AI Model Preparation

1. LiDAR Mapping

Refer to the instructions in [11.Lidar Course] - [5. Gmapping-SLAM mapping] in this product tutorial to start the car and build and save the map. This map will be used for navigation in the AI large model later.

2. Color Calibration

Start the color calibration program to calibrate and save the HSV values of the four colors (red, green, blue, and yellow) in a parameter file. This parameter file will be loaded later in the AI large model color tracking example, primarily for voice commands such as "Start tracking red," "Start following the yellow block," etc.

- USB Camera

Source Code Path: `~/yahboomcar_ros2_ws/yahboomcar_ws/src/yahboomcar_voice_ctrl/yahboomcar_voice_ctrl/colorSelect.py`

Parameter File Path: `~/yahboomcar_ros2_ws/yahboomcar_ws/src/yahboomcar_voice_ctrl/yahboomcar_voice_ctrl/colorHSV.text`

"Start patrolling the green line," "Start autonomous driving patrolling the red line," and so on.

📝 You can copy the color parameters in `colorHSV.text` to `colorfollowHSV.text`.

Line-following autonomous driving parameter file path: `~/yahboomcar_ros2_ws/yahboomcar_ws/src/yahboomcar_voice_ctrl/yahboomcar_voice_ctrl/colorfollowHSV.text`

- nuwa Depth Camera

Source code path: `~/yahboomcar_ros2_ws/yahboomcar_ws/src/yahboomcar_voice_ctrl_depth/yahboomcar_voice_ctrl_depth/colorSelect.py`

Parameter file path: `~/yahboomcar_ros2_ws/yahboomcar_ws/src/yahboomcar_voice_ctrl_depth/yahboomcar_voice_ctrl_depth/colorHSV.text`

For PI5/JETSON NANO controllers, you must first enter the Docker container. This is not necessary for Orin boards.

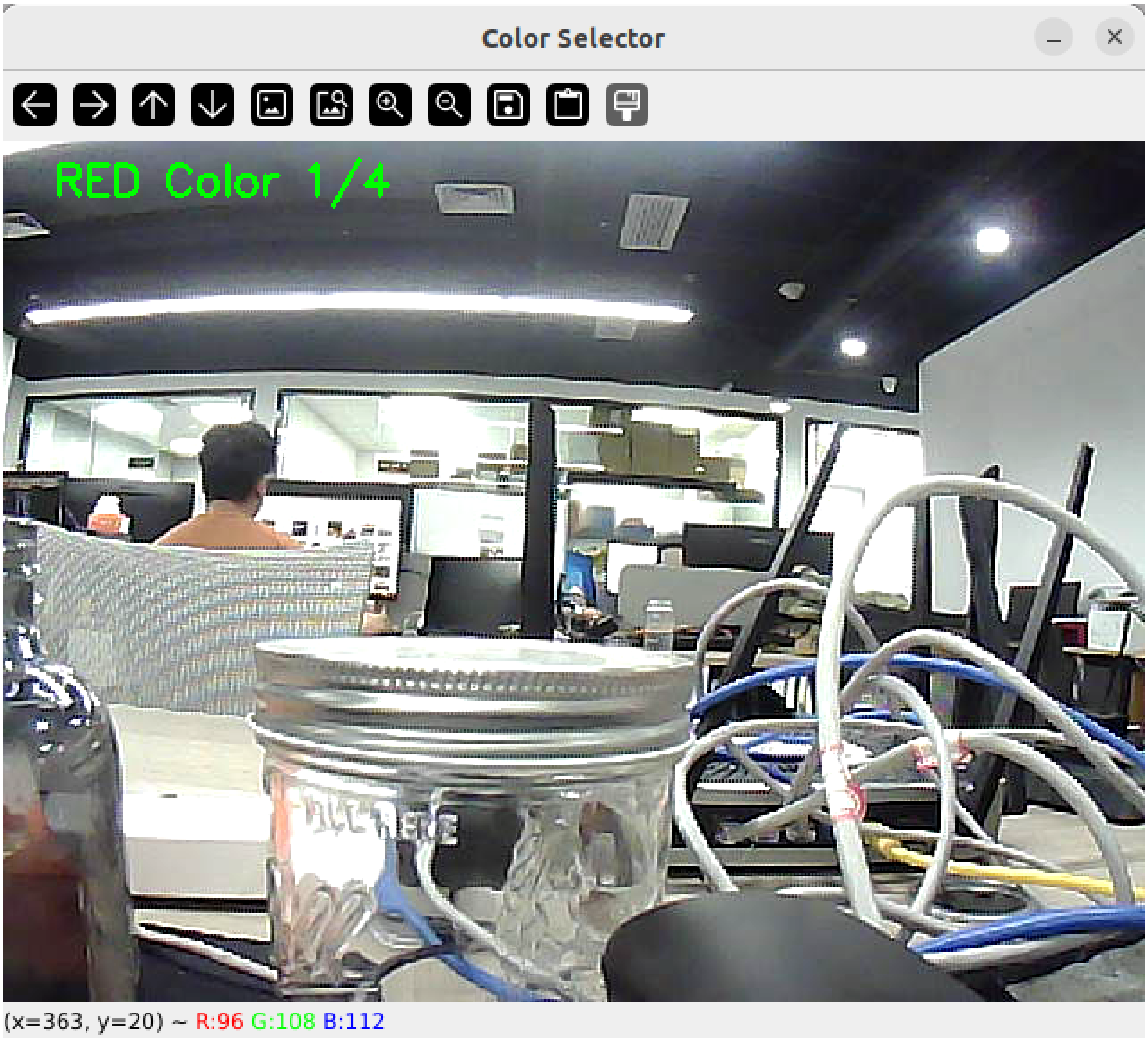
Starting the camera

```
#nuwa camera
ros2 launch ascamera hp60c.launch.py
#usb camera
ros2 launch usb_cam camera.launch.py
```

