This document currently supports direct deployment of open-source algorithm frameworks from Gaoqing EM TECH, with the link provided below:

Mini Pi Plus Full-Body Control Dance Baseline:

https://github.com/HighTorque-Robotics/Mini-Pi-Plus_BeyondMimic

Mini Pi Plus Falling down and Climbing up Baseline:

https://github.com/HighTorque-Robotics/Mini-Pi-Plus_PBHC

Mini Pi Walking Algorithm Baseline:

https://github.com/HighTorque-Robotics/livelybot_pi_rl_baseline

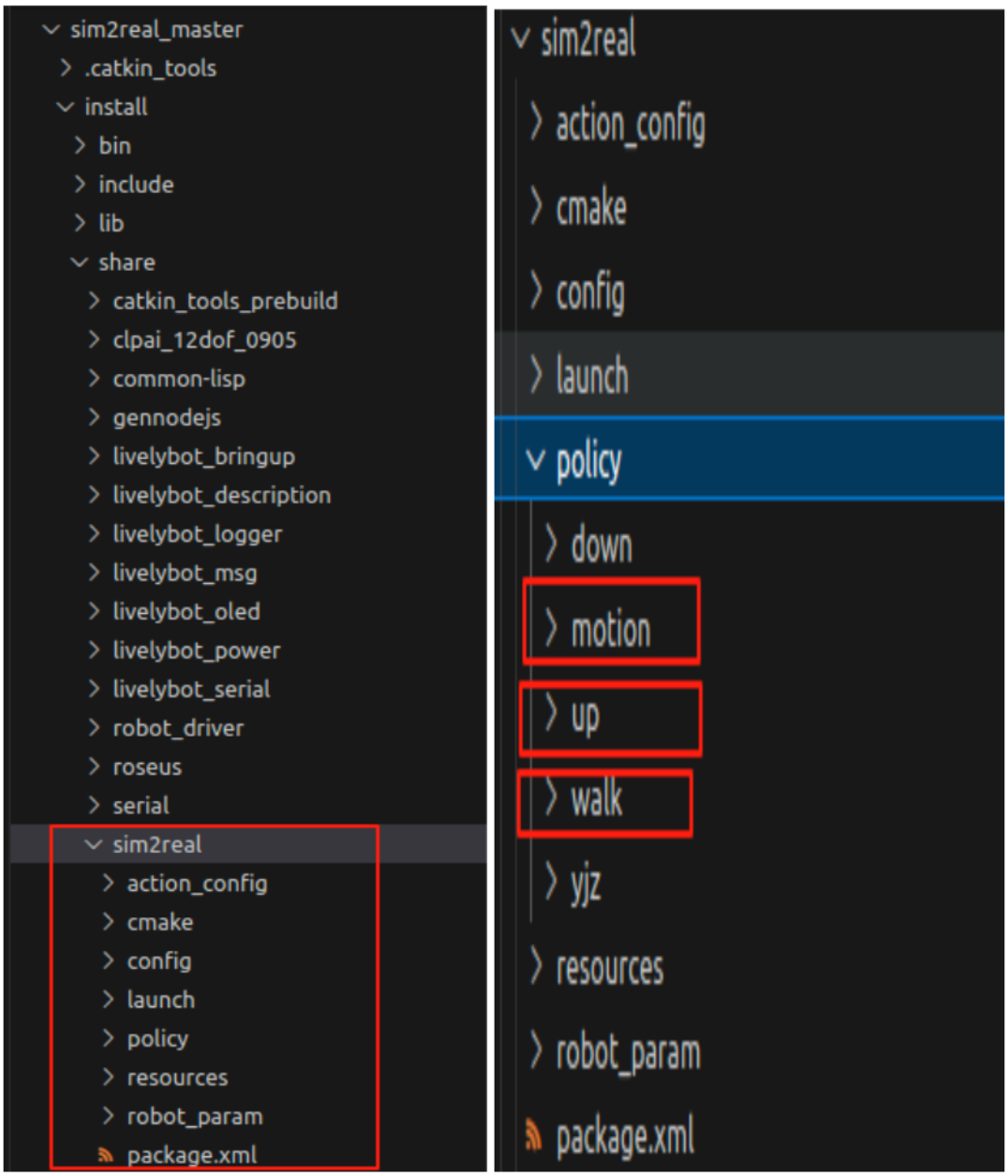
Mini Pi Falling down and Climbing up Algorithm Baseline:

https://github.com/HighTorque-Robotics/HoST

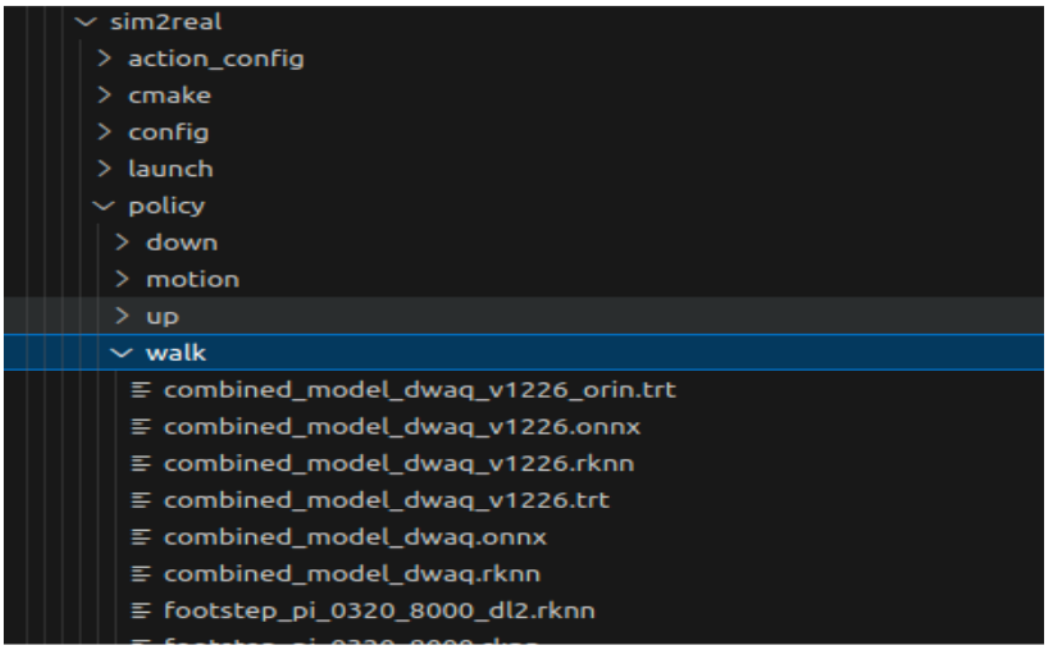
The trained strategy is configured according to the following process

