Color recognition grab blocks

1. Color recognition instructions

The color recognition grab block uses the HSV color recognition function. The path where the HSV color calibration file is saved is ~/jetcobot_ws/src/jetcobot_color_identify/scripts/HSV_config.txt.

If the color recognition is not accurate enough, please recalibrate the HSV value of the block color according to the [Color Threshold Adjustment Color Block Calibration] course.

After the calibration operation is completed, it will be automatically saved to the HSV_config file. Rerun the program without additional code modification.

2. Map placement

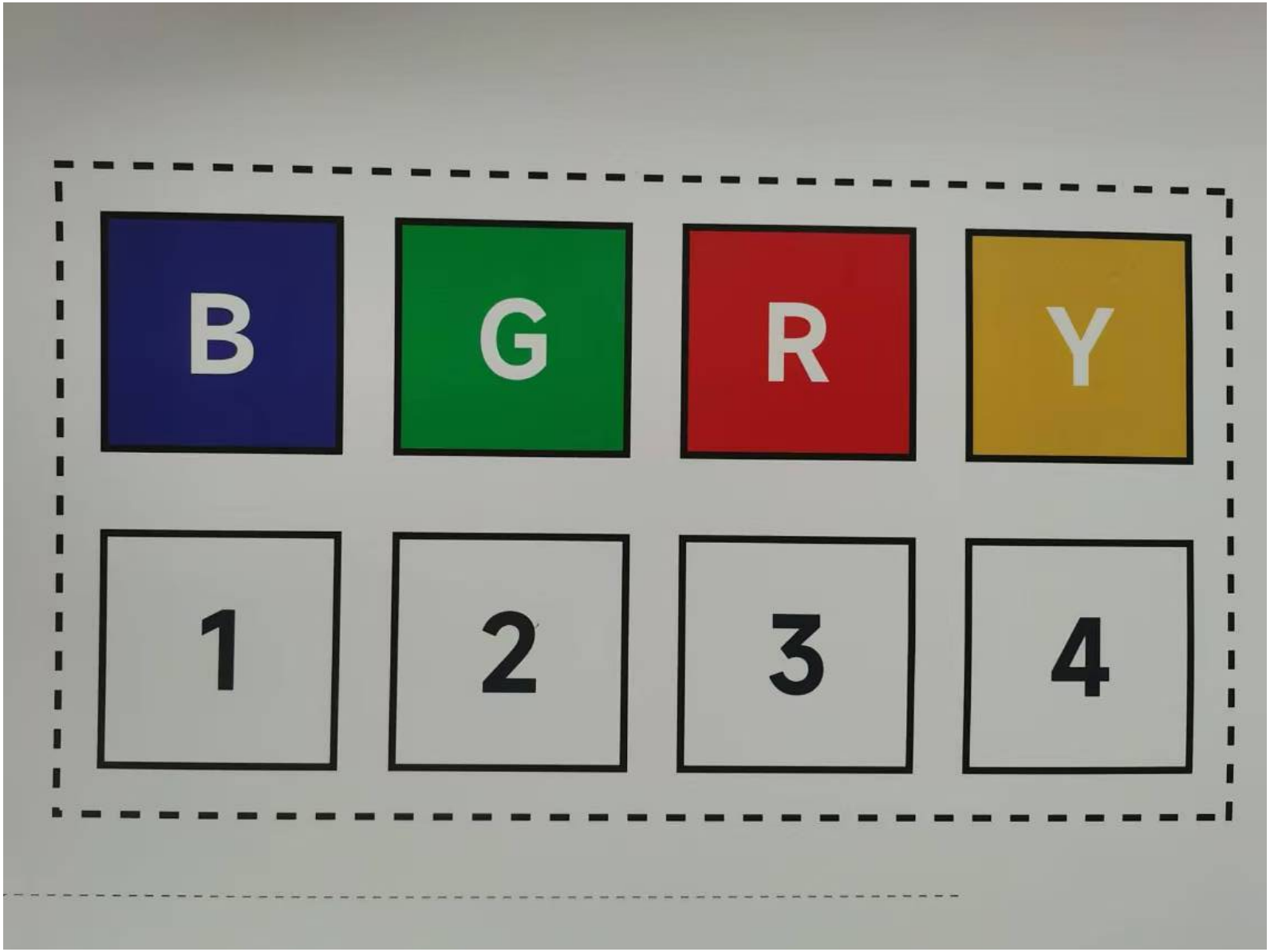
Place the blocks in the four color areas of red, green, blue and yellow.

