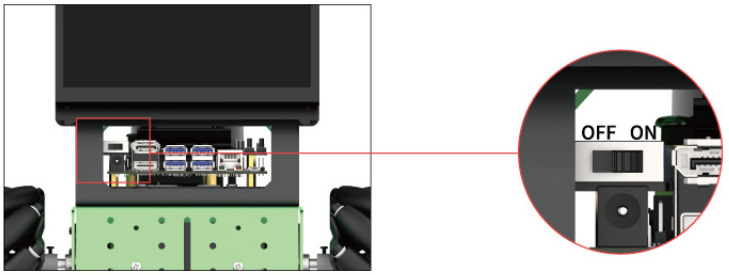
3. 找到电池的DC插口，取出套件附带的专用充电器，将充电器的插头连接至电池。



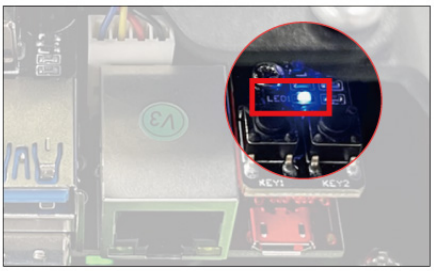
4. 可通过查看充电器上的指示灯了解充电状态。红色表示充电中，绿色表示充电完成。充电时长约为4个小时，充电完成后请及时将充电器拔下，避免过度充电。

2.开机

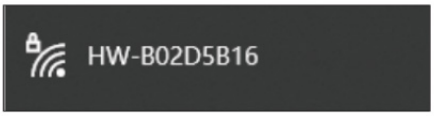
1. 将扩展板上的开关推至“ON”挡。



2 在20~30S后，扩展板上的LED1将亮蓝灯并闪烁，等待蜂鸣器发出“嘀”的一声，说明ROS配置完成，设备启动完毕。



3 设备出厂默认为AP直连模式，开机成功后，会产生一个以“HW”开头的热点，首次连接时需输入密码“hiwonder”。



4 购买旗舰版或专业开发版的用户，在安装7寸液晶显示屏后，开机完成屏幕将显示系统启动后的桌面。

上手试玩

下载APP

1.安装与连接

苹果/安卓用户可扫描右上方二维码下载并安装APP。其中苹果需要确保系统在9.0及以上，安卓系统在5.0及以上。

安卓用户特别需要注意，请务必在手机设置内为APP开启所有权限，否则可能会影响正常功能实现！

此处以安卓系统下的手机 APP 为示例进行操作，此流程同样适用于 iOS 系统。

1 打开手机APP“WonderAi”，依次点击“进阶套件”、“JetAuto”。(如果是专业开发版的用户则选择“高阶套件 -> JetAuto Pro”，其余连接方法同后文一致)。

2 点击界面右下方的“+”按键，选择“直连模式”。

❸ 点击“去连接设备热点”按键，前往设置界面，连接机器人生成的热点。

❹ 热点名称以“HW”为开头，热点密码为“hiwonder”。

注意：iOS系统下，需等待手机状态栏显示Wi-Fi图标 后再返回APP，否则可能会搜索不到设备。若出现搜索不到设备的情况，可点击APP界面右上方的刷新图标 。

❺ 返回手机APP，点击对应的机器人图标，进入模式选择界面。

注意：若手机弹窗提示“网络不可用，是否继续连接”之类的弹窗，单击“保持连接”即可。

2.APP控制

机体遥控

1)点击模式选择界面的“机体遥控”，可进入该玩法的操作界面。该界面可分为两部分，左侧是玩法控制区域，右侧是摄像头回传画面显示区域。

可扫描二维码获取
手机APP控制演示

如果连接了专业开发版（JetAuto Pro），机体遥控的界面则与上图略有不同，会在此基础上增加单目与3D深度相机切换、机械臂控制的功能，如下图所示：

2)机体遥控图标对应功能可参考下表，我们点击对应图标即可实时控制机器人移动。

图标	功能说明	图标	功能说明
	开启/关闭重力控制模式。		（专业开发版功能）可将摄像头切换为3D深度相机或单目相机。
	拖动摇杆可控制JetAuto机器人朝各个方向（360°）平移。特别注意：控制机器人时，我们是以机器人为第一视角判定方向，而不是以APP右侧回传图像进行判定。		（专业开发版功能）调出视觉机械臂的操控页面。 
	调节机器人的移动速度，数值范围是10-100。		
	控制机器人左右转。		
	显示摄像头当前画面，拖动画面可对摄像头云台进行转动。		