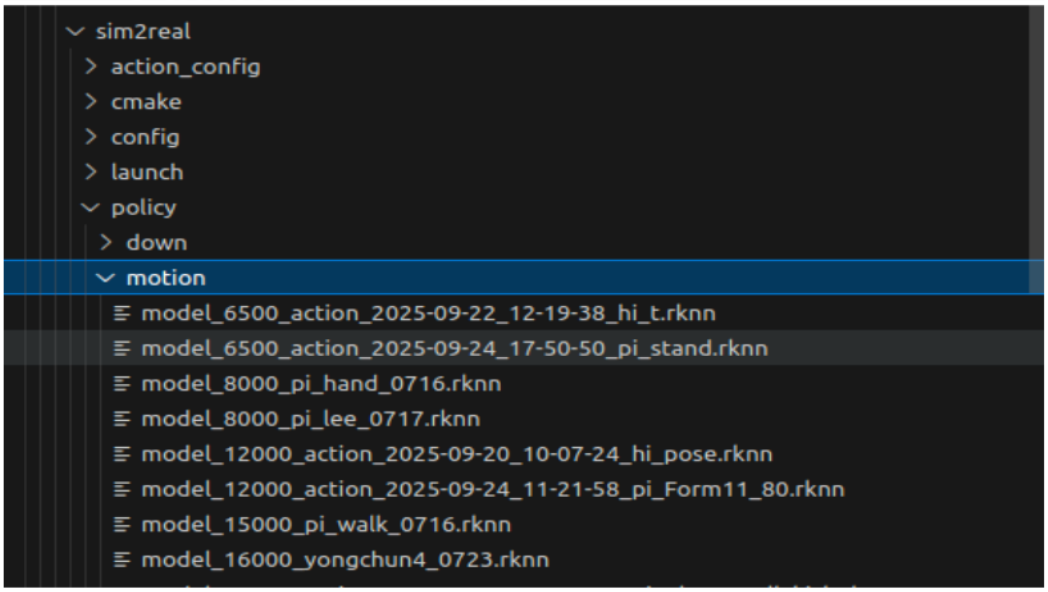
1、Storage Policy

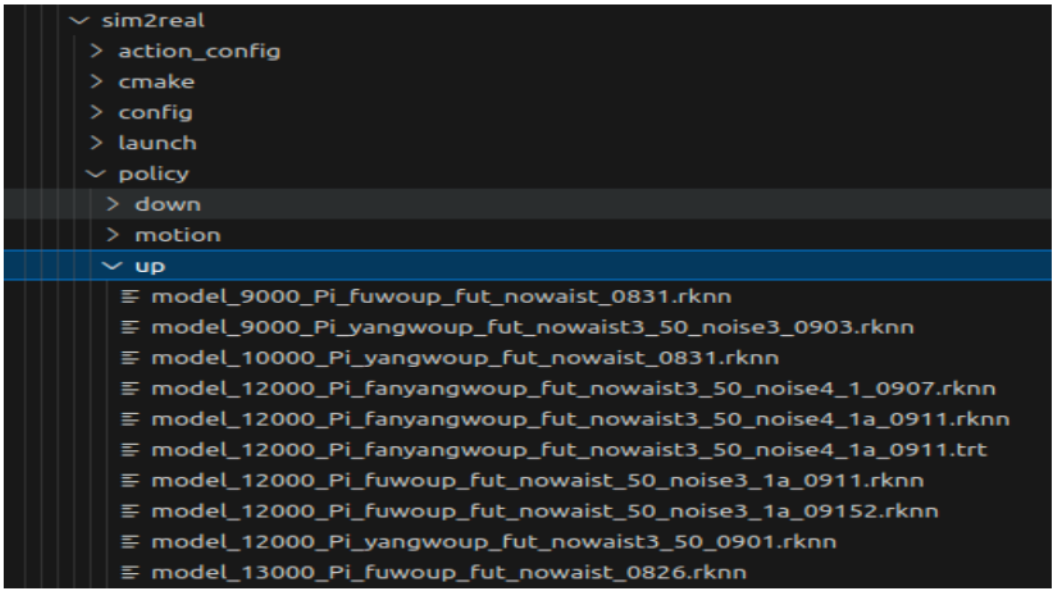
Find the policy folder containing various action policies from the /install/share/sim2real path in the sim2real_master file, as shown in the following figure



Save the converted rknn policy format in the corresponding folder

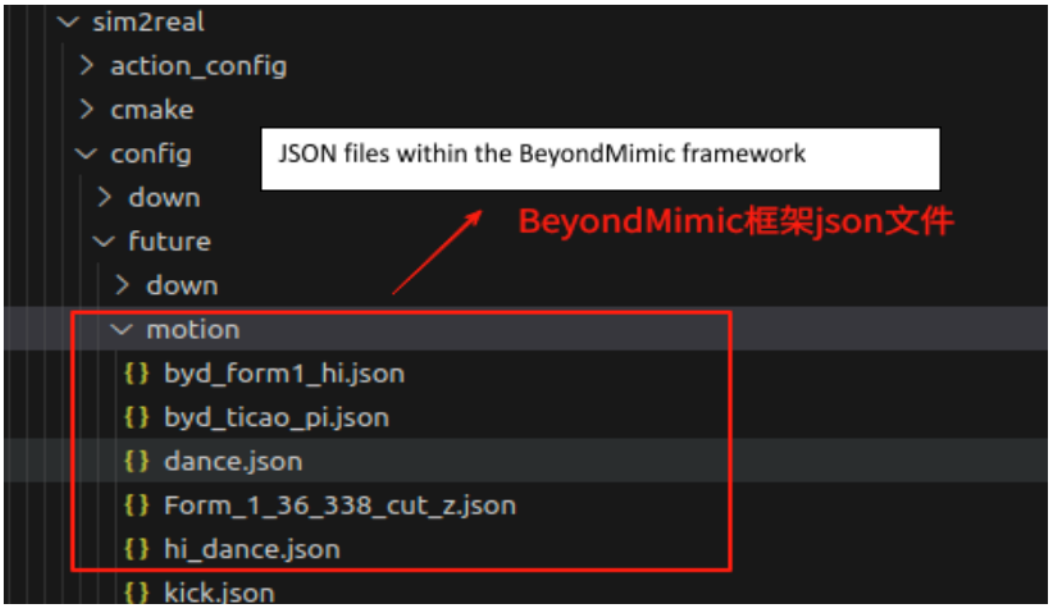

sim2real
action_config
cmake
config
launch
policy
down
motion
up
walk
combined_model_dwaq_v1226_orin.trt
combined_model_dwaq_v1226.onnx
combined_model_dwaq_v1226.rknn
combined_model_dwaq_v1226.trt
combined_model_dwaq.onnx
combined_model_dwaq.rknn
footstep_pi_0320_8000_dl2.rknn

