太极、跳舞分支

- 没有合并到主分支之前为`fandes/dev/add-taiji-demo`

```
git checkout fandes/dev/add-taiji-demo
```

环境配置和确认

- kuavo-ros-control能够正常运行
- 额外依赖
  - 升级pandas版本(重要)

```
sudo su
pip install pandas==2.0.3
```

> ⚠️ 遥控器启动必须在root下执行`pip install pandas==2.0.3`，不能只安装在lab用户目录下，也可以都装一次！

  - 安装 robot_localization 包相关依赖

```
sudo apt-get install libgeographic-dev ros-noetic-geographic* -y
```

- 确认手臂config增益
  - 执行 `cat ~/.config/lejuconfig/config.yaml`打印手臂电机配置，确认`parameter`项和下列一致

```
parameter:
    # 关节参数[vel, kp_pos, kd_pos, tor, kp_vel, kd_vel, ki_vel]
    Left_joint_arm_1: [0, 25, 8, 0, 0, 0, 0]
    Left_joint_arm_2: [0, 20, 6, 0, 0, 0, 0]
    Left_joint_arm_3: [0, 20, 6, 0, 0, 0, 0]
    Left_joint_arm_4: [0, 10, 3, 0, 0, 0, 0]
    Left_joint_arm_5: [0, 10, 3, 0, 0, 0, 0]
    Left_joint_arm_6: [0, 10, 3, 0, 0, 0, 0]
    Right_joint_arm_1: [0, 25, 8, 0, 0, 0, 0]
    Right_joint_arm_2: [0, 20, 6, 0, 0, 0, 0]
    Right_joint_arm_3: [0, 20, 6, 0, 0, 0, 0]
    Right_joint_arm_4: [0, 10, 3, 0, 0, 0, 0]
    Right_joint_arm_5: [0, 10, 3, 0, 0, 0, 0]
    Right_joint_arm_6: [0, 10, 3, 0, 0, 0, 0]
    Head_joint_low: [0, 4, 3, 0, 0, 0, 0]
    Head_joint_high: [0, 10, 6, 0, 0, 0, 0]
```

编译

```
catkin build humanoid_controllers # 在仓库目录执行
```

使用案例

通过命令行运行跳舞

1. 启动机器人程序，并站立

```
sudo su
source devel/setup.bash
roslaunch humanoid_controllers load_kuavo_real.launch
```

2. 启动跳舞程序
   - 启动自动程序，会自动执行手势舞、太极、跳舞，各段动作时间配置在 `src/demo/full_body_demo/scripts/action_sequence.yaml`中

```
source devel/setup.bash
python3 ./src/demo/full_body_demo/scripts/timed_action_executor.py
```

   - 单独启动各段动作,

```
source devel/setup.bash
# 太极
python3 ./src/demo/csv2body_demo/step_player_csv_ocs2.py
src/demo/csv2body_demo/actions/taiji_wuhan_step_part.csv
# 手势舞
python3 ./src/demo/full_body_demo/csv_trajectory_publisher.py
./rbd_state_motions1.csv
# 跳舞
python3 ./src/demo/full_body_demo/csv_trajectory_publisher.py
./rbd_states_0314_5deg_ik_8_full.csv
```

通过遥控器运行

- 配置遥控器自启动程序

```
 cd <kuavo-ros-control>/src/humanoid-
control/h12pro_controller_node/scripts
 sudo su
 ./deploy_autostart.sh
```

⚠️ 注意: h12pro 遥控器的程序以及机器人程序，vr 程序都会使用部署时的 ROS_MASTER_URI 与 ROS_IP，请确保部署时的 ROS_MASTER_URI 与 ROS_IP 正确。

执行后，会自动安装依赖，并启动 h12pro 遥控器程序。

- 配置遥控器按键执行程序
  - 修改`src/humanoid-control/h12pro_controller_node/config/customize_config.json`
  - 将命令行启动跳舞的命令添加到想要的按键下，类型改为`shell`,例如绑定按键为`拨杆都摆到右侧+D键`可以这样配置

```
"customize_action_RR_D": {
  "type": "shell",
  "command": "python3 /home/lab/kuavo-ros-control/src/demo/full_body_demo/scripts/timed_action_executor.py > /home/lab/executor_output.txt 2>&1"
},
```

  - 修改后保存，重新启动遥控器服务之后即可生效

```
sudo systemctl restart ocs2_h12pro_monitor.service
```