

First Trial

1. Configure and connect APP

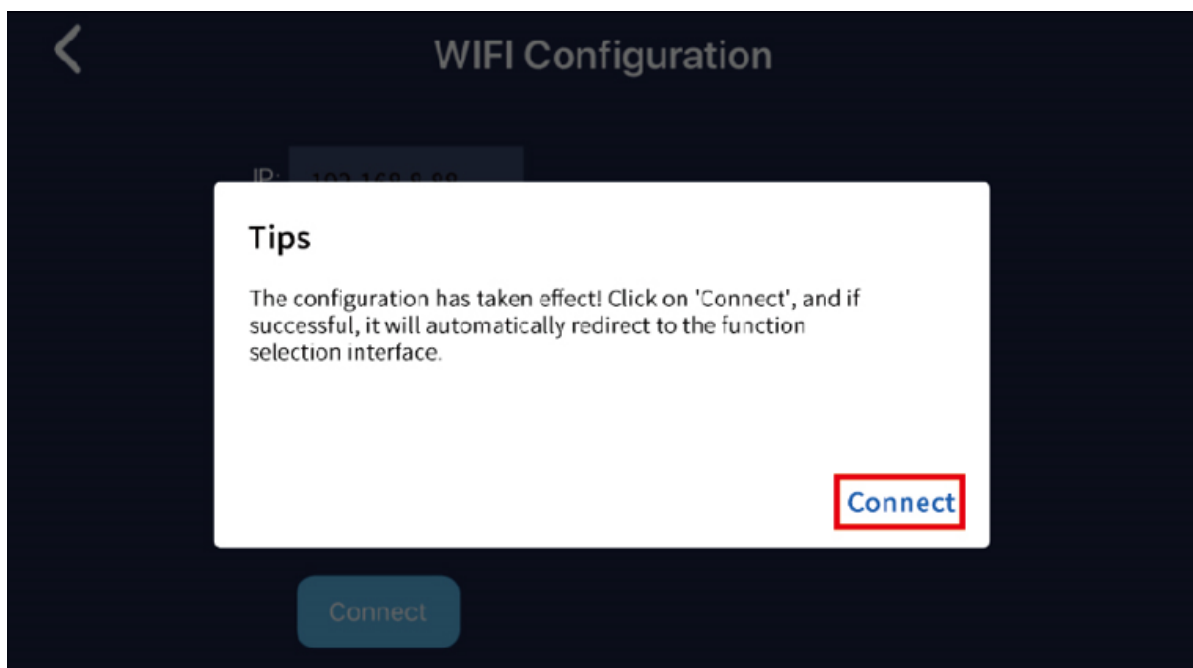
1. Please install the robot device correctly according to the instructions, and then power on the device.
2. Turn on the power switch and wait for about 1 minute. When you hear the buzzer "beep~beep~beep~", it means that the system initialization is complete and the robot arm will rotate to the initial posture.
3. Check the OLED light on the expansion board to get the IP address of the device.



4. Open the WiFi settings on the mobile phone and connect to the hotspot signal of the robot arm [DOFBOT-Pro], password: 12345678.
5. Open the [YahboomRobot] APP. For the first time, you need to select [ROS Robot] -> [DOFBOT Pro] device.



6. Click [IP Connection], then enter the IP address of the device, keep the others unchanged, and click [Connect].
7. Click [Connect] again. If the connection is successful, it will automatically jump to the configuration interface.



8. [Servo Calibration]: Before using the robot arm, the center position of the robot arm is very important. The deviation of the center position will directly affect the accuracy of all subsequent gameplay.

Press the [Return to Center] button to determine whether the robot arm is vertically upward, left and right centering, and the mechanical claw is gripping. If normal, please click the [Skip] button. If not, click [Start Calibration].



Guide: DOFBOT Calibration

All servos must be calibrated before DOFBOT is used, otherwise it will not work properly. Press the [Middle] button to check whether DOFBOT is in the state of vertical upward, horizontal center, and the mechanical claw is closed. If it is normally, please click the [Skip], otherwise, we need the click [Calibration] button to calibrate each servo

1

2

3

4

5

6

Middle

Calibrate

Skip

9. After clicking [Start Calibration], the robot arm calibration state will be entered. Carefully check whether the robot arm is upright, whether the left and right centering is normal, and the mechanical claw should be pressed by hand to the gripping state. After the adjustment is completed, click [Confirm Calibration]. When the indicator rings of all numbers change from blue to green, it means that the setting is successful. Click [Next].