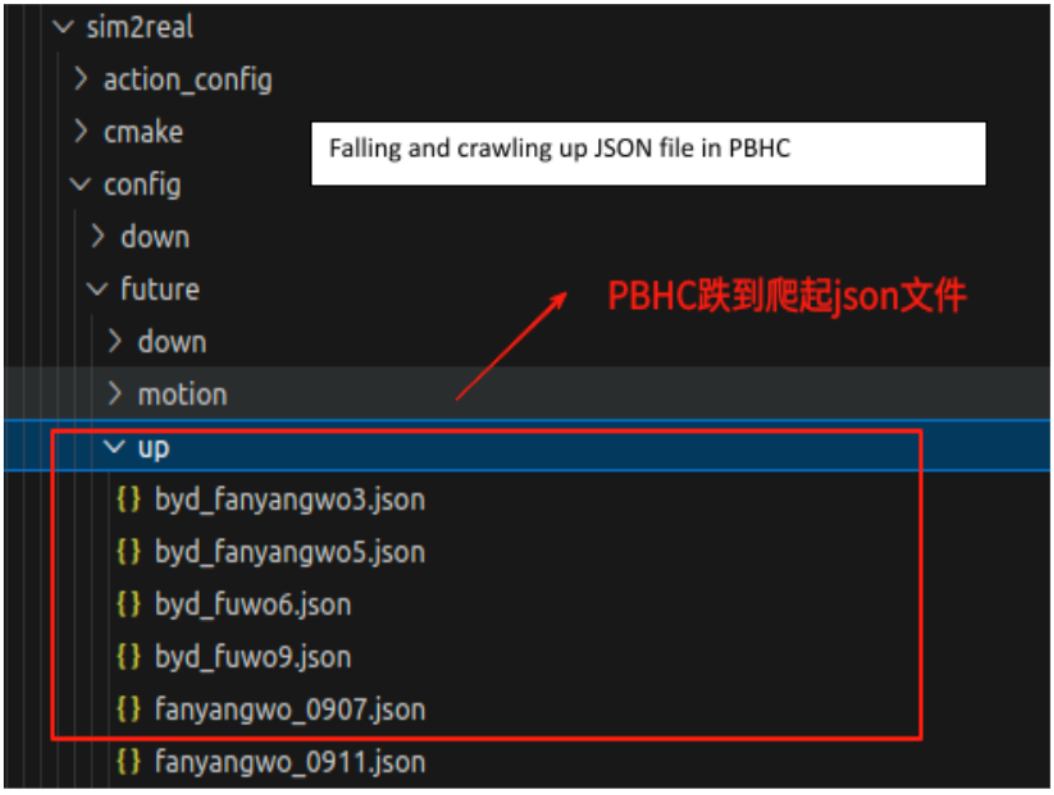

sim2real
action_config
cmake
config
launch
policy
down
motion
model_6500_action_2025-09-22_12-19-38_hi_t.rknn
model_6500_action_2025-09-24_17-50-50_pi_stand.rknn
model_8000_pi_hand_0716.rknn
model_8000_pi_lee_0717.rknn
model_12000_action_2025-09-20_10-07-24_hi_pose.rknn
model_12000_action_2025-09-24_11-21-58_pi_Form11_80.rknn
model_15000_pi_walk_0716.rknn
model_16000_yongchun4_0723.rknn


sim2real
action_config
cmake
config
launch
policy
down
motion
up
model_9000_Pi_fuwoup_fut_nowaist_0831.rknn
model_9000_Pi_yangwoup_fut_nowaist3_50_noise3_0903.rknn
model_10000_Pi_yangwoup_fut_nowaist_0831.rknn
model_12000_Pi_fanyangwoup_fut_nowaist3_50_noise4_1_0907.rknn
model_12000_Pi_fanyangwoup_fut_nowaist3_50_noise4_1a_0911.rknn
model_12000_Pi_fanyangwoup_fut_nowaist3_50_noise4_1a_0911.trt
model_12000_Pi_fuwoup_fut_nowaist_50_noise3_1a_0911.rknn
model_12000_Pi_fuwoup_fut_nowaist_50_noise3_1a_09152.rknn
model_12000_Pi_yangwoup_fut_nowaist3_50_0901.rknn
model_13000_Pi_fuwoup_fut_nowaist_0826.rknn

2、Store Future Frame JSON Files (only applicable to BeyondMimic and PBHC algorithm frameworks)

If using the BeyondMimic and PBHC algorithm frameworks to train future frame JSON format files, they need to be stored in the *sim2real_master/install/share/sim2real/config/future/motion* path. Other algorithm frameworks do not need to perform this step