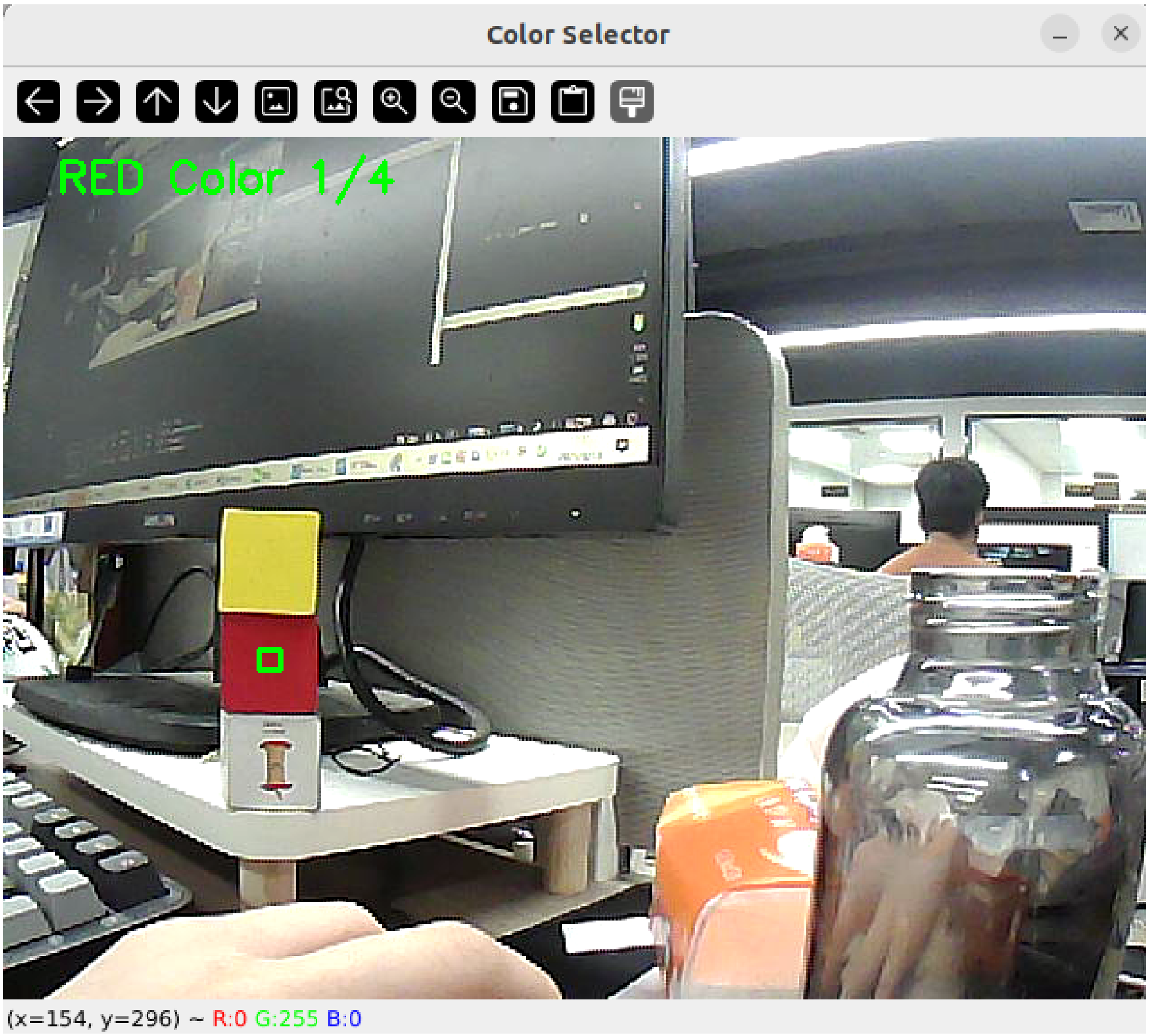
Starting the color calibration program

```
#nuwa camera
ros2 run yahboomcar_voice_ctrl_depth colorSelect
#usb camera
ros2 run yahboomcar_voice_ctrl_colorSelect
```

