```python
import gym
from stable_baselines3 import PPO
from stable_baselines3.common.vec_env import DummyVecEnv
from stable_baselines3.common.evaluation import evaluate_policy
import os
```

```python
!pip install stable-baselines3[extra]
!pip install pyglet==1.3.2
!pip install pyopengl
```

```
Requirement already satisfied: stable-baselines3[extra] in c:\users\owner\anaconda3\lib\site-packages (1.8.0)
Requirement already satisfied: cloudpickle in c:\users\owner\anaconda3\lib\site-packages (from stable-baselines
3[extra]) (2.0.0)
Requirement already satisfied: importlib-metadata~=4.13 in c:\users\owner\anaconda3\lib\site-packages (from sta
ble-baselines3[extra]) (4.13.0)
Requirement already satisfied: torch>=1.11 in c:\users\owner\anaconda3\lib\site-packages (from stable-baselines
3[extra]) (2.0.1)
Requirement already satisfied: gym==0.21 in c:\users\owner\anaconda3\lib\site-packages (from stable-baselines3[
extra]) (0.21.0)
Requirement already satisfied: matplotlib in c:\users\owner\anaconda3\lib\site-packages (from stable-baselines3
[extra]) (3.5.2)
Requirement already satisfied: pandas in c:\users\owner\anaconda3\lib\site-packages (from stable-baselines3[ext
ra]) (1.4.4)
Requirement already satisfied: numpy in c:\users\owner\anaconda3\lib\site-packages (from stable-baselines3[extr
a]) (1.21.5)
Requirement already satisfied: tensorboard>=2.9.1 in c:\users\owner\anaconda3\lib\site-packages (from stable-ba
selines3[extra]) (2.13.0)
Requirement already satisfied: ale-py==0.7.4 in c:\users\owner\anaconda3\lib\site-packages (from stable-baselin
es3[extra]) (0.7.4)
Requirement already satisfied: tqdm in c:\users\owner\anaconda3\lib\site-packages (from stable-baselines3[extra
]) (4.64.1)
Requirement already satisfied: opencv-python in c:\users\owner\anaconda3\lib\site-packages (from stable-baselin
es3[extra]) (4.7.0.72)
Requirement already satisfied: psutil in c:\users\owner\anaconda3\lib\site-packages (from stable-baselines3[ext
ra]) (5.9.0)
Requirement already satisfied: autorom[accept-rom-license]~=0.6.0 in c:\users\owner\anaconda3\lib\site-packages
(from stable-baselines3[extra]) (0.6.1)
Requirement already satisfied: pillow in c:\users\owner\anaconda3\lib\site-packages (from stable-baselines3[ext
ra]) (9.2.0)
Requirement already satisfied: rich in c:\users\owner\anaconda3\lib\site-packages (from stable-baselines3[extra
]) (13.4.1)
Requirement already satisfied: importlib-resources in c:\users\owner\anaconda3\lib\site-packages (from ale-py==
0.7.4->stable-baselines3[extra]) (5.12.0)
Requirement already satisfied: click in c:\users\owner\anaconda3\lib\site-packages (from autorom[accept-rom-lic
ense]~=0.6.0->stable-baselines3[extra]) (8.0.4)
Requirement already satisfied: requests in c:\users\owner\anaconda3\lib\site-packages (from autorom[accept-rom-
license]~=0.6.0->stable-baselines3[extra]) (2.28.1)
Requirement already satisfied: AutoROM.accept-rom-license in c:\users\owner\anaconda3\lib\site-packages (from a
utorom[accept-rom-license]~=0.6.0->stable-baselines3[extra]) (0.6.1)
Requirement already satisfied: zipp>=0.5 in c:\users\owner\anaconda3\lib\site-packages (from importlib-metadata
~=4.13->stable-baselines3[extra]) (3.8.0)