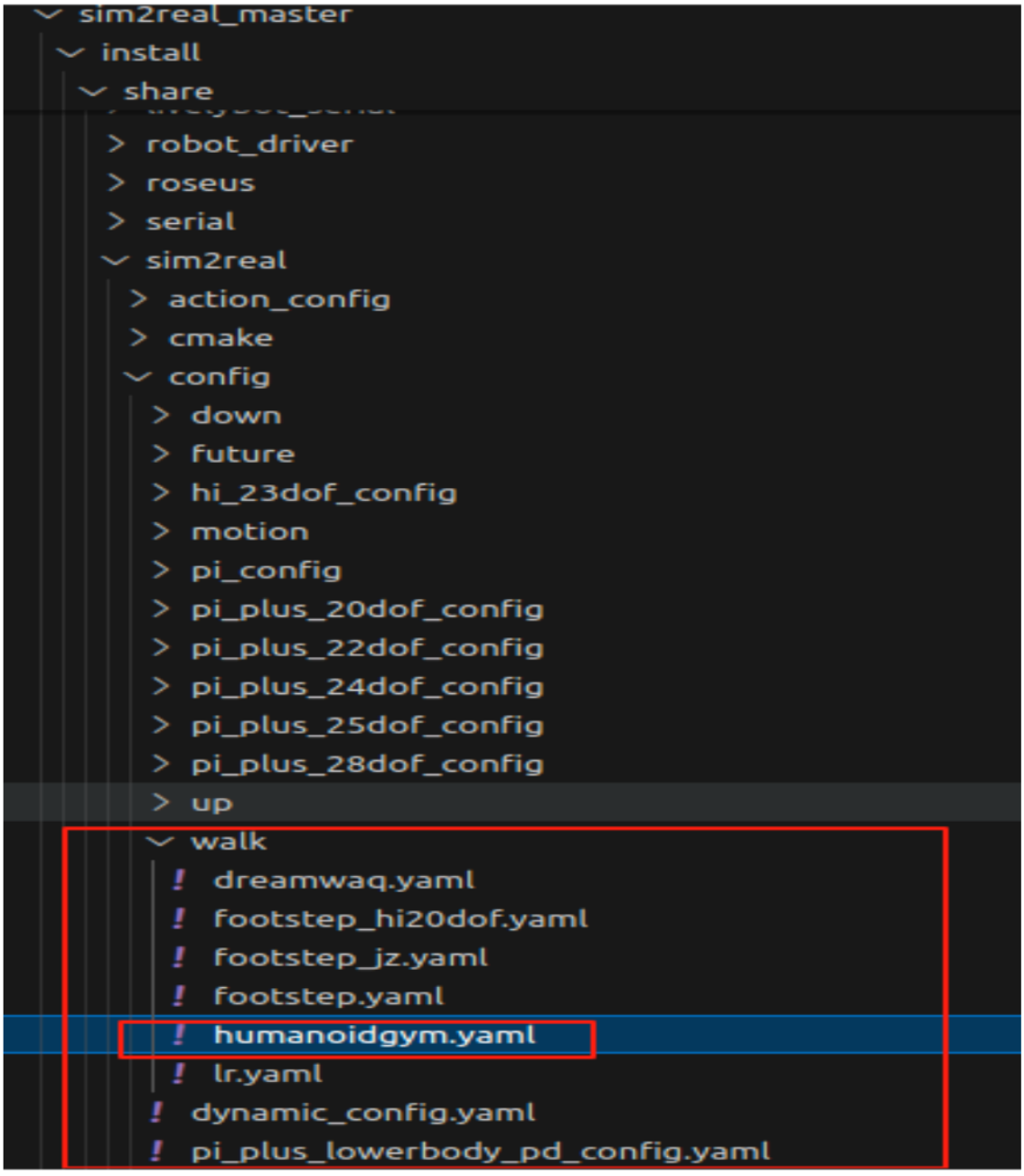




3、 Mini Pi&Mini Pi Plus Configuration File Instructions (execute 3.1 or 3.2 according to the actual robot model)

3.1 Mini Pi Configuration File

Example: Mini Pi based on *https://github.com/HighTorque-Robotics/livelybot_pi_rl_baseline,The policy configuration file obtained after training is as follows, only the policy name and algorithm name need to be declared in the yaml file*

