

CS 391R Robosuite Tutorial

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Basic Usage

Installation

Install with `pip`

```
$ pip install robosuite
```

Test installation with

```
$ python -m robosuite.demos.demo_random_action
```

Install from source

1. Clone the robosuite repository

```
$ git clone https://github.com/StanfordVL/robosuite.git  
$ cd robosuite
```

2. Create an virtual environment with conda (optional)

```
$ conda create -n robosuit python=3.8
```

3. Install the base requirements with

```
$ pip install -r requirements.txt
```

4. Test installation with

```
$ python -m robosuite.demos.demo_random_action
```

Quickstart

Running Standardized Environments

```
import numpy as np
import robosuite as suite

# create environment instance
env = suite.make(
    env_name="Lift", # try with other tasks like "Stack" and "Door"
    robots="Panda", # try with other robots like "Sawyer" and "Jaco"
    has_renderer=True,
    has_offscreen_renderer=False,
    use_camera_obs=False,
)

# reset the environment
env.reset()

for i in range(1000):
    action = np.random.randn(env.robots[0].dof) # sample random action
    obs, reward, done, info = env.step(action) # take action in the environment
    env.render() # render on display
```

Building Your Own Environment

Create the world

```
from robosuite.models import MujocoWorldBase

world = MujocoWorldBase()
```

Create a robot

```
from robosuite.models.robots import Panda

mujoco_robot = Panda()
```

Add a gripper

```
from robosuite.models.grippers import gripper_factory

gripper = gripper_factory('PandaGripper')
mujoco_robot.add_gripper(gripper)
```

Add the robot to the world

```
mujoco_robot.set_base_xpos([0, 0, 0])
world.merge(mujoco_robot)
```

Create a table

```
from robosuite.models.arenas import TableArena

mujoco_arena = TableArena()
mujoco_arena.set_origin([0.8, 0, 0])
world.merge(mujoco_arena)
```

Add an object which can move around

```
from robosuite.models.objects import BallObject
from robosuite.utils.mjcf_utils import new_joint

sphere = BallObject(
    name="sphere",
    size=[0.04],
    rgba=[0, 0.5, 0.5, 1]).get_obj()
sphere.set('pos', '1.0 0 1.0')
world.worldbody.append(sphere)
```

Obtain a `MjModel` instance and run simulation

```

model = world.get_model(mode="mujoco_py")

from mujoco_py import MjSim, MjViewer

sim = MjSim(model)
viewer = MjViewer(sim)
viewer.vopt.geomgroup[0] = 0 # disable visualization of collision mesh

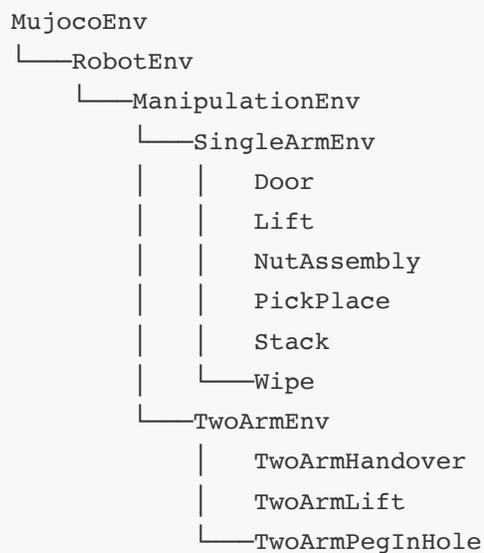
for i in range(10000):
    sim.data.ctrl[:] = 0
    sim.step()
    viewer.render()

```

Inherit Base Environments

Standardized environments are inherited from base environments:

- MujocoEnv
- RobotEnv
- ManipulationEnv
- SingleArmEnv
- TwoArmEnv



<https://github.com/UT-Austin-RPL/robosuite-project-template>