Requirement already satisfied: google-auth<3,>=1.6.3 in c:\users\owner\anaconda3\lib\site-packages (from tensor
board>=2.9.1->stable-baselines3[extra]) (2.19.1)
Requirement already satisfied: google-auth-oauthlib<1.1,>=0.5 in c:\users\owner\anaconda3\lib\site-packages (fr
om tensorboard>=2.9.1->stable-baselines3[extra]) (1.0.0)
Requirement already satisfied: absl-py>=0.4 in c:\users\owner\anaconda3\lib\site-packages (from tensorboard>=2.
9.1->stable-baselines3[extra]) (1.4.0)
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>=2.9.1->stable-baselines3[extra]) (3.20.3)
Requirement already satisfied: grpcio>=1.48.2 in c:\users\owner\anaconda3\lib\site-packages (from tensorboard>=
2.9.1->stable-baselines3[extra]) (1.54.2)
Requirement already satisfied: tensorboard-data-server<0.8.0,>=0.7.0 in c:\users\owner\anaconda3\lib\site-packa
ges (from tensorboard>=2.9.1->stable-baselines3[extra]) (0.7.1)
Requirement already satisfied: werkzeug>=1.0.1 in c:\users\owner\anaconda3\lib\site-packages (from tensorboard>
=2.9.1->stable-baselines3[extra]) (2.0.3)
Requirement already satisfied: wheel>=0.26 in c:\users\owner\anaconda3\lib\site-packages (from tensorboard>=2.9
.1->stable-baselines3[extra]) (0.37.1)
Requirement already satisfied: markdown>=2.6.8 in c:\users\owner\anaconda3\lib\site-packages (from tensorboard>
=2.9.1->stable-baselines3[extra]) (3.3.4)
Requirement already satisfied: setuptools>=41.0.0 in c:\users\owner\anaconda3\lib\site-packages (from tensorboa
rd>=2.9.1->stable-baselines3[extra]) (67.8.0)
Requirement already satisfied: filelock in c:\users\owner\anaconda3\lib\site-packages (from torch>=1.11->stable
-baselines3[extra]) (3.6.0)
Requirement already satisfied: sympy in c:\users\owner\anaconda3\lib\site-packages (from torch>=1.11->stable-ba
selines3[extra]) (1.10.1)
Requirement already satisfied: jinja2 in c:\users\owner\anaconda3\lib\site-packages (from torch>=1.11->stable-b
aselines3[extra]) (2.11.3)
Requirement already satisfied: networkx in c:\users\owner\anaconda3\lib\site-packages (from torch>=1.11->stable
-baselines3[extra]) (2.8.4)
Requirement already satisfied: typing-extensions in c:\users\owner\anaconda3\lib\site-packages (from torch>=1.1
1->stable-baselines3[extra]) (3.7.4.3)
Requirement already satisfied: python-dateutil>=2.7 in c:\users\owner\anaconda3\lib\site-packages (from matplot
lib->stable-baselines3[extra]) (2.8.2)
Requirement already satisfied: pyparsing>=2.2.1 in c:\users\owner\anaconda3\lib\site-packages (from matplotlib-
>stable-baselines3[extra]) (3.0.9)
Requirement already satisfied: packaging>=20.0 in c:\users\owner\anaconda3\lib\site-packages (from matplotlib->
stable-baselines3[extra]) (21.3)
```

```
Requirement already satisfied: cycler>=0.10 in c:\users\owner\anaconda3\lib\site-packages (from matplotlib->sta
ble-baselines3[extra]) (0.11.0)
Requirement already satisfied: kiwisolver>=1.0.1 in c:\users\owner\anaconda3\lib\site-packages (from matplotlib
->stable-baselines3[extra]) (1.4.2)
Requirement already satisfied: fonttools>=4.22.0 in c:\users\owner\anaconda3\lib\site-packages (from matplotlib
->stable-baselines3[extra]) (4.25.0)
Requirement already satisfied: pytz>=2020.1 in c:\users\owner\anaconda3\lib\site-packages (from pandas->stable-
baselines3[extra]) (2022.1)