Guide: DOFBOT Calibration

As shown in the figure on the left, adjust DOFBOT to vertical upward, horizontal center, and the mechanical claw is closed. Then click [Ok]. Waiting for all servo numbers to become green, which means that all servo has been calibrated successfully. If the number is red, the current servo angle is beyond the adjustment range

1

2

3

4


5

6

Last

Ok

Next



Guide: DOFBOT Calibration

As shown in the figure on the left, adjust DOFBOT to vertical upward, horizontal center, and the mechanical claw is closed. Then click [Ok]. Waiting for all servo numbers to become green, which means that all servo has been calibrated successfully. If the number is red, the current servo angle is beyond the adjustment range

1

2

3

4

5

6

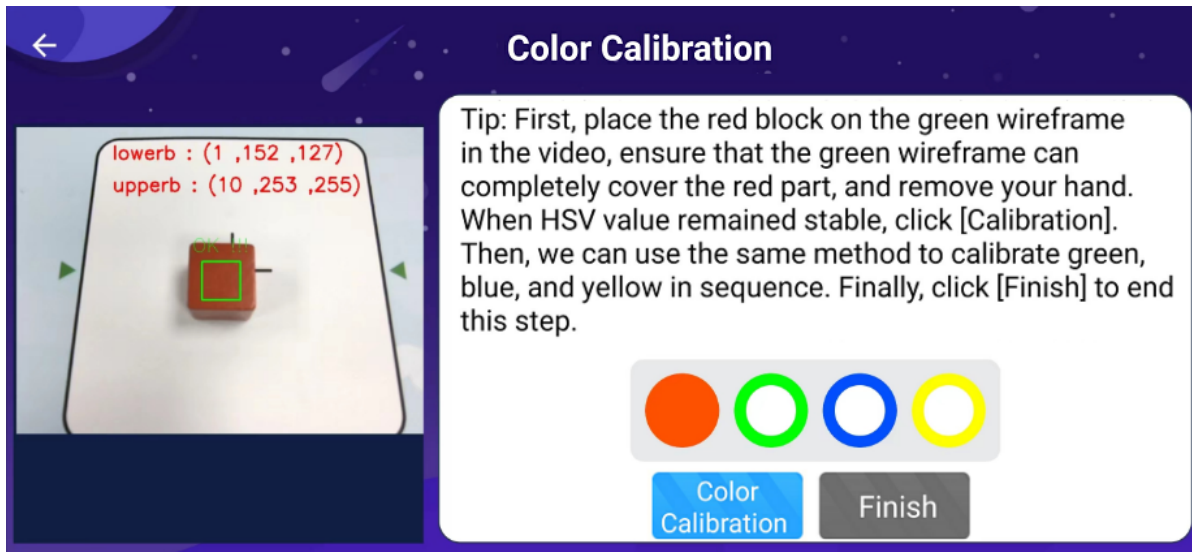
Last

Ok

Next

10. [Color Calibration]: Please bring the red block to the position of the camera's field of view box and the recognition box can completely cover the color block, take your hand away, wait for the HSV value of the color displayed in real time in the image to stabilize, and then

display OK. Click [Color Calibration] to complete the calibration of the color, and then check the green, blue, and yellow blocks in turn according to the method just now. If a color does not need to be calibrated, you can click [Skip] and finally click [Finish].



2. Mobile APP control

The main interface of the robot arm's APP is divided into eight modules in total, and each module corresponds to a different function.

2.1. Remote control



Click the [Remote Control] icon on the main interface, and the following interface will appear.

The left side is the screen displayed by the camera, and the upper right side shows a robotic arm with numbers 1 to 6, representing the six servos of the robotic arm. When it is displayed in red, it means that the servo with the current ID number is selected, and then you can drag the slider below or press the buttons on the left and right sides to adjust the position of the servo.

[Get Angle]: After each click, the APP will read the angle of the current servo and update it to the slider above.

[Return to Center]: The robotic arm stands upright.

[Emergency Stop]: After clicking this button, the robotic arm turns off the torque, the servo no longer receives control commands, and there is no function to maintain the current position. You can use your hands to move the positions of all servos. Clicking again will turn on the torque of the robotic arm, and all servos will maintain their current positions and can receive control commands.

