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21AIE311 - Reinforcement Learning
Lab Worksheet - 2
OpenAI Gymnasium Implementation

1. Installing Gymnasium in Google Colaboratory and Laptop.

```
pip install gymnasium
```

After successful installation run the below code in both environments.

```
import gymnasium as gym
env = gym.make('CartPole-v1', render_mode='rgb_array')
env.reset()
env.render()
```

2. Load the following Gym environments and observe the
   a) Mountain Car
   b) Lunar Lander

3. Running an environment-agent interaction cycle in Laptop.

```
import gymnasium as gym
env = gym.make('CartPole-v1', render_mode='rgb_array')
import time

for _ in range(10):
    env.reset()
    done = False
    while not done:
        action = env.action_space.sample()
        obs,reward,done,x,info = env.step(action)
        env.render()
        time.sleep(0.01)
```

4. Running an environment-agent interaction cycle in Google Colab.

Installing necessary packages for visualization

```
!pip install swig
!apt-get install -y xvfb x11-utils > /dev/null
!pip install gymnasium[box2d] pyvirtualdisplay  PyOpenGL PyOpenGL-accelerate > /dev/null
```

Code

```
import pyvirtualdisplay
_display = pyvirtualdisplay.Display(visible=False,size=(1400, 900))  # use False with Xvfb
_ = _display.start()
!echo $DISPLAY
import gymnasium as gym
import matplotlib.pyplot as plt
from IPython import display
import time

env = gym.make('CartPole-v1', render_mode='rgb_array')
for _ in range(10):
    env.reset()
    done = False
    while not done:
        action = env.action_space.sample()
        obs,reward,done,x,info = env.step(action)
        fig, ax = plt.subplots(figsize=(20, 10))
        ax.axis('off')
        img = ax.imshow(env.render())
        display.display(plt.gcf())
        display.clear_output(wait=True)
        time.sleep(0.01)
```

5. Write code for the agent-environment interaction cycle for the following environments.
    a) Mountain Car
    b) Lunar Lander
6. Alter the interaction cycle code to record all the rewards from each training episode and plot it against the episode number using Matplotlib.