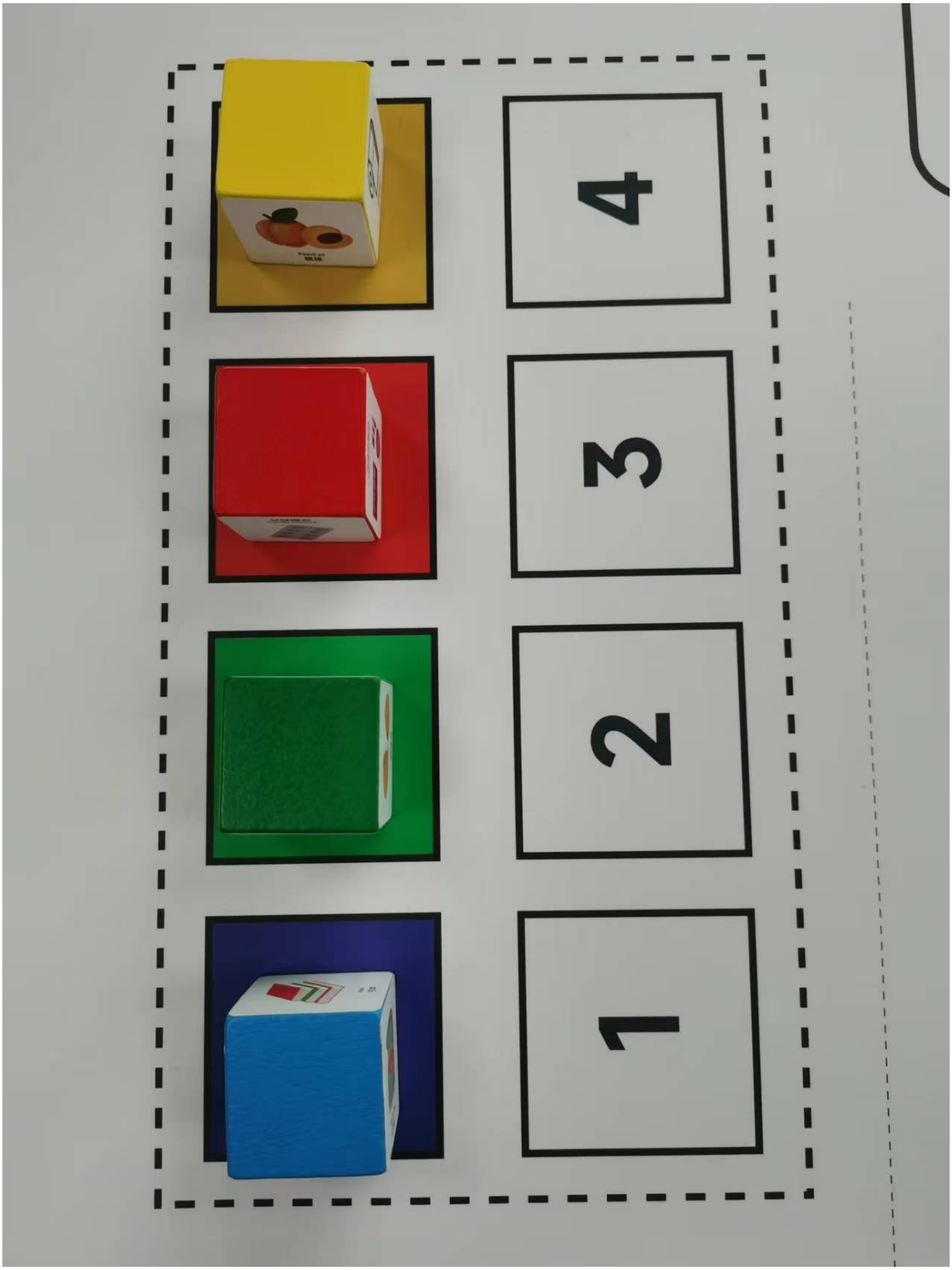
Place the yellow blocks in the Y area,

Place the red blocks in the R area,

Place the green blocks in the G area,

Place the blue blocks in the B area.


B
G
R
Y
1
2
3
4



3. About code

Code path：~/jetcobot_ws/src/jetcobot_grasp/scripts/2_color_recognition_grasp.py

~/jetcobot_ws/src/jetcobot_utils/src/jetcobot_utils/grasp_controller.py

Control the movement and grasping functions of the robotic arm.

```
def grasp_run(self, color_name):
        self.graspController.ctrl_nod()
        if color_name == 'yellow':
```

```
            self.graspController.goYellowfixedPose()
        elif color_name == 'red':
            self.graspController.goRedfixedPose()
        elif color_name == 'green':
            self.graspController.goGreenfixedPose()
        elif color_name == 'blue':
            self.graspController.goBluefixedPose()
        else:
            return
        self.graspController.drop_gripper(1.5)
        self.graspController.close_gripper(1)
        self.graspController.goColorOverPose()
        self.graspController.goBoxCenterlayer1Pose()
        self.graspController.open_gripper(1)
        self.graspController.rise_gripper(1)
        self.graspController.init_pose()
        self.status = 'waiting'
```

The position coordinates corresponding to the color area.

If the clamping position coordinates are inaccurate, you can modify this coordinate value appropriately.

```
# Color fixed point grabbing position
    def goYellowfixedPose(self):
        coords = [140, 250, 160, -175, 0, -45]
        self.go_coords(coords, 3)

    def goRedfixedPose(self):
        coords = [75, 250, 160, -175, 0, -45]
        self.go_coords(coords, 3)

    def goGreenfixedPose(self):