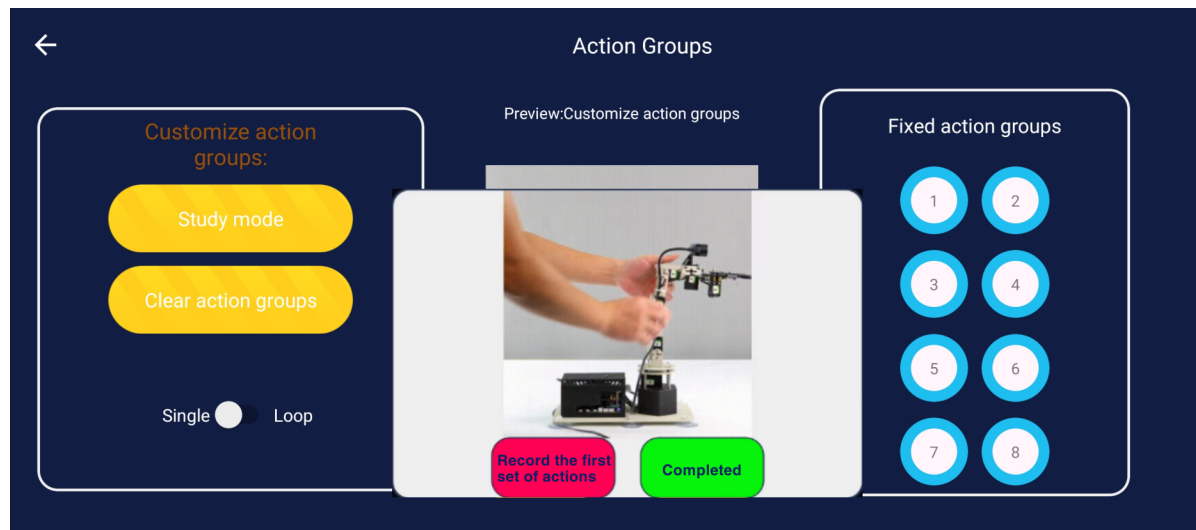
2.2. Action Group



Click the [Action Group] icon on the main interface, and the following interface will appear.

There are two ways to play the action group. The first is the custom action group on the left, and the second is the fixed action group on the right. The preview screen of the action group in the middle, the running action group and the stop action group. Click [Run] to run the current action group. Click [Stop] and the robot will stop running the action group.

[Custom Workgroup]: allows the robot to learn and execute action groups. Click [Learning Mode], a dialog box will pop up, and the RGB light on the robot expansion board will show a breathing light state:



Click the [Record Xth Action] button, the robot will record the current posture as an action group, and the RGB light breathing light on the robot expansion board will change color, indicating that the action has been recorded. If you want to exit after recording multiple groups of actions, click [Finish Learning], and the breathing light on the expansion board will go out. Click the [Run] button in the action group interface to run the action group that the robot has just learned.

If a red breathing light appears, it means that the learning is wrong or the recorded action group is full (up to 20 groups of actions can be stored). Please click the [Finish Learning] button to exit.

[Fixed Action Group]: Click different number buttons to know the function of the corresponding action group from the preview window. When you click [Run], the fixed robot action group function will be run.

2.3. Gesture interaction



Click the [Gesture Interaction] icon on the main interface, and the following interface will appear.



Gesture interaction includes two gameplays, the first is gesture recognition action, and the second is gesture recognition stacking; after selecting the corresponding function, click the slider on the right of [Gameplay Switch] to start the gameplay; the function preview window will display the guidance function operation; click the slider of [Gameplay Switch] again to turn off the function.

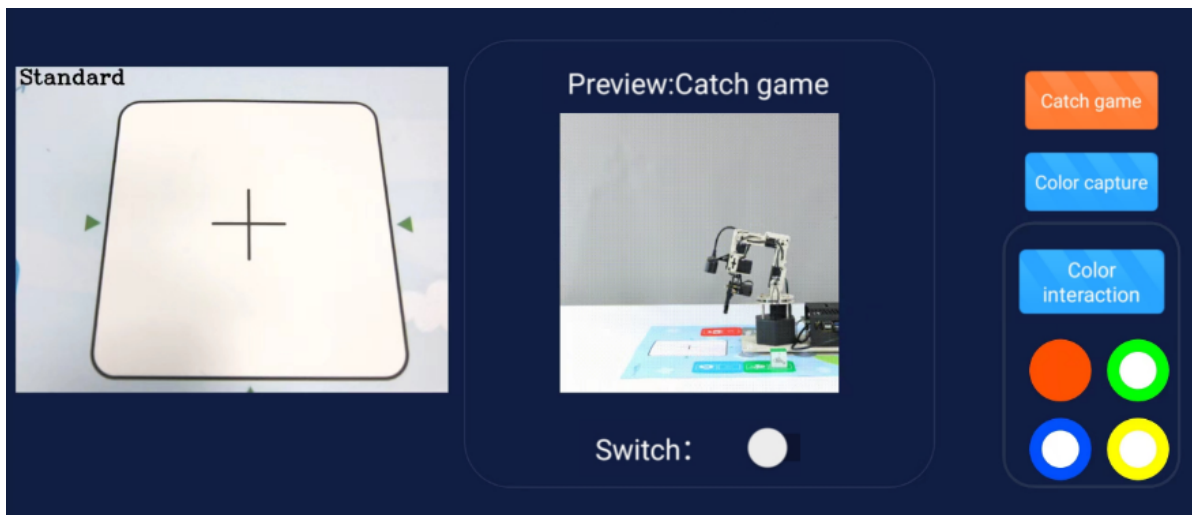
[Gesture Recognition Action]: Can recognize gestures 1~5 and perform corresponding actions.

