6.8 Robotic arm memory action

1.API Introduction

1.The API corresponding to 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 the learning mode，enable=1：means entering the learning mode.

After entering the 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, and you can move the robot arm at any angle.Each time you press the K1 button of the expansion board, the breathing light will switch to another color, indicating that the current angle of the robotic arm has been recorded. Up to 20 groups of actions can be recorded.When the number of recorded action groups exceeds 20, pressing the K1 key will no longer record the action, and the breathing light will appear red. After exiting the learning mode, the robot arm will automatically turn on the torque and turn off the RGB light.

Return value: None.

3.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: Returns the number of currently recorded action groups.

3.The API corresponding to the running 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：Run the action group once,mode=2：Run the action group cyclically.

Return value: None.

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

Arm_Clear_Action()

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

Parameter explanation:

Return value: None.

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

Arm_Action_Study()

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

Parameter explanation:

Return value: None.

2.Code content

Code path：/home/jetson/Dofbot/3.ctrl_Arm/8.study_mode.ipynb

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

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

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

```python
# Turn on the learning mode, the RGB light on the expansion board will appear in
the breathing light state, and all servos of the robotic arm will enter the off-
torque state.
# That is, it can be moved freely, and the mechanical arm can be moved to the
position to be remembered.
Arm.Arm_Button_Mode(1)
```

```python
# In learning mode, every time this cell is run, the current actions are recorded
and saved to the expansion board. At the same time, the RGB lights 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. The functions of the two are the same.
Arm.Arm_Action_Study()
```

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

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

```
# Single run action group
Arm.Arm_Action_Mode(1)
```

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

```
# Stop 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 green.
# Note: Once the recorded action group is cleared, it cannot be restored.
Arm.Arm_Clear_Action()
```

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

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

After turning on the learning mode, you can swing the posture of the robotic arm, and then run Arm.Arm_Action_Study() or press the K1 key on the expansion board to record the current posture of the robotic 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 operations are explained in comments in the above code.