3)点击“重力控制”按键后，将手机屏幕水平朝上，倾斜手机屏幕，JetAuto机器人会根据手机倾斜方向进行移动，具体操作方法如下表所示：

手机倾斜方向	功能说明
	
前低后高	控制机器人前进
前高后低	控制机器人后退
左低右高	控制机器人左平移
左高右低	控制机器人右平移

激光雷达

注意：

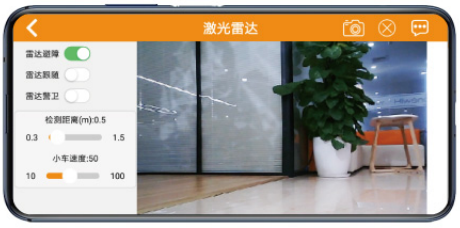
1）启动玩法前，请将机器人放置于宽阔平台处，确保它拥有足够的活动空间。

2）为了获得更好的体验效果，尽量将障碍物放置在机器人前方，请勿放置在侧面。

点击模式选择界面的“激光雷达”，可进入该玩法的操作界面。该界面可分为两部分：

1）界面左侧是玩法开关和参数调节区域；

2）界面右侧是摄像头回传画面显示区域。



“激光雷达”玩法分为3种模式，分别是雷达避障、雷达跟随和雷达警卫。

◆ 雷达避障

1）点击“雷达避障”右侧的开关按键，启动该玩法模式，机器人会不断前进。

2）当检测到障碍物，机器人会自动转向以躲避障碍物。

◆ 雷达跟随

1）点击“雷达跟随”右侧的开关按键，启动该玩法模式。

2）当检测到障碍物，机器人会调整自身位置，使机体和障碍物始终保持一定距离。

◆ 雷达警卫

1）点击“雷达警卫”右侧的开关按键，启动该玩法模式。

2）当检测到障碍物，机器人会调整机体朝向，使机体面向障碍物。

智能巡逻

注意：

1）本玩法不支持专业开发版（JetAuto Pro）版本。

2）启动玩法前，请将机器人放置于宽阔平台处，确保它拥有足够的活动空间。

点击模式选择界面的“智能巡逻”即可进入该玩法的操作界面。点击“开始”按键，启动玩法。以正方形模式为例，点击APP界面左侧的“正方形模式”按键，机器人会以当前位置为原点，开始以正方形为轨迹进行移动。

目标追踪

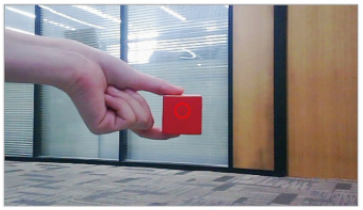
注意：

1）本玩法建议将摄像头稍微向下一点，使目标物体和机器人处于同一个地面上，以平移方式移动目标物体，这样可以获得更好的体验效果。

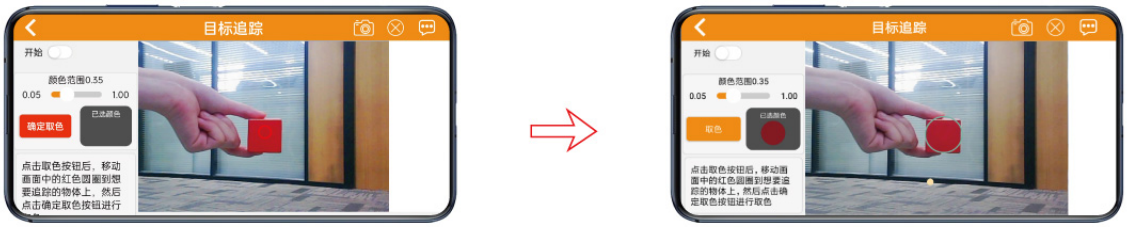
2）确保摄像头的视野范围内不存在其他包含目标识别颜色的物体，以免影响玩法的实现效果。