Requirement already satisfied: markdown-it-py<3.0.0,>=2.2.0 in c:\users\owner\anaconda3\lib\site-packages (from
rich->stable-baselines3[extra]) (2.2.0)
Requirement already satisfied: pygments<3.0.0,>=2.13.0 in c:\users\owner\anaconda3\lib\site-packages (from rich
->stable-baselines3[extra]) (2.15.1)
Requirement already satisfied: colorama in c:\users\owner\anaconda3\lib\site-packages (from tqdm->stable-baseli
nes3[extra]) (0.4.5)
Requirement already satisfied: cachetools<6.0,>=2.0.0 in c:\users\owner\anaconda3\lib\site-packages (from googl
e-auth<3,>=1.6.3->tensorboard>=2.9.1->stable-baselines3[extra]) (5.3.1)
Requirement already satisfied: urllib3<2.0 in c:\users\owner\anaconda3\lib\site-packages (from google-auth<3,>=
1.6.3->tensorboard>=2.9.1->stable-baselines3[extra]) (1.26.11)
Requirement already satisfied: six>=1.9.0 in c:\users\owner\anaconda3\lib\site-packages (from google-auth<3,>=1
.6.3->tensorboard>=2.9.1->stable-baselines3[extra]) (1.15.0)
Requirement already satisfied: pyasn1-modules>=0.2.1 in c:\users\owner\anaconda3\lib\site-packages (from google
-auth<3,>=1.6.3->tensorboard>=2.9.1->stable-baselines3[extra]) (0.2.8)
Requirement already satisfied: rsa<5,>=3.1.4 in c:\users\owner\anaconda3\lib\site-packages (from google-auth<3,
>=1.6.3->tensorboard>=2.9.1->stable-baselines3[extra]) (4.9)
Requirement already satisfied: requests-oauthlib>=0.7.0 in c:\users\owner\anaconda3\lib\site-packages (from goo
gle-auth-oauthlib<1.1,>=0.5->tensorboard>=2.9.1->stable-baselines3[extra]) (1.3.1)
Requirement already satisfied: mdurl~=0.1 in c:\users\owner\anaconda3\lib\site-packages (from markdown-it-py<3.
0.0,>=2.2.0->rich->stable-baselines3[extra]) (0.1.2)
Requirement already satisfied: idna<4,>=2.5 in c:\users\owner\anaconda3\lib\site-packages (from requests->autor
om[accept-rom-license]~=0.6.0->stable-baselines3[extra]) (3.3)
Requirement already satisfied: certifi>=2017.4.17 in c:\users\owner\anaconda3\lib\site-packages (from requests-
>autorom[accept-rom-license]~=0.6.0->stable-baselines3[extra]) (2022.9.14)
Requirement already satisfied: charset-normalizer<3,>=2 in c:\users\owner\anaconda3\lib\site-packages (from req
uests->autorom[accept-rom-license]~=0.6.0->stable-baselines3[extra]) (2.0.4)
Requirement already satisfied: MarkupSafe>=0.23 in c:\users\owner\anaconda3\lib\site-packages (from jinja2->tor
ch>=1.11->stable-baselines3[extra]) (2.0.1)
Requirement already satisfied: mpmath>=0.19 in c:\users\owner\anaconda3\lib\site-packages (from sympy->torch>=1
.11->stable-baselines3[extra]) (1.2.1)
Requirement already satisfied: pyasn1<0.5.0,>=0.4.6 in c:\users\owner\anaconda3\lib\site-packages (from pyasn1-
modules>=0.2.1->google-auth<3,>=1.6.3->tensorboard>=2.9.1->stable-baselines3[extra]) (0.4.8)
Requirement already satisfied: oauthlib>=3.0.0 in c:\users\owner\anaconda3\lib\site-packages (from requests-oau
thlib>=0.7.0->google-auth-oauthlib<1.1,>=0.5->tensorboard>=2.9.1->stable-baselines3[extra]) (3.2.2)
Requirement already satisfied: pyglet==1.3.2 in c:\users\owner\anaconda3\lib\site-packages (1.3.2)
Requirement already satisfied: future in c:\users\owner\anaconda3\lib\site-packages (from pyglet==1.3.2) (0.18.
2)
Requirement already satisfied: pyopengl in c:\users\owner\anaconda3\lib\site-packages (3.1.7)
```

