

Lesson 1 PC Software Interface

Introduction

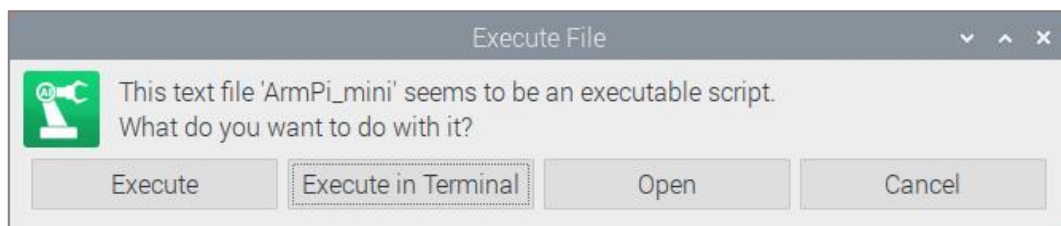
PC software is a system built-in software for programming robot action. You can use it to control the servo movement, adjust servo deviation and color threshold.

This lesson will introduction the layout and function of PC software.

1. Start PC Software

1.1 Use Desktop Icon (for beginner)

- 1) Double click  icon to open PC software.
- 2) Click “Execute” in the pop-up window and open PC software.



1.2 Use Command Line

- 1) Click on  icon to open command line terminal.
- 2) Enter command “sudo ArmPi_mini_Software/ArmPi_mini.py” and press “Enter” to start PC software.

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pi@raspberrypi:~ $ sudo ArmPi_mini_Software/ArmPi_mini.py
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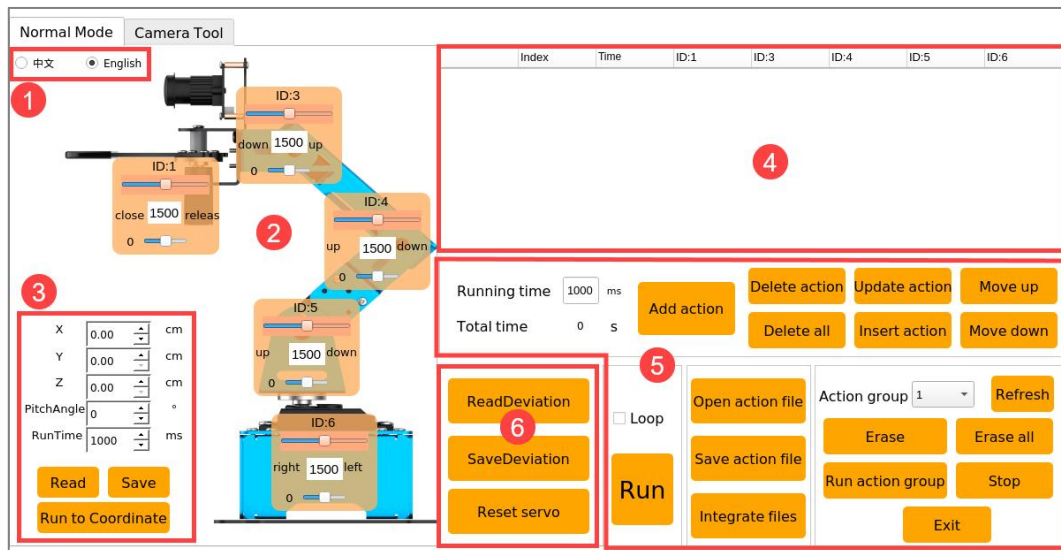
2. Software Interface Layout

PC software has two function interfaces including normal mode and camera

tool.

2.1 Normal Mode

Under normal mode, you can control servo, adjust deviation and calibrate position. The interface is shown below:

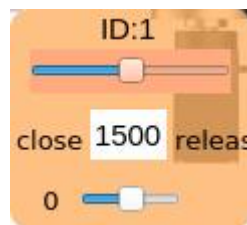


1) Language Option

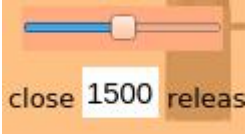
The language of PC software can be switched between Chinese and English. (it will synchronize with the interface language of camera tool)

2) Servo Control Area

The icons on servo control area correspond to five servos of robotic arm. You can rotate servo by dragging the corresponding slider.



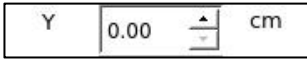
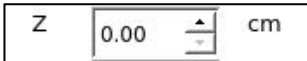
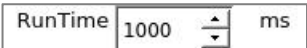
Icon	Function
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	Servo ID number. Here it refers to ID1 servo.
	Servo slider (big slider) is used to adjust servo angle. It ranges from 500 to 2500, corresponding to angles 0° - 180°. The middle value of 1500 corresponding to 90° degrees.
	Deviation slider (small slider) is used to adjust servo deviation. It ranges from -150 to 150, corresponding to angle -13° - 13°.

3) Inverse Kinematics Control Area

This area is mainly for calibrating the gripping position of robot arm. If the gripping position is incorrect during using robot arm, you can adjust its position in this area.