        coords = [10, 250, 160, -175, 0, -45]
        self.go_coords(coords, 3)

    def goBluefixedPose(self):
        coords = [-60, 250, 160, -175, 0, -45]
        self.go_coords(coords, 3)
```

The coordinate value of the placement position. If the placement position coordinate is inaccurate, you can modify this coordinate value appropriately.

```
# First layer of the center of the box
    def goBoxCenterlayer1Pose(self):
        coords = [220, 0, 120, -175, 0, -45]
        self.go_coords(coords, 3)
```

4. Start code

Start roscore

- If you are using Jetson Orin NX/Jetson Orin Nano board. You need to enter the Docker environment using the following command.
- Then, run roscore

```
sh ~/start_docker.sh
roscore
```

- If you are using Jetson Nano board. You need to enter the following command directly.

```
roscore
```

Start the program

Open a newterminal

- If you are using Jetson Orin NX/Jetson Orin Nano board. You need to enter the Docker environment using the following command.

```
sh ~/start_docker.sh
rosrun jetcobot_grasp 2_color_recognition_grasp.py
```

- If you are using Jetson Nano board. You need to enter the following command directly.

```
rosrun jetcobot_grasp 2_color_recognition_grasp.py
```

5. Experimental results

After the program runs, the robotic arm will go to the corresponding color according to the recognized color, grab the building blocks and put them in the middle area.

For example, if yellow is recognized, it goes to the yellow position to grab the building block, puts it in the middle, and then restores the initial position.

Before the next color recognition, you need to remove the building block that was clamped in the middle last time, otherwise there will be a conflict.