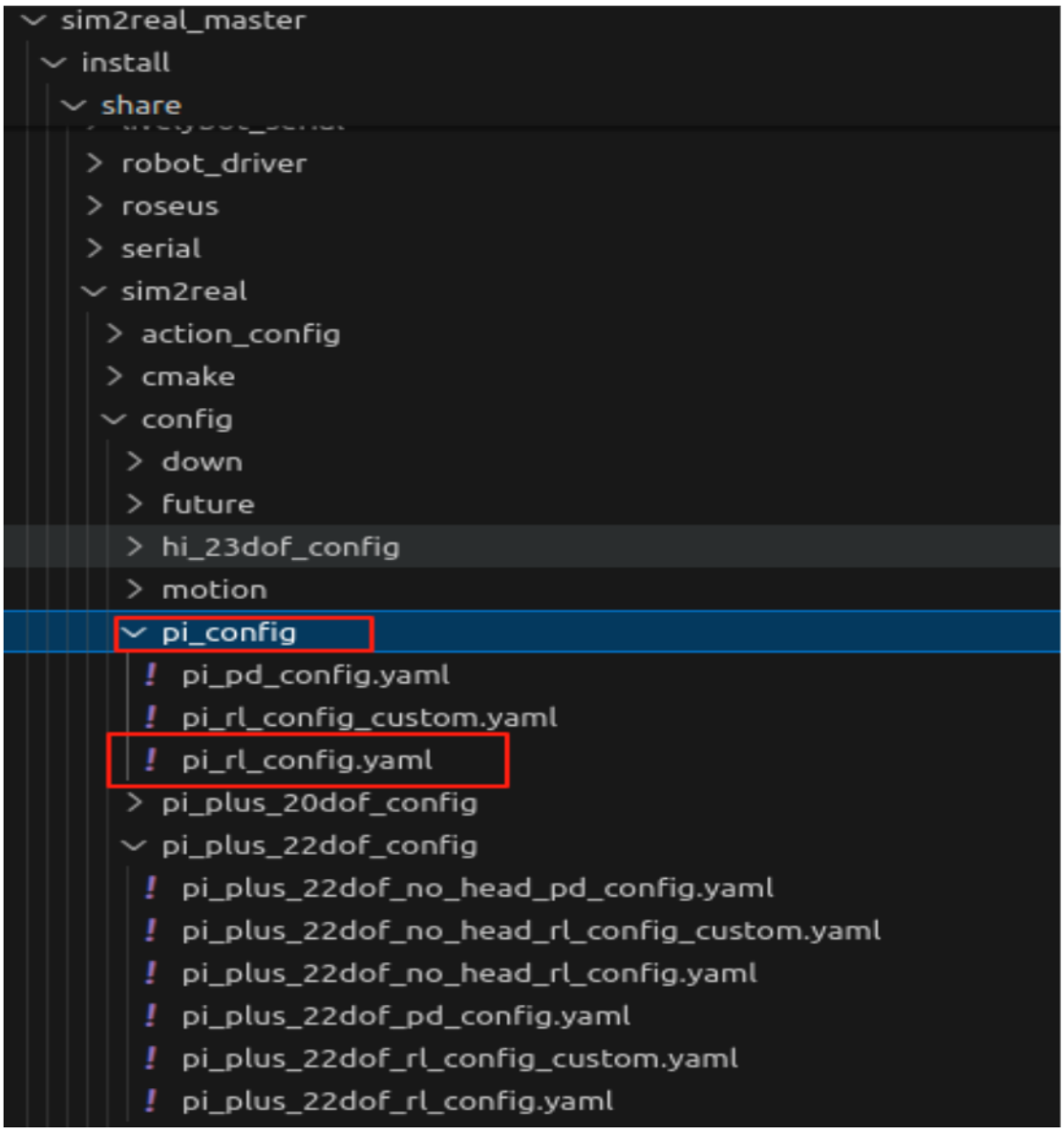


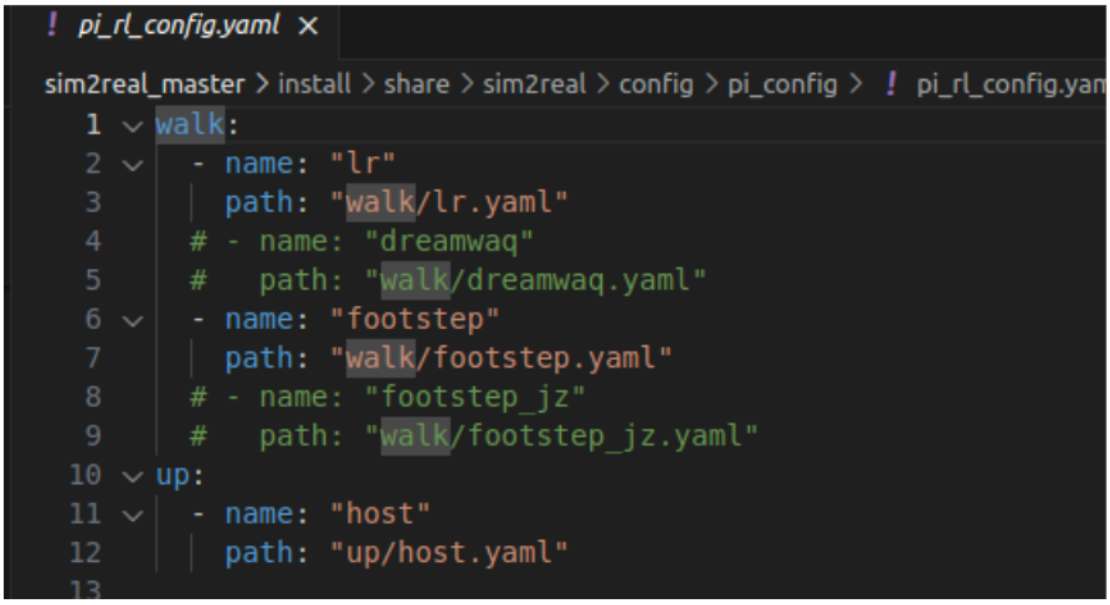
humanoidgym.yaml

sim2real_master > install > share > sim2real > config > walk > humanoidgym.yaml

```yaml
policy_name: "policy_from_pt_humanoidgym.rknn"

algorithm: "humanoidgym"

motor_group: "lowerBody"

dofs: 12

frame_stack: 15

num_single_obs: 47

frequency: 0.5

cmd_lin_vel_scale: 2.0
cmd_ang_vel_scale: 1.0
rbt_lin_pos_scale: 1.0
rbt_lin_vel_scale: 0.05
rbt_ang_vel_scale: 0.5

cmd_vel_x_min:   -0.15
cmd_vel_x_max:    0.15
cmd_vel_y_min:   -0.20
cmd_vel_y_max:    0.20
cmd_vel_yaw_min: -2.00
cmd_vel_yaw_max:  2.00

clip_obs: 18.0

pd_ctrl_f: 1000
rl_ctrl_f: 100
```

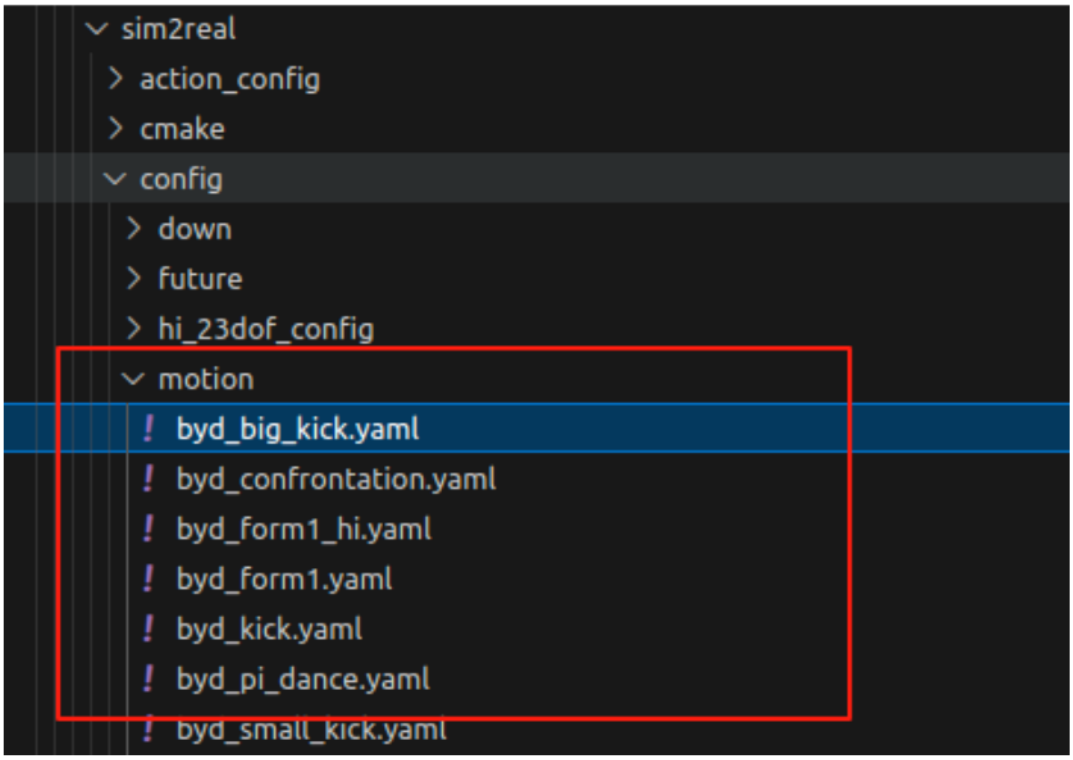
If you need to configure other walking algorithm frameworks on Mini Pi, you can follow the instructions in the file below to enter the corresponding algorithm configuration YAML file, follow the configuration in the file above to declare your own strategy, and then configure the algorithm strategy you want to verify in the path of sim2real_master/install/share/sim2real/config/pi_config in pi_rl_config YAML


sim2real_master
install
share
robot_driver
roseus
serial
sim2real
action_config
cmake
config
down
future
hi_23dof_config
motion
pi_config
pi_pd_config.yaml
pi_rl_config_custom.yaml
pi_rl_config.yaml
pi_plus_20dof_config
pi_plus_22dof_config
pi_plus_22dof_no_head_pd_config.yaml
pi_plus_22dof_no_head_rl_config_custom.yaml
pi_plus_22dof_no_head_rl_config.yaml
pi_plus_22dof_pd_config.yaml
pi_plus_22dof_rl_config_custom.yaml
pi_plus_22dof_rl_config.yaml