In [3]: 
```python
!conda --version
```

```
conda 22.9.0
```

## Testing Environment

In [4]: 
```python
environment_name = "CarRacing-v2"
```

In [5]: 
```python
env = gym.make(environment_name, render_mode="human")
```

In [6]: 
```python
env.reset()
```

```
Out[6]:  (array([[[0, 0, 0],
                 [0, 0, 0],
                 [0, 0, 0],
                 ...,
                 [0, 0, 0],
                 [0, 0, 0],
                 [0, 0, 0]],

                [[0, 0, 0],
                 [0, 0, 0],
                 [0, 0, 0],
                 ...,
                 [0, 0, 0],
                 [0, 0, 0],
                 [0, 0, 0]],

                [[0, 0, 0],
                 [0, 0, 0],
                 [0, 0, 0],
                 ...,
                 [0, 0, 0],
                 [0, 0, 0],
                 [0, 0, 0]],

                ...,

                [[0, 0, 0],
                 [0, 0, 0],
                 [0, 0, 0],
                 ...,
                 [0, 0, 0],
                 [0, 0, 0],
                 [0, 0, 0]],

                [[0, 0, 0],
                 [0, 0, 0],
                 [0, 0, 0],
                 ...,
                 [0, 0, 0],
                 [0, 0, 0],
                 [0, 0, 0]],

                [[0, 0, 0],
                 [0, 0, 0],
                 [0, 0, 0],
                 ...,
                 [0, 0, 0],
                 [0, 0, 0],
                 [0, 0, 0]]], dtype=uint8),
          {})
```

```python
In [ ]:
```

```python
In [7]:  env.action_space.sample()
```

```
Out[7]:  array([0.39646387, 0.59655064, 0.54222566], dtype=float32)
```

```python
In [8]:  env.observation_space
```

```
Out[8]:  Box(0, 255, (96, 96, 3), uint8)
```

```python
In [ ]:
```

```python
In [9]:  env = gym.make(environment_name)
```

```python
In [10]:  env.action_space
```

```
Out[10]:  Box([-1.  0.  0.], 1.0, (3,), float32)
```

```python
In [11]:  env.observation_space
```

```
Out[11]:  Box(0, 255, (96, 96, 3), uint8)
```

```python
In [ ]:
```

```python
In [12]:  env.reset()
```

```
Out[12]:  (array([[[0, 0, 0],
             [0, 0, 0],
             [0, 0, 0],
             ...,
             [0, 0, 0],
             [0, 0, 0],
             [0, 0, 0]],

            [[0, 0, 0],
             [0, 0, 0],
             [0, 0, 0],
             ...,
             [0, 0, 0],
             [0, 0, 0],
             [0, 0, 0]],

            [[0, 0, 0],
             [0, 0, 0],
             [0, 0, 0],
             ...,
             [0, 0, 0],
             [0, 0, 0],
             [0, 0, 0]],

            ...,

            [[0, 0, 0],
             [0, 0, 0],
             [0, 0, 0],
             ...,
             [0, 0, 0],
             [0, 0, 0],
             [0, 0, 0]],

            [[0, 0, 0],
             [0, 0, 0],
             [0, 0, 0],
             ...,
             [0, 0, 0],
             [0, 0, 0],
             [0, 0, 0]],

            [[0, 0, 0],
             [0, 0, 0],
             [0, 0, 0],
             ...,
             [0, 0, 0],
             [0, 0, 0],
             [0, 0, 0]]], dtype=uint8),
       {})
```

```python
In [13]:  env.close()
```

```python
In [14]:  episodes = 5
          for episode in range(1, episodes+1):
              state = env.reset()
              done = False
              score = 0

              while not done:
                  env.render()
                  action = env.action_space.sample()
                  n_state, reward, done, info = env.step(action)
                  score+=reward
              print('Episode:{} Score:{}'.format(episode, score))
```

```
C:\Users\Owner\miniconda3\envs\racedrive\lib\site-packages\gym\envs\box2d\car_racing.py:569: UserWarning: WARN:
You are calling render method without specifying any render mode. You can specify the render_mode at initializa
tion, e.g. gym("CarRacing-v2", render_mode="rgb_array")
  gym.logger.warn(
C:\Users\Owner\miniconda3\envs\racedrive\lib\site-packages\gym\utils\passive_env_checker.py:233: DeprecationWar
ning: `np.bool8` is a deprecated alias for `np.bool_`.  (Deprecated NumPy 1.24)
  if not isinstance(terminated, (bool, np.bool8)):
---------------------------------------------------------------------------
ValueError                                Traceback (most recent call last)
Cell In[14], line 10
      8     env.render()
      9     action = env.action_space.sample()
---> 10     n_state, reward, done, info = env.step(action)
     11     score+=reward
     12 print('Episode:{} Score:{}'.format(episode, score))

ValueError: too many values to unpack (expected 4)
```

## Training Self-Driver Model

```
In [15]:  log_path = os.path.join('Training','Logs')
```

```
In [16]:  env = gym.make(environment_name)
          env = DummyVecEnv([lambda: env])
          model = PPO('CnnPolicy', env, verbose = 1,tensorboard_log=log_path)
```

```
Using cpu device
Wrapping the env in a VecTransposeImage.
```

<div style="background-color:#fdd">

```
C:\Users\Owner\miniconda3\envs\racedrive\lib\site-packages\stable_baselines3\common\vec_env\patch_gym.py:49: Us
erWarning: You provided an OpenAI Gym environment. We strongly recommend transitioning to Gymnasium environment
s. Stable-Baselines3 is automatically wrapping your environments in a compatibility layer, which could potentia
lly cause issues.
  warnings.warn(
```

</div>

```
In [ ]:  model.learn(total_timesteps=20000)
```

```
Logging to Training\Logs\PPO_18
```

## Adding a callback

```
In [ ]:  from stable_baselines3.common.callbacks import EvalCallback, StopTrainingOnRewardThreshold
         import os
```

```
In [ ]:  save_path = os.path.join('Training', 'Saved Models')
         log_path = os.path.join('Training', 'Logs')
```

```
In [ ]:  env = gym.make(environment_name)
         env = DummyVecEnv([lambda: env])
```

```
In [ ]:  stop_callback = StopTrainingOnRewardThreshold(reward_threshold=190, verbose=1)
         eval_callback = EvalCallback(env,
                                      callback_on_new_best=stop_callback,
                                      eval_freq=20000,
                                      best_model_save_path=save_path,
                                      verbose=1)
```

```
In [ ]:  model = PPO('MlpPolicy', env, verbose = 1, tensorboard_log=log_path)
```

```
In [ ]:  model.learn(total_timesteps=20000, callback=eval_callback)
```

## Viewing tensorboard

```
In [ ]:
```

```
In [ ]:
```

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