After successful startup, the current calibration color will be displayed in the upper left corner.

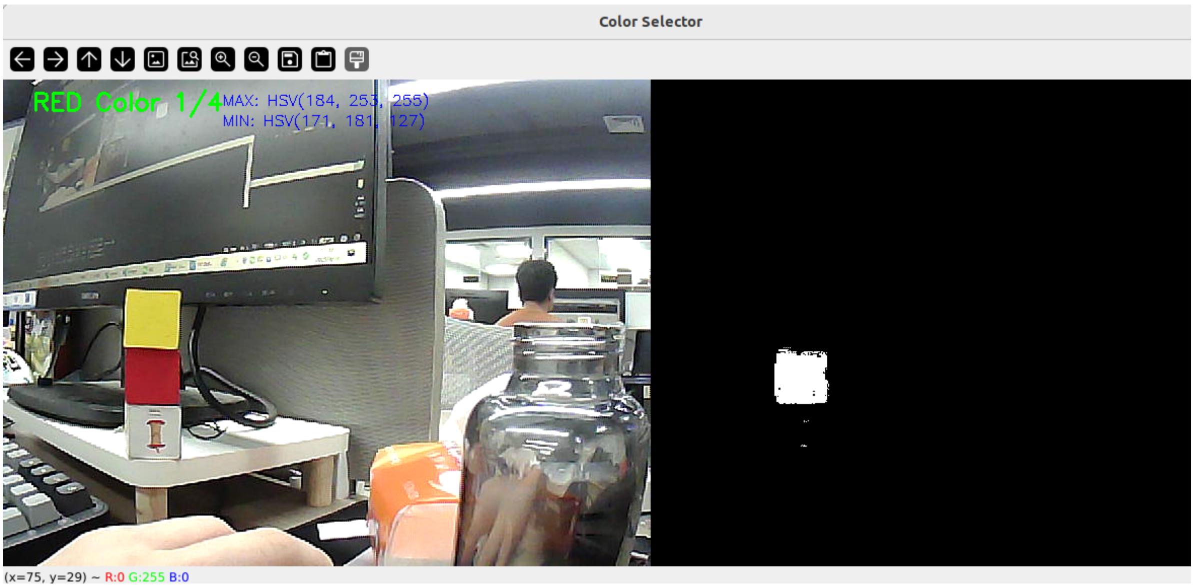


Use your mouse to select an area (this area can only have one color).



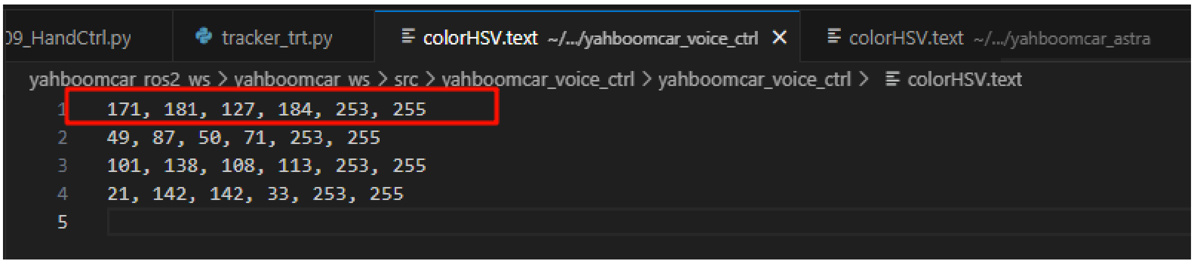
```
(x=154, y=296) ~ R:0 G:255 B:0
```

Once you release the mouse, the binarized image will be displayed.



```
MAX: HSV(184, 253, 255)
MIN: HSV(171, 181, 127)
(x=75, y=29) ~ R:0 G:255 B:0
```