1）点击模式选择界面的“目标追踪”，可进入该玩法的操作界面。

2）点击“取色”按键后，将回传画面内的红色圆圈拖动至目标物体处以选取颜色。



3）点击“确定取色”按键后，“已选颜色”处会显示当前选择颜色。



4) 点击“开始”按键，启动玩法。移动目标物体，机器人会随之进行移动。

巡线行驶

注意：

1) 本玩法在开始前需要将摄像头稍微向下。

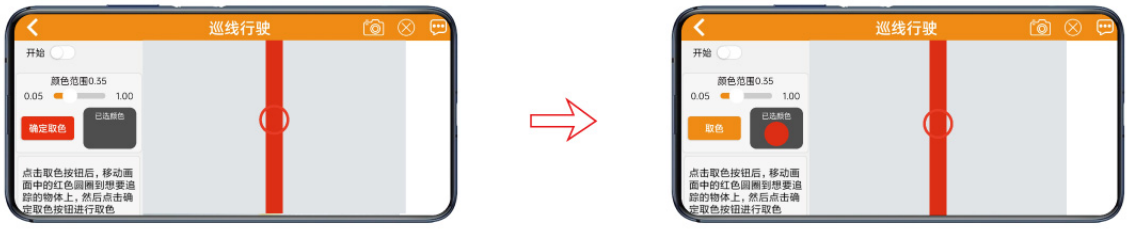
2) 启动玩法前，请用胶带铺设巡线轨道，并将机器人放置在轨道上。

3) 启动玩法后，请确保摄像头的视野范围内不存在其他包含目标识别颜色的物体，以免影响玩法的实现效果。

1) 点击模式选择界面的“巡线行驶”，可进入该玩法的操作界面。

2) 此处以红色胶带为例，点击“取色”按键后，将回传画面内的红色圆圈拖动至轨道处以选取颜色。

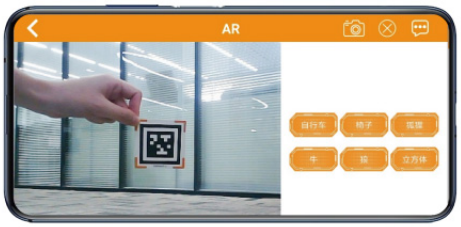
3) 点击“确定取色”按键后，“已选颜色”处会显示当前选择颜色。

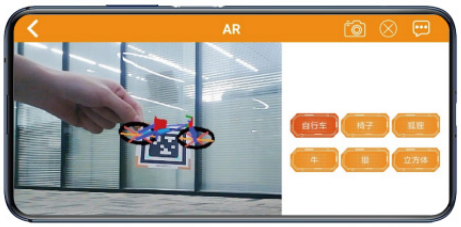


4) 点击“开始”按键，启动玩法，机器人会沿着轨道前行。

AR

点击模式选择界面的“AR”即可进入该玩法的操作界面。将附赠的任意一张标签放置于摄像头的视野范围内，并点击任意一个三维图像选项，此处以“自行车”为例，回传画面内的标签处会显示自行车的三维图像。





常见问题解答

问题1： 为什么打开电源开关，机器人却无法开机？

解答： 需要确认电池对接线是否已对接。
因快递运输安全要求，电池对接线在出厂时是断开的。在充电及使用机器人前，用户需要先将对接线以红对红、黑对黑的形式进行对接，操作方法可前往本手册“首次开机->1.充电及使用前说明”的位置处进行学习。

问题2： 部分安卓手机APP能连接到机器人的热点，但却搜索不到设备？

解答： 1. 检查是否为手机APP提供了所有的权限。
2. 把手机的移动数据关闭掉，确认GPS信号定位是否打开。
3. Wi-Fi连接后返回APP，然后在APP内点击 按键刷新设备。

问题3： 为什么购买了7寸液晶显示屏，在连接屏幕后无法实现触摸功能？

解答： 需要确认屏幕上的电源线是连接在了“CTOUCH”接口上。
注意，连接在“CTOUCH”上即可触控，而如果是连接在了“Power”上，则只具备供电作用，无法触控。

问题4： 为什么打开手机APP玩法，摄像头却没有画面显示？

解答： 使用时不小心触碰到了摄像头的连接线可能会造成此现象，可在开机前检查下摄像头USB口是否插稳，或者重新插拔。

问题5： JetAuto专业开发版（JetAuto Pro）为什么开机成功后，视觉机械臂上的舵机还可以掰动？

解答： 1. 请检查一下舵机线是否有插紧。
2. 参考本手册内容，通过手机APP的“机体遥控”功能，对每个舵机进行单独控制，排查是否能正常转动。

问题6： 为什么使用一段时间，蜂鸣器“滴滴”报警？

解答： 机器人支持低压报警，当电池电压低于10V后，蜂鸣器会发声提示，此时需让机器人尽快充电，以确保其功能及玩法效果的稳定性。

问题7： 为什么目标追踪或巡线行驶相关玩法效果不佳？

解答： 1.取色颜色范围要适中，不宜过大或过小，范围过大则会把目标以外的颜色取进去，过小则容易丢失目标，同时摄像头画面内不要出现与目标颜色相近的物体。

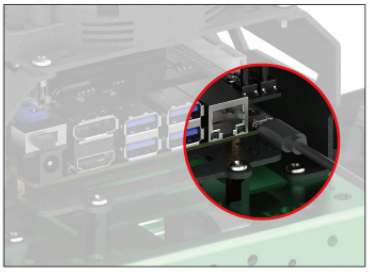
2.在执行目标追踪玩法时，请尽量使目标物体同机器人处于同一地面上。

问题8： 为什么无法通过手机APP或手柄控制机器人？

解答： 确认手机APP、接收器等无误后，可通过扫描下方二维码，前往电子资料查看如何开启手机APP自启服务（该服务内包含了手柄控制）。

问题9： 进入机器人系统桌面后不小心将Enable Wi-Fi取消勾选了（如下图所示），从而导致搜索不到机器人热点？

解答： 首先使用USB线连接Jetson主板到电脑端口，然后通过访问固定IP的方式来进入机器人系统桌面，最后重新刷新手机或电脑的Wi-Fi列表。



关于访问固定IP的这种方式，可扫描下方二维码来参考。

问题10：如何让机器人连接外部Wi-Fi？

解答： 连接外部网络需将机器人配置为STA局域网模式，可扫描下方二维码参考“局域网模式连接”章节。