[Gesture Recognition Stacking]: Recognize gestures 1234, respectively grab the blue, green, red, and yellow building blocks and stack them in order. When gesture 5 is recognized, all blocks are pushed down and the recognition data is reset.

2.4. Color Interaction



Click the [Color Interaction] icon on the main interface, and the following interface will appear.



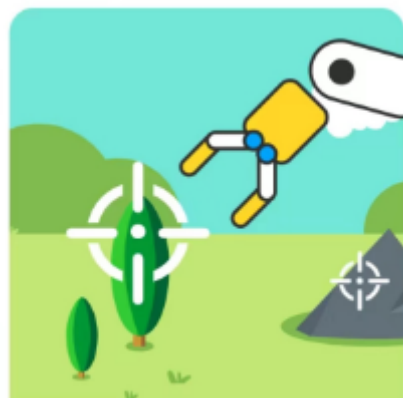
Color interaction includes three gameplays in total. The first is "Let Me Catch", the second is "Color Grabbing", and the third is "Luring the Snake Out of the Hole". After selecting the corresponding function, click the slider on the right of [Gameplay Switch] to turn on the function, and click again to turn off the function.

[Let Me Catch]: Place the block on the cross on the map, and the robot arm will automatically identify the current color and grab the block and put it in the area of the corresponding color.

[Color Grab]: Put the building block in front of the camera. After the robot arm recognizes the color of the building block, it will sound a whistle. You need to put the building block in the area of the corresponding color. The robot arm will grab the building block from the corresponding color area to the cross.

[Luring the Snake Out of the Hole]: Select the color below and turn on the gameplay switch. Put the building block of the selected color in front of the camera of the robot arm. The robot arm will imitate the movement of the snake. When the "snake" is led to the longest, it will open its claws to grab the building block and put it down. When the building block is infinitely close to it, the "snake" will tremble with fear. When switching colors, turn off the gameplay switch first to be effective.

2.5. Tracking gameplay



Click the [Tracking gameplay] icon on the main interface, and the following interface will appear.



The tracking gameplay includes three gameplays in total. The first is color tracking, the second is color picking tracking, and the third is face tracking. Click the slider on the right of [Gameplay Switch] to turn on the function, and click again to turn off the function.

[Color Tracking]: Select a color, turn on the gameplay switch, and then put the building block of the corresponding color in front of the camera. Move the building block and the robotic arm will move with the building block.

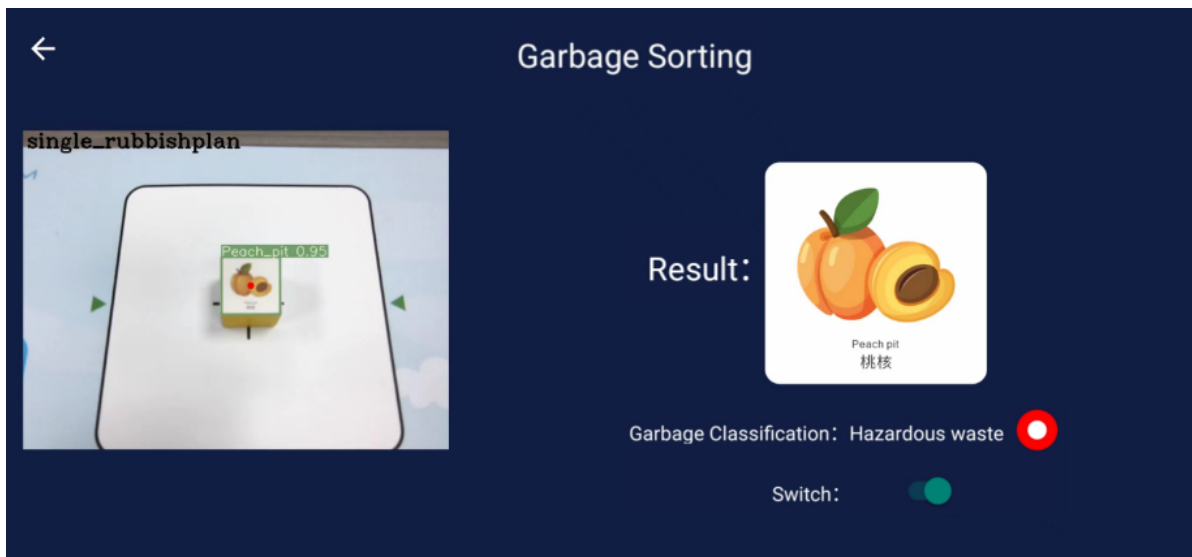
[Color Picking Tracking]: After clicking the [Color Picking Tracking] button, a box will be displayed on the camera interface. Fill the box with the color to be tracked. After the color is accurately picked, click the slider on the right of [Gameplay Switch]. The system will fully detect the outline of the color and the robotic arm will move with it.