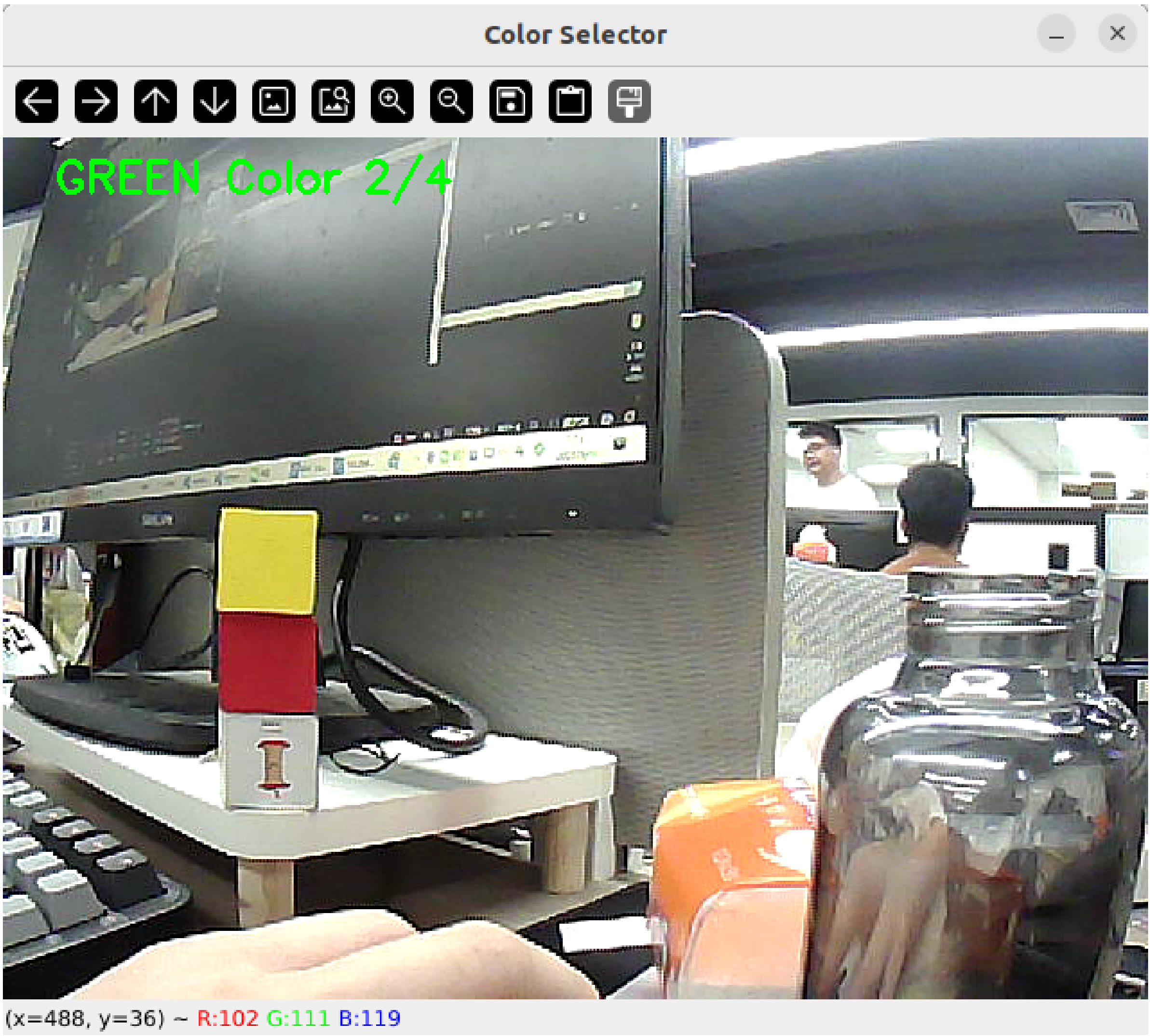
After confirming that the color calibration is correct, press the spacebar. The HSV value for red will be written to the first line of the parameter file.