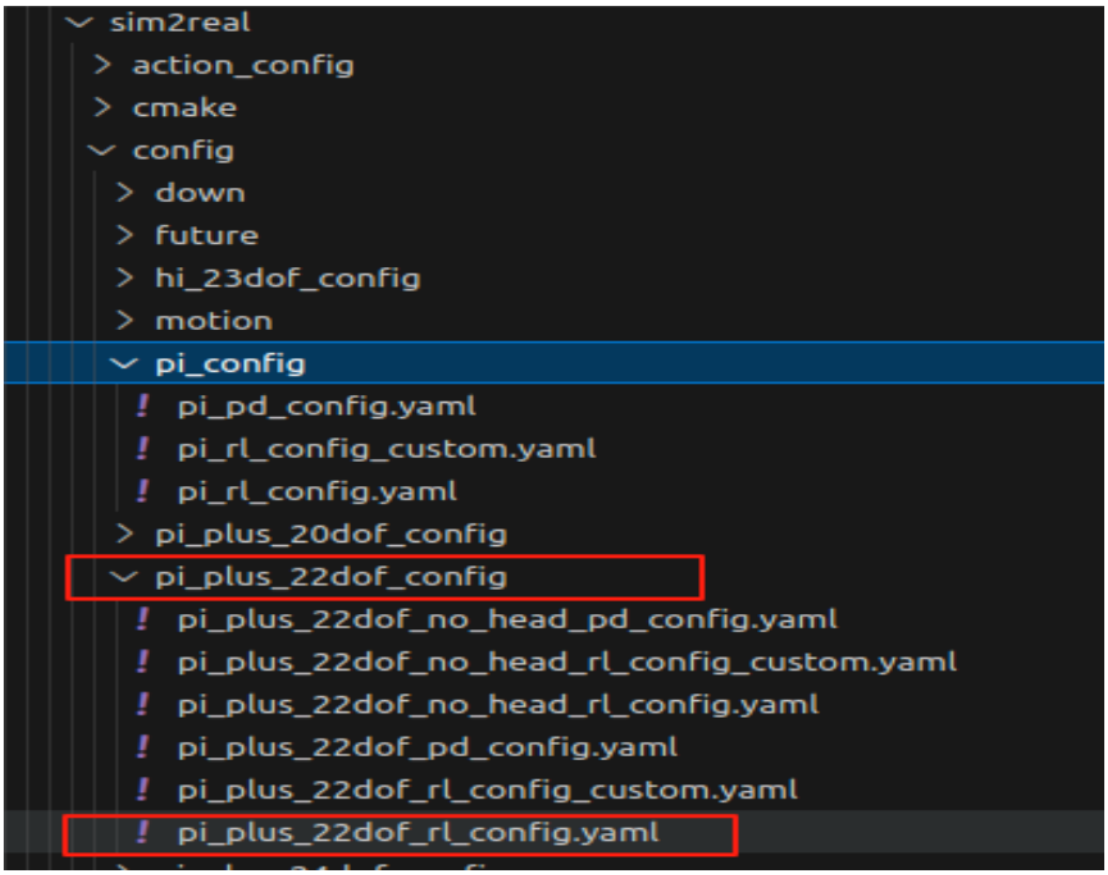

pi_rl_config.yaml
sim2real_master > install > share > sim2real > config > pi_config > pi_rl_config.yam
walk:
- name: "lr"
path: "walk/lr.yaml"
- name: "dreamwaq"
path: "walk/dreamwaq.yaml"
- name: "footstep"
path: "walk/footstep.yaml"
- name: "footstep_jz"
path: "walk/footstep_jz.yaml"
up:
- name: "host"
path: "up/host.yaml"

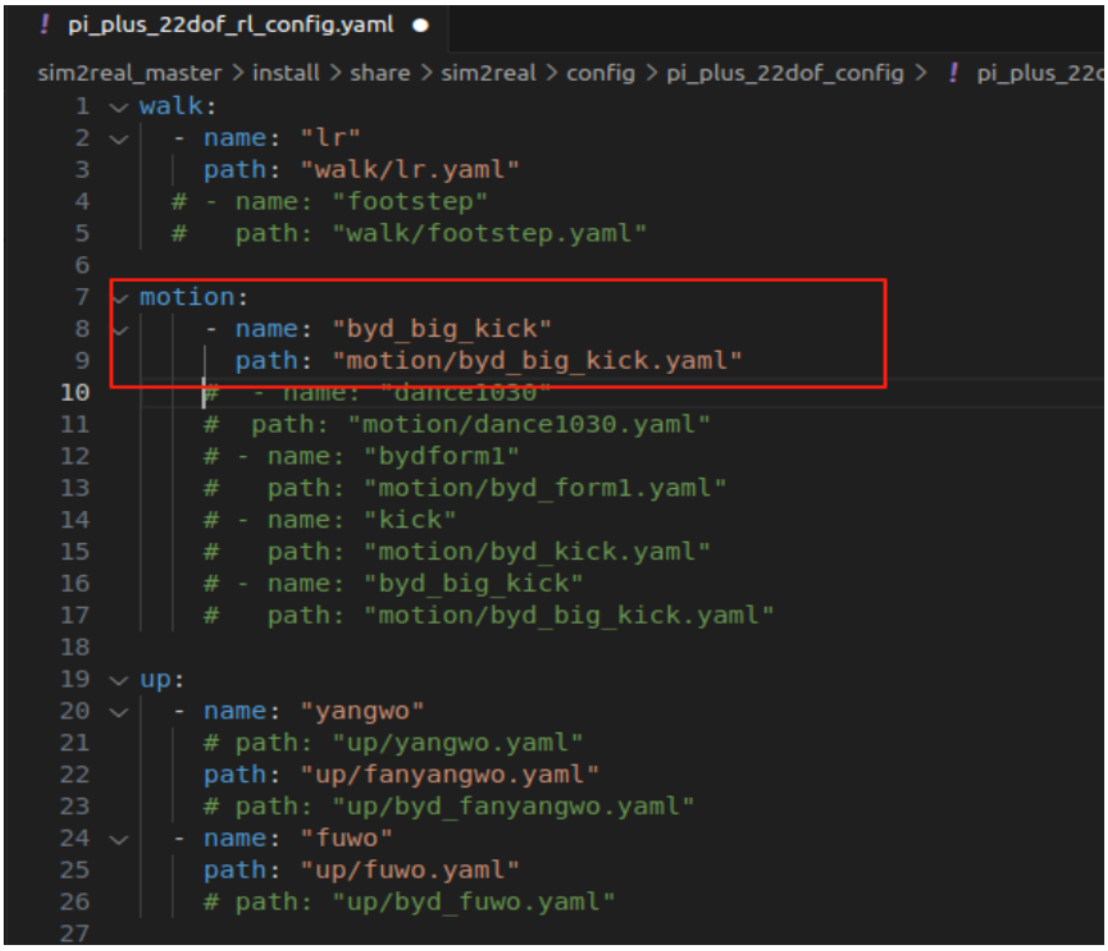
3.2Mini Pi Plus Configuration File

Example 1 : Mini Pi Plus Based on https://github.com/HighTorque-Robotics/Mini-Pi-Plus_BeyondMimic,The policy configuration file obtained after training is as follows. Simply declare the policy name and the future frame JSON file name in the byd_big_kick.yaml file under the sim2real_master/install/share/sim2real/config/motion path