[Face Tracking]: Click the [Face Tracking] button, then click the slider on the right side of [Gameplay Switch]. The robot arm will detect whether there is a face in the current camera image. If there is a face, it will mark and track the face movement.

2.6. Garbage Sorting



Click the [Garbage Sorting] icon on the main interface, and the following interface will appear.

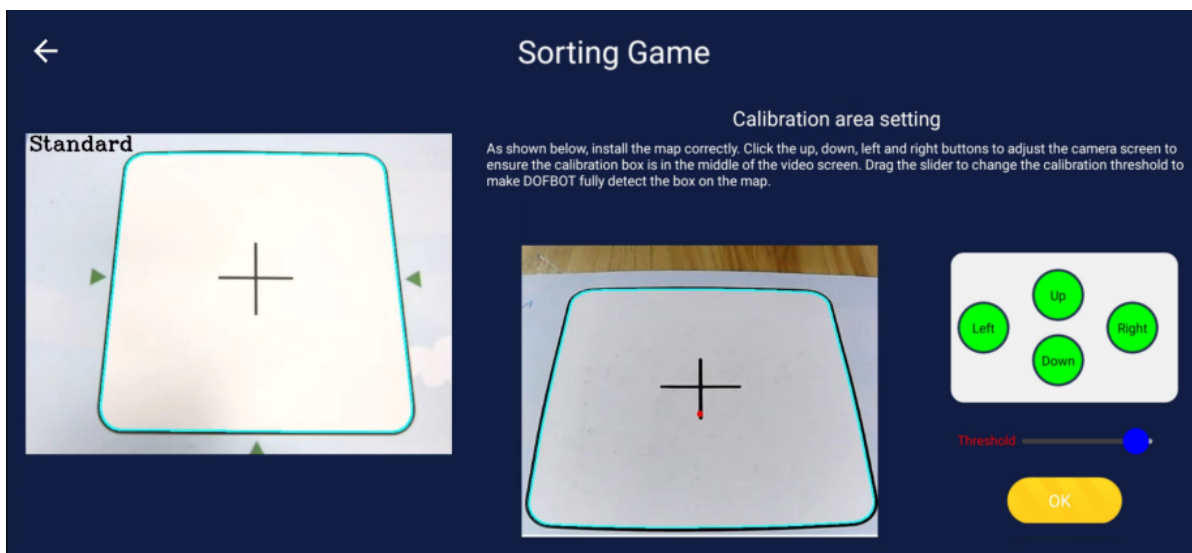


Click the slider on the right side of [Gameplay Switch], the system will automatically load the model, and after the red prompt [Model-Loading...] in the image disappears, place the block with the garbage picture in the camera's field of view. The garbage sorting function can identify the type of garbage attached to the current building block. The camera collects information in the picture and displays the type of garbage on the APP. After continuous identification for 10 times, the garbage is sorted according to the garbage type to the corresponding garbage location in the map.