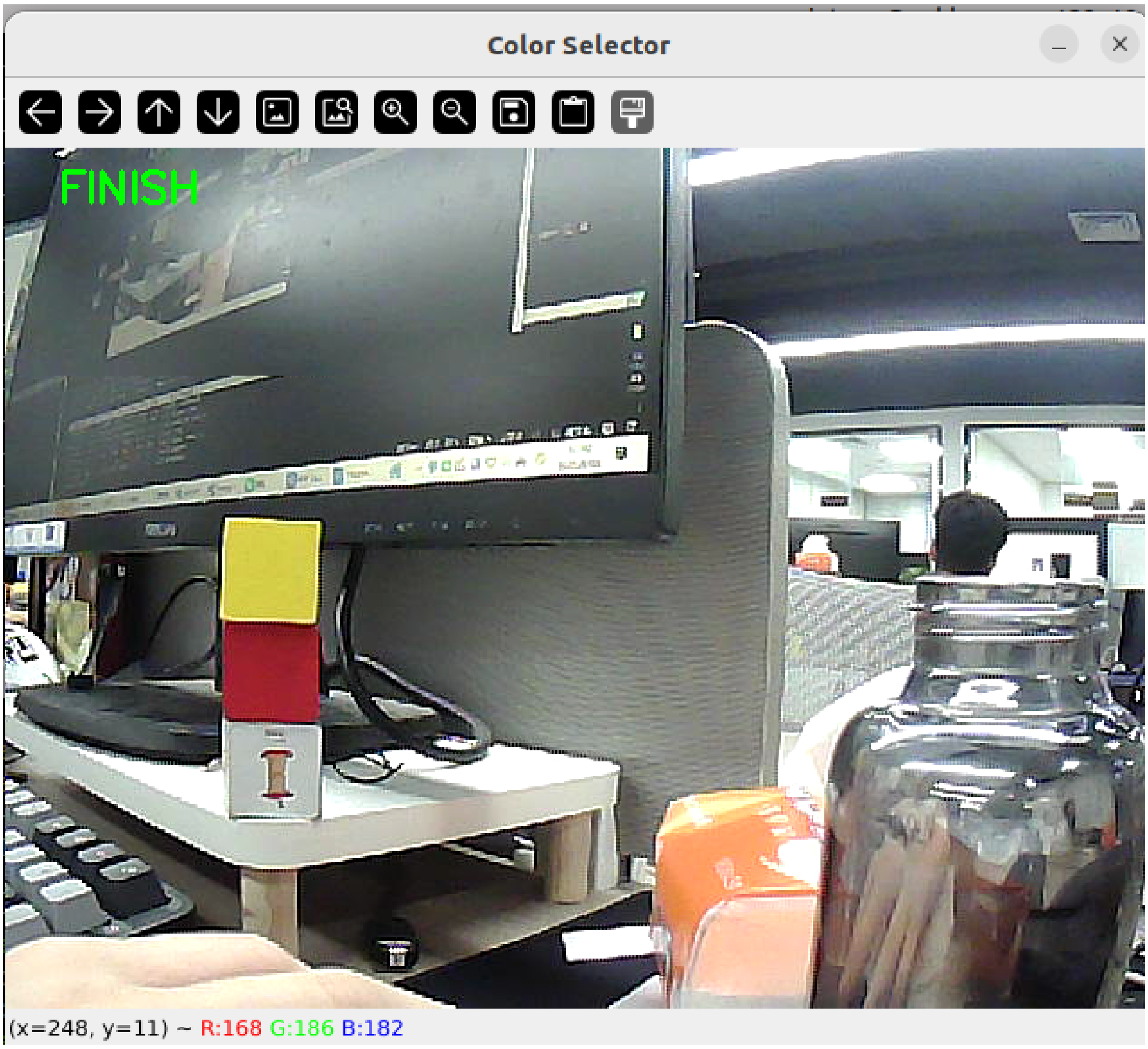
09_HandCtrl.py
tracker_trt.py
colorHSV.text ~/.../yahboomcar_voice_ctrl
colorHSV.text ~/.../yahboomcar_astra
yahboomcar_ros2_ws > yahboomcar_ws > src > yahboomcar_voice_ctrl > yahboomcar_voice_ctrl > colorHSV.text

```
171, 181, 127, 184, 253, 255
49, 87, 50, 71, 253, 255
101, 138, 108, 113, 253, 255
21, 142, 142, 33, 253, 255
```

Now, we move on to the next color calibration, and so on. The HSV values are written to the second, third, and fourth lines of the parameter file.



When the last color calibration is complete, "Finish" will be displayed in the upper left corner.



Finally, we can exit the program by pressing the `Q/q` key on the keyboard.

3. Configuring the Large Model API Key

All large model gameplay requires configuring the corresponding large model key. This section covers a lot of details, so I won't go into detail here. Please refer to the tutorial [3.AI Model Basics] - [5.Configure AI large model]