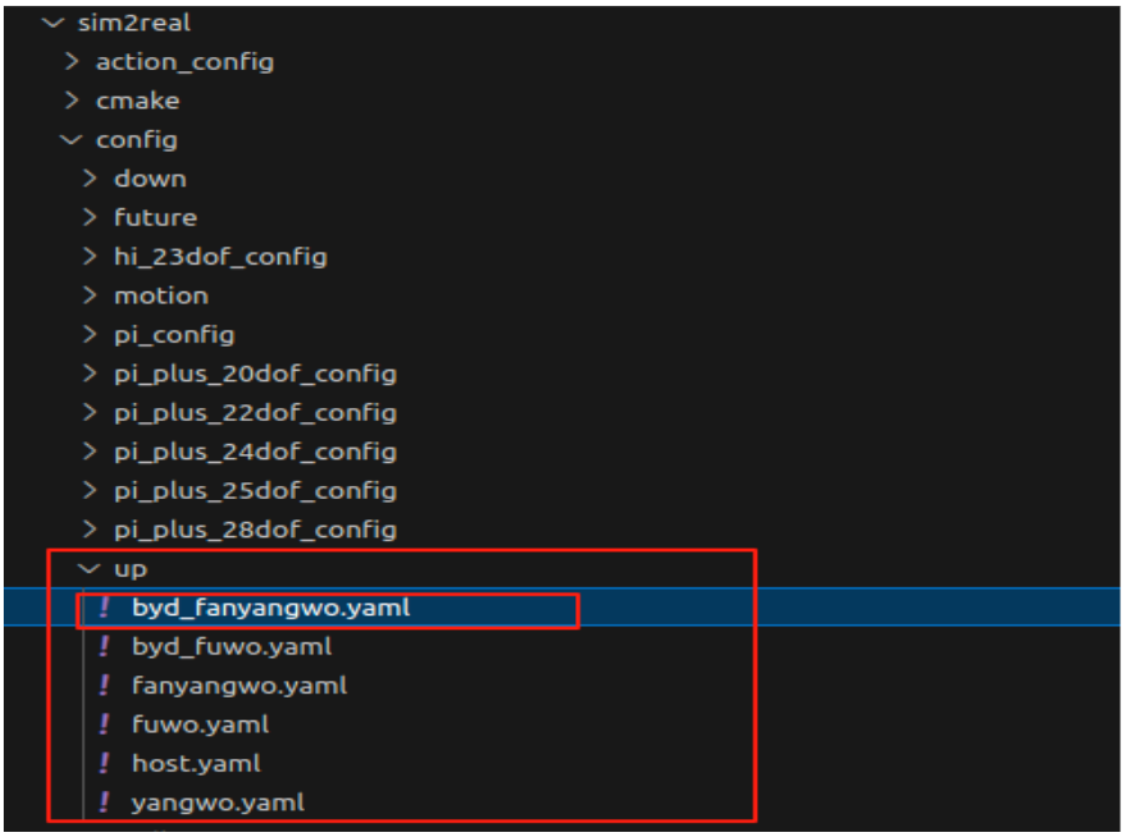


Configure the algorithm strategy pi_plus_22dof_rl_config. yaml required for real machine validation in the sim2real_master/install/share/sim2real/config/piupleus_22dof_config path


sim2real
action_config
cmake
config
down
future
hi_23dof_config
motion
pi_config
pi_pd_config.yaml
pi_rl_config_custom.yaml
pi_rl_config.yaml
pi_plus_20dof_config
pi_plus_22dof_config
pi_plus_22dof_no_head_pd_config.yaml
pi_plus_22dof_no_head_rl_config_custom.yaml
pi_plus_22dof_no_head_rl_config.yaml
pi_plus_22dof_pd_config.yaml
pi_plus_22dof_rl_config_custom.yaml
pi_plus_22dof_rl_config.yaml


pi_plus_22dof_rl_config.yaml
sim2real_master > install > share > sim2real > config > pi_plus_22dof_config > pi_plus_22c
walk:
- name: "lr"
path: "walk/lr.yaml"
- name: "footstep"
path: "walk/footstep.yaml"
motion:
- name: "byd_big_kick"
path: "motion/byd_big_kick.yaml"
- name: "dance1030"
path: "motion/dance1030.yaml"
- name: "bydform1"
path: "motion/byd_form1.yaml"
- name: "kick"
path: "motion/byd_kick.yaml"
- name: "byd_big_kick"
path: "motion/byd_big_kick.yaml"
up:
- name: "yangwo"
path: "up/yangwo.yaml"
path: "up/fanyangwo.yaml"
path: "up/byd_fanyangwo.yaml"
- name: "fuwo"
path: "up/fuwo.yaml"
path: "up/byd_fuwo.yaml"

Example 2：The Mini Pi Plus based on https://github.com/HighTorque-Robotics/Mini-Pi-Plus_PBHC,The policy configuration file obtained after training is as follows. Simply declare the policy name and the future frame JSON file name in the byd_fanyangwo.yaml file in the sim2real_master/install/share/sim2real/config/up path