2.7. Developer gameplay (Beta)

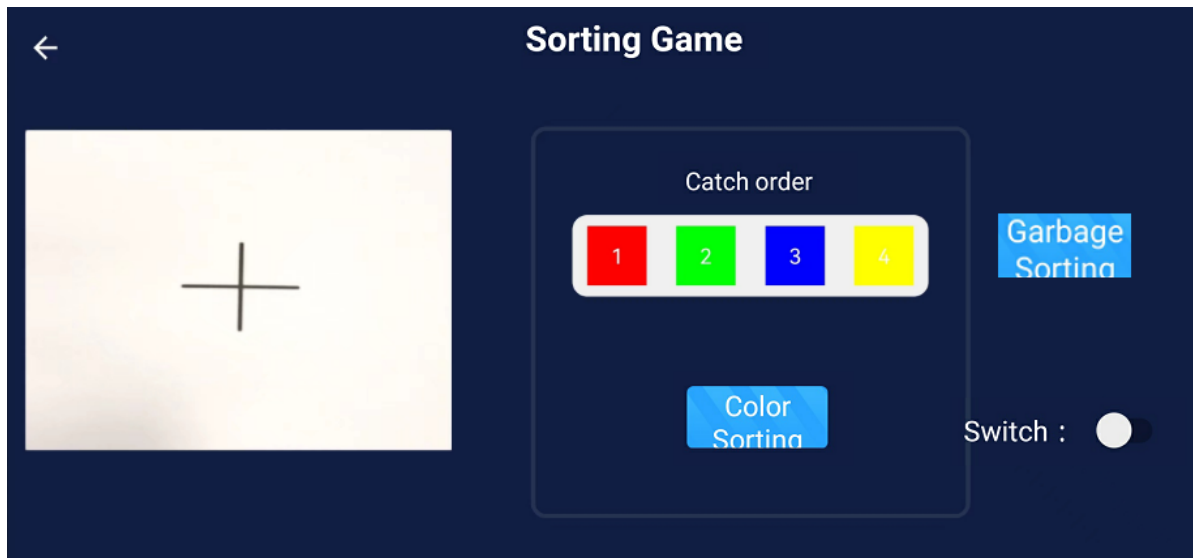


Click the [Developer gameplay (Beta)] icon on the main interface, and the following interface will appear.



Adjust the [up, down, left, and right] buttons to move the robot arm so that the box appears completely in the field of view. Slide the slider of [calibration threshold] to adjust the border detection threshold until the four sides of the box are completely detected, as shown in the figure above. Click [Confirm calibration] to enter the function interface.

[Sorting gameplay] interface, as shown in the figure below.



[Color sorting] gameplay: Click [1], [2], [3], [4] boxes to change the color (black means not selected).

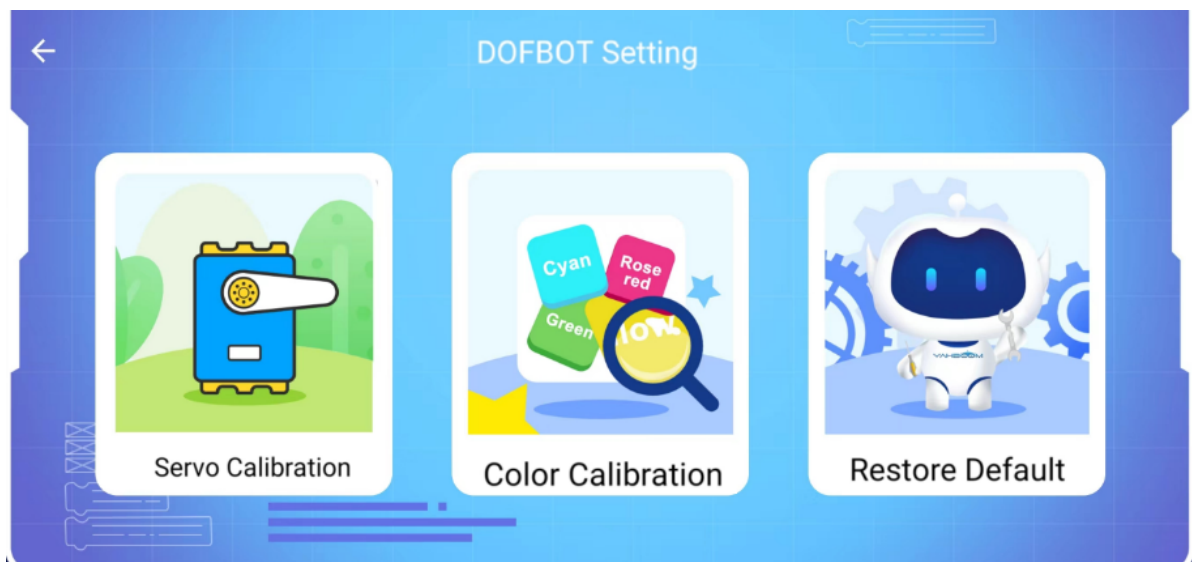
Click the [Color Sorting] button to open the color recognition channel. After the color recognition is correct, click the slider on the right side of [Game Switch] to sort and grab according to the color selection order.