X	0.00	▲ ▼	cm
Y	0.00	▲ ▼	cm
Z	0.00	▲ ▼	cm
PitchAngle	0	▲ ▼	$^{\circ}$
RunTime	1000	▲ ▼	ms
Read Save			
Run to Coordinate			

Icon	Function
	(Take robot as the first) Used to control the gripper to move left or right.
	(Take robot as the first) Used to control the gripper to move forward and backward.
	Used to control the gripper to move up and down. (Note: the program has set the z-axis value to 1cm and the gripper will be in the middle of the two sides of the block, so it is not commended to modify this value.)
	The angel between gripper and x axis. Due to the program settings, it does not need to modify.
	The movement time used by the gripper to move from the previous position to the set coordinate value. (just for checking the running effect)
	Read the current position information of gripper
	Save the adjusted position coordinate value
	Control robot to the set coordinate value

4) Action Date List

The action data list will display the running time of each action and the value of each servo.

	Index	Time	ID:1	ID:3	ID:4	ID:5	ID:6
▶	1	1500	1500	830	2360	920	1500
	2	1000	1500	500	2360	920	1500
	3	1000	1500	1200	2360	920	1500
	4	1000	1500	500	2360	920	1500
	5	1000	1500	1200	2360	920	1500
	6	1000	1500	830	2360	920	1500

Icon	Function
Index	Action number
Time	Running time
ID:1	Double click the value 1500 under this ID to modify.

5) Action Setting Area

Icon	Function
Running time 1000 ms	The time required to run a single action. You can click it to modify.
Total time 0 s	The total time for running an action group
Add action	Add the current action in servo control area to the last line of the action data list.

	Delete all the selected actions in action data list
	Delete all the actions in action data list
	Replace the value of the selected actions in action data list. (The value will be replaced with the current servo value in servo control area, and the running time will be replaced with the set running time.)
	Insert a line of action in front of the selected action
	Swap the selected action with its previous action
	Swap the selected action with its next action
	Click on “Run” button to run the action group in action data list once. (If check “loop”, robot arm will cyclically execute the action.)
	Click it to select and open the action group to load it to action data list. (The path of the action group file: /home/pi/ArmPi_mini/ ActionGroups)

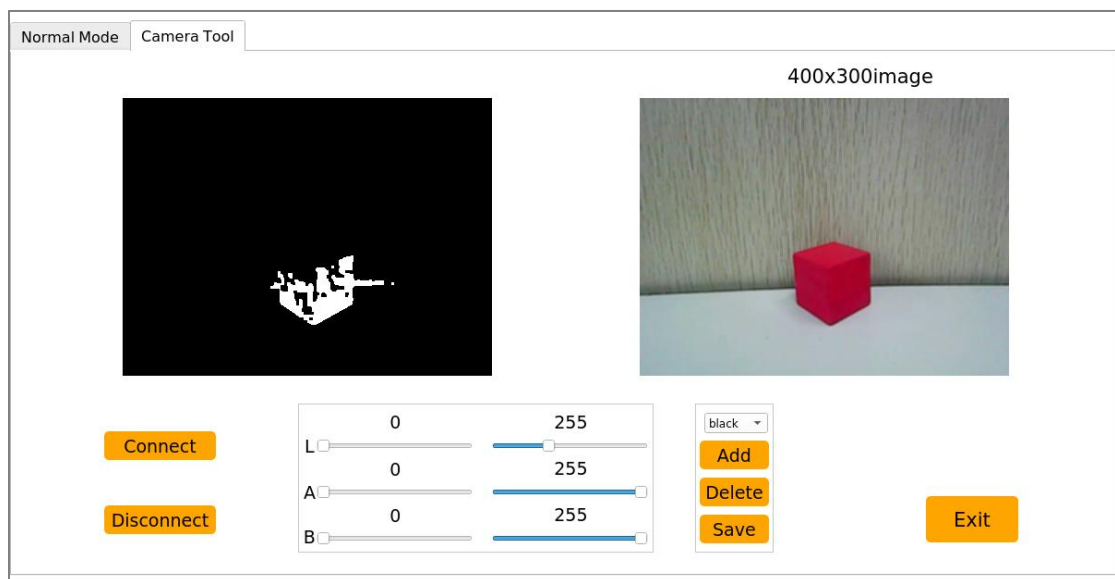
	Save the action group in action data list to the specific position. (The path of the action group file: /home/pi/ArmPi_mini/ ActionGroups)
	After opening an action group, click it and open another action group file. Then two action groups are integrated into a new action group.
	Display the action group saved in PC software
	Refresh the selection bar of the action group
	Delete the current action group file
	(Caution) Delete all action group files
	Run the selected action group once
	Stop running action group
	Exit PC software

6) Deviation Setting Area

Icon	Function
	Click to read the saved deviation automatically
	After clicking, the deviation adjusted by PC software can be saved to the robot arm
	Click it to restore all servos in servo control area to 1500

2.2 Camera Tool

The camera tool is used to adjust the threshold of the recognized color, as the figure shown below.



Please refer to the content “4.5 Add Recognition Color” in “6. AI Vision Learning/ Lesson 1 Color Recognition”