Robotic arm memory action

1. API introduction

1. The corresponding API for entering/exiting learning mode is:

Arm_Button_Mode(enable)

Function: Set whether the robot arm enters learning mode.

Parameter explanation:

enable: enable=0: means exiting learning mode, enable=1: means entering learning mode.

After entering learning mode, the RGB light on the robot arm expansion board will show a breathing light state, and the robot arm will automatically turn off the torque. You can bend the angle of the robot arm at will. Each time you press the K1 button on the expansion board, the breathing light will switch to another color, indicating that the current angle of the robot arm has been recorded. Up to 20 groups of actions can be recorded. When the number of recorded action groups exceeds 20 groups, press the K1 button to stop recording the action, and the breathing light will be red. After exiting learning mode, the robot arm will automatically turn on the torque and turn off the RGB light.

Return value: None.

2. The API corresponding to reading the current number of action groups is:

Arm_Read_Action_Num()

Function: Read the number of currently recorded action groups.

Parameter explanation:

Return value: Return the number of currently recorded action groups.

3. The API corresponding to running the action group is:

Arm_Action_Mode(mode)

Function: Run the recorded action group.

Parameter explanation:

mode: mode=0: stop running the action group, mode=1: single run action group, mode=2: loop

Run the action group.

Return value: None.

4. The API corresponding to clearing the action group is:

Arm_Clear_Action()

Function: Clear the recorded action group, which cannot be restored after clearing.

Parameter explanation:

Return value: None.

5. In learning mode, the API corresponding to the learning action is:

Arm_Action_Study()

Function: In learning mode, send a command to tell the expansion board to record the current robot arm posture as an action group. When learning is successful, the RGB light will change color.

Parameter explanation:

Return value: None.

2. Code content

Code path:

```
~/dofbot_pro/dofbot_ctrl/scripts/08.study_mode.ipynb
```

The following code content needs to be executed according to each actual step, and cannot be run all at once.

```
#!/usr/bin/env python3
#coding=utf-8
import time
from Arm_Lib import Arm_Device
```

```
# Create a robot object
Arm = Arm_Device()
time.sleep(.1)
```

```
# Turn on the learning mode, the RGB light on the expansion board will show the breathing light state, and all the servos of the robot arm will enter the torque-off state,
# which means that you can move the robot arm freely to the position you want to remember.
Arm.Arm_Button_Mode(1)
```

```
# In the learning mode, each time you run this cell, the current action will be recorded and saved to the expansion board, and the RGB light on the expansion board will switch colors,
# If the red breathing light appears, it means that the learned action group is full (20 groups).
# This command can also be replaced by pressing the K1 key on the expansion board, and the functions of the two are the same.
Arm.Arm_Action_Study()
```

```
# Turn off the learning mode. Turn off the breathing light
Arm.Arm_Button_Mode(0)
```

```
# Read the current number of action groups
num = Arm.Arm_Read_Action_Num()
print(num)
```

```
# Run an action group once
Arm.Arm_Action_Mode(1)
```

```
# Run an action group in a loop
Arm.Arm_Action_Mode(2)
```

```
# Stop an action group
Arm.Arm_Action_Mode(0)
```

```
# Clear the action group. When the clearing is completed, the RGB light on the
expansion board will light up green.
# Note: Once the recorded action group is cleared, it cannot be restored.
Arm.Arm_Clear_Action()
```

```
del Arm # Release the Arm object
```

Open the program in jupyter lab and click the Run cell button on the toolbar to run the program step by step.

After turning on the learning mode, you can swing the posture of the robot arm, then run Arm.Arm_Action_Study() or press the K1 key on the expansion board to record the current posture of the robot arm. Run this operation several times and then turn off the learning mode. Next, you can run the action group you just learned to see the effect. The specific operation is explained in the above code.