[Garbage Sorting] Gameplay: Click the [Garbage Sorting] button to load the model. Please wait patiently. After the red prompt [Model-Loading...] in the image disappears, place the block with the garbage picture in the camera field of view. The system automatically recognizes it. Click the slider on the right side of [Game Switch] to start sorting the building blocks into the corresponding category.

2.8. Robot Arm Settings



Click the [Robot Arm Settings] icon on the main interface, and the following interface will appear.

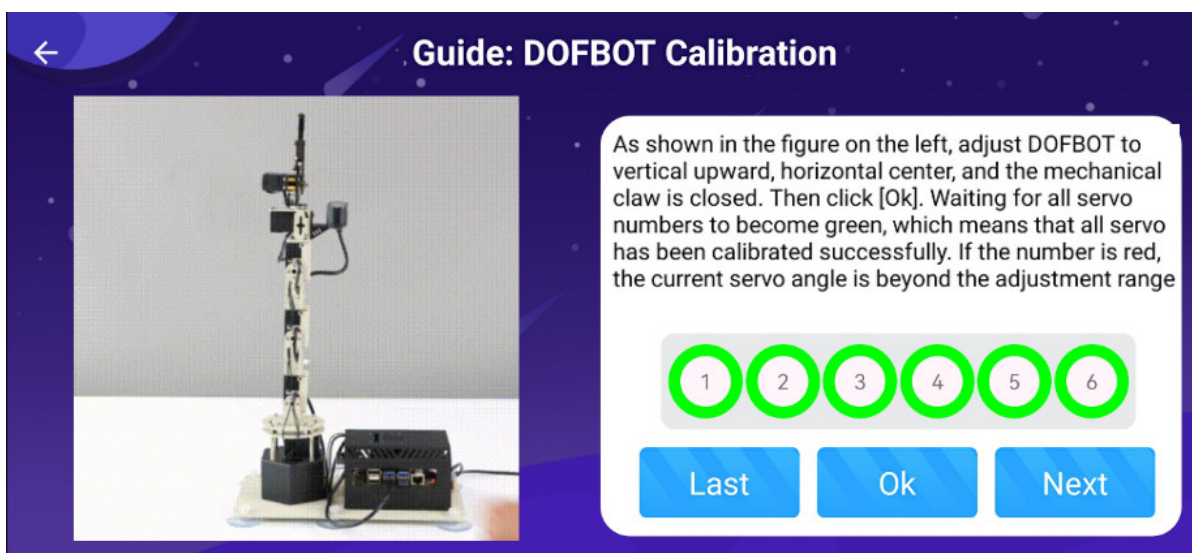


The robot arm settings include three functions in total. The first is servo calibration, the second is color calibration, and the third is to restore the default configuration.

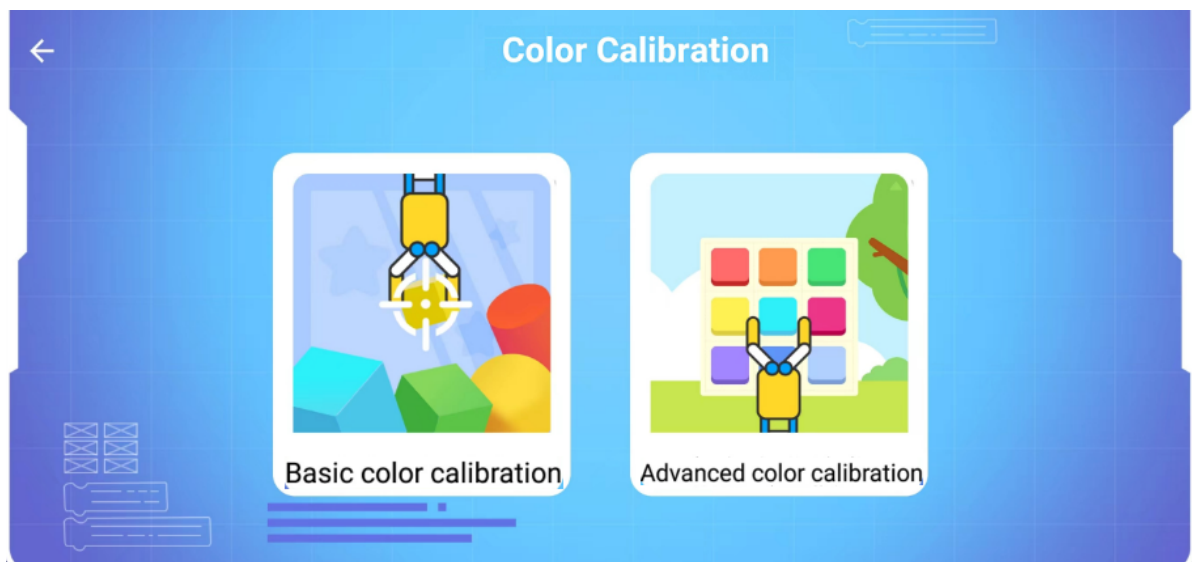
[Servo Calibration]: Before using the robot arm, the center position of the robot arm is very important. The deviation of the center position will directly affect the accuracy of all subsequent gameplay.