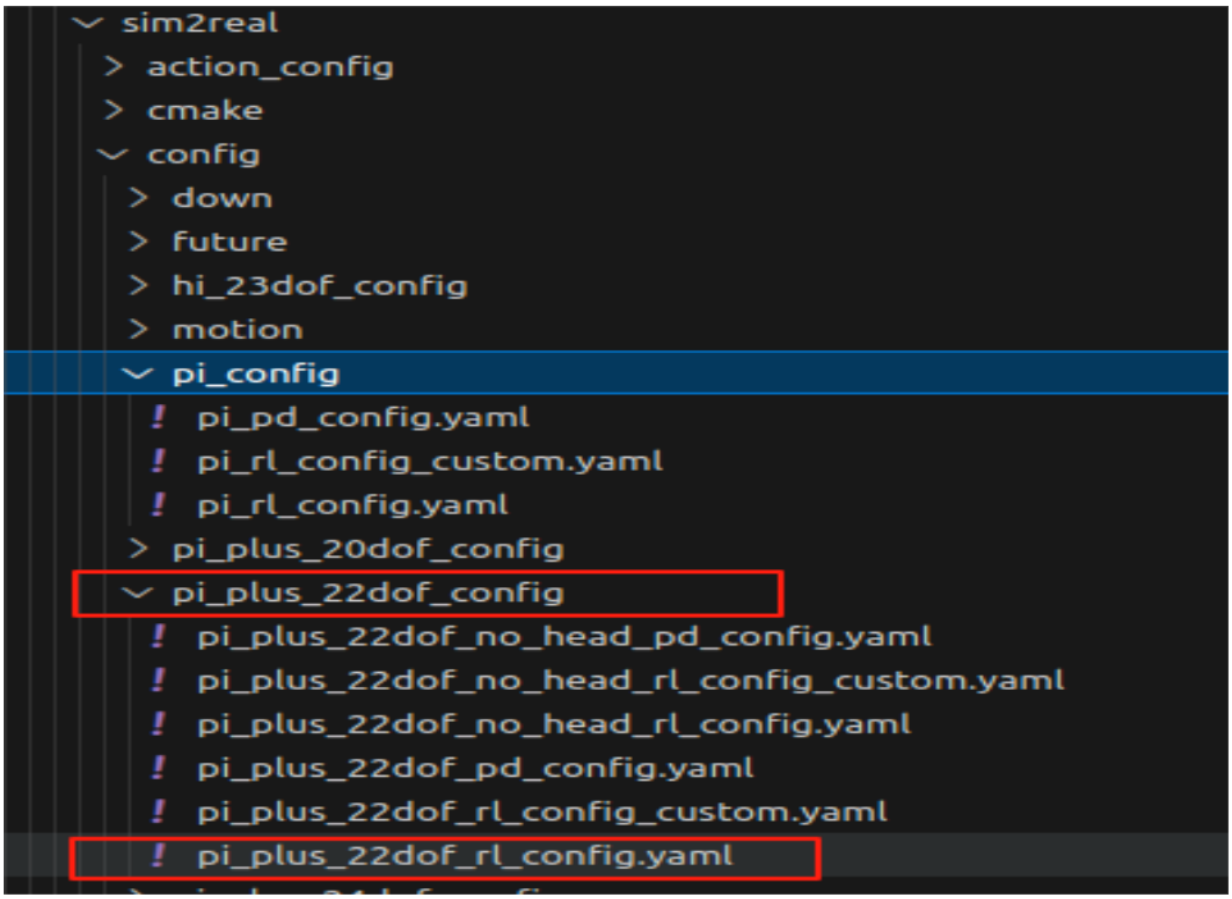


byd_fanyangwo.yaml

sim2real_master > install > share > sim2real > config > up > byd_fanyangwo.yaml

```yaml
policy_name: "up/model_20000_action_2025-10-17_11-37-22_fanyangwoup5.rknn"
detect_falls: false

algorithm: "bydmmc"

future_file_name: "up/byd_fanyangwo5.json"

motor_group: "all"

dofs: 22

# ref_pos(dofs) + ref_vel(dofs) + ref_ori(6) + angle_vel(3) + pos(dofs) + vel(dofs) + actions(dofs)
num_single_obs: 119

motion_len: 1000.2 # 通过json的数据判断 ，无需在此处写

cmd_lin_vel_scale: 1.0
cmd_ang_vel_scale: 1.0
rbt_lin_pos_scale: 1.0
rbt_lin_vel_scale: 1.0
rbt_ang_vel_scale: 1.0

clip_obs: 100.0

pd_ctrl_f: 200
rl_ctrl_f: 50
```

Configure the algorithm strategy pi_plus_22dof_rl_config. yaml required for real machine validation in the sim2real_master/install/share/sim2real/config/piupleus_22dof_config path



pi_plus_22dof_rl_config.yaml

sim2real_master > install > share > sim2real > config > pi_plus_22dof_config > pi_plus_22dof_rl_config.yaml

```yaml
walk:
  - name: "lr"
    path: "walk/lr.yaml"
  # - name: "footstep"
  #   path: "walk/footstep.yaml"

motion:
    - name: "byd_big_kick"
      path: "motion/byd_big_kick.yaml"
    #  - name: "dance1030"
    #  path: "motion/dance1030.yaml"
    # - name: "bydform1"
    #   path: "motion/byd_form1.yaml"
    # - name: "kick"
    #   path: "motion/byd_kick.yaml"
    # - name: "byd_big_kick"
    #   path: "motion/byd_big_kick.yaml"

up:
  - name: "yangwo"
    # path: "up/yangwo.yaml"
    path: "up/fanyangwo.yaml"
    # path: "up/byd_fanyangwo.yaml"
  - name: "fuwo"
    path: "up/fuwo.yaml"
    # path: "up/byd_fuwo.yaml"
```

4、Start up the Robot

Because there will be a self starting script after booting, the configuration file needs to be modified to verify the policy, and the self starting program needs to be manually closed, or the terminal needs to use the command *'pkill -f ros'* to close all running nodes, and then execute the following command to pull up the robot program:

Startup Method of Mini Pi

cd sim2real_master

source ./install/setup.bash

roslaunch sim2real_master joy_control_pi.launch

Startup Method of Mini Pi Plus

cd sim2real_master

source ./install/setup.bash

roslaunch sim2real_master joy_control_pi_plus.launch

After successful startup, follow the instructions in the product manual to enter the Default mode. The default algorithm for this mode is the algorithm at the top of pi_rl_config. yaml or pi_plus_22dof_config. If you need to switch between Walk and Motion actions, you can use the LT+RT+cross key to switch left and right when the robot is squatting or standing still. Then, the real machine verification strategy requires simultaneously pressing the LT+RT+LB buttons on the controller to play.

Attention: To verify the falling and crawling action, use the joystick to enter the Default mode. After the robot stands, place it flat on the ground. Before unlocking (i.e. in a stationary state), the verification strategy requires simultaneously pressing the LT+RT+LB buttons on the joystick. After unlocking (i.e. entering the reinforcement learning walking mode), fanyangwo is automatically triggered when the robot is lying down on the ground, and fuwo is automatically triggered when the robot is lying down on the ground.