Press the [Return to Center] button to determine whether the robot arm is vertically upward, left and right, and the mechanical claw is grasped. If normal, please click the [Skip] button. If not, click [Start Calibration].

After clicking [Start Calibration], you will enter the state of calibrating the robotic arm. Carefully check whether the robotic arm is upright and whether the left and right centering is normal. The mechanical claw should be pressed by hand to the gripping state. After the adjustment is completed, click [Confirm Calibration]. When the indicator rings of all numbers change from blue to green, it means that the setting is successful. Click [Return].



[Color Calibration] Instructions: Color calibration has two functions. The first is [Entry-level Calibration], which has the same function as in the boot configuration, and the second is [Professional Color Calibration].

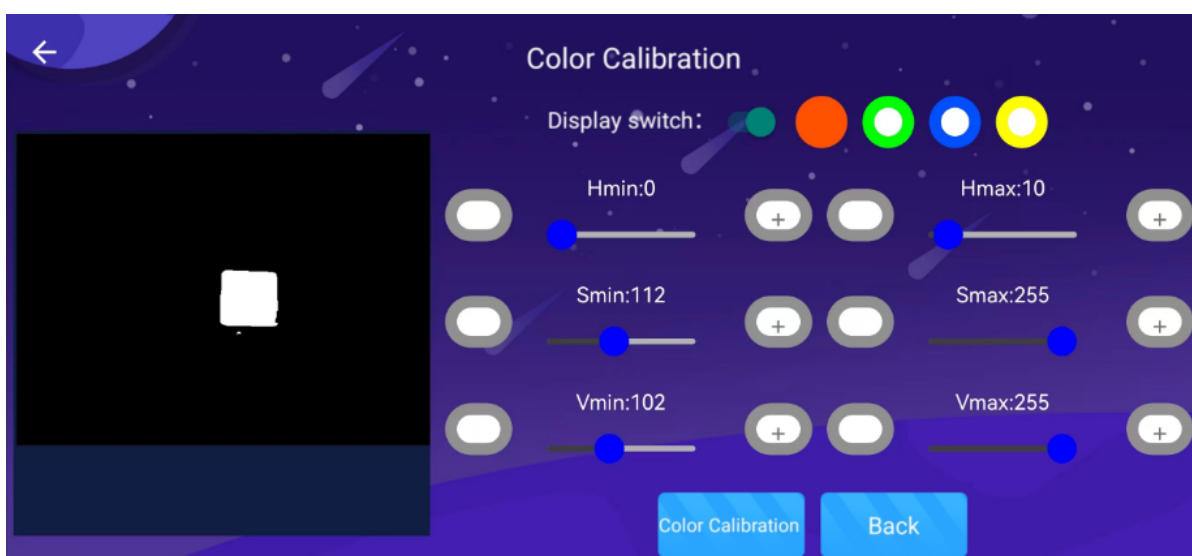


[Color Calibration] Instructions: Please bring the red building block to the position of the camera's field of view box and the recognition box can completely cover the color block, take your hand away, wait for the HSV value of the color displayed in real time in the image to stabilize, and then display OK. Click [Color Calibration] to complete the calibration of the color, and then check the green, blue, and yellow building blocks in turn according to the method just now. If a color does not need to be calibrated, you can click [Skip] and finally click [Finish].

[Color Professional Calibration] Instructions: First put the four color building blocks at the same time

[Professional Color Calibration] Instructions: First put the four colors of building blocks in the field of view at the same time, select the color to be calibrated, then slide the [Display Switch] button to view the black and white image, adjust it through the HSV slider until no interfering color is detected, click [Color Calibration] to complete the calibration of the color, and calibrate other colors in the same way.

Verify the result, change the position of the building blocks at will, and click [Return] to accurately identify the building blocks under the color image. For detailed introduction, please refer to the course [Visual Basic Course] -> [Color Calibration].



[Restore default configuration] Instructions: Clear the configuration information of the APP. You need to reboot the configuration robot before you can use it again.

