

Cloud and Hardware Specifications

| | |
|-------|---|
| CPU | 2vCPU - 13 GB, Quad core Intel i5-4690K @ 3.5 GHz |
| GPU | 1xNVIDIA Tesla V100, 1x NVIDIA GeForce GTX 980 Ti |
| Zone | us-west-1b |
| Cloud | Google Cloud Platform |

Model Specifications

| MODEL | Network | TRAINING TIME | # EPISODES | BATCH SIZE & LEARNING RATE |
|----------|------------------------------|---------------|------------|----------------------------|
| Baseline | 4 Layer Dense Neural Network | ~ 17 Hours | 75 | 50; 0.09 |
| Advanced | 5 Layer CNN | ~ 5 Hours | 320 | 256; 0.0001 |

Baseline Architecture

| | | | |
|-----------|-----------|-----------|-----------|
| Layer 1 | Layer 2 | Layer 3 | Layer 4 |
| 24 (relu) | 48 (relu) | 72 (relu) | 96 (relu) |

CNN Architecture

| | Width | Height | Depth | # Params | Filter Width | Filter Height | Filter Depth | Filter Count | Stride Width | Stride Height |
|--------------|-------|--------|-------|----------|--------------|---------------|--------------|--------------|--------------|---------------|
| Input | 240 | 256 | 3 | | | | | | | |
| Conv 1 | 55 | 59 | 32 | 55328 | 24 | 24 | 3 | 32 | 4 | 4 |
| Conv 2 | 22 | 22 | 64 | 452672 | 13 | 17 | 32 | 64 | 2 | 2 |
| Conv 3 | 11 | 11 | 64 | 589888 | 12 | 12 | 64 | 64 | 1 | 1 |
| Conv 4 | 4 | 4 | 128 | 524416 | 8 | 8 | 64 | 128 | 1 | 1 |
| Conv 5 | 1 | 1 | 128 | 262272 | 4 | 4 | 128 | 128 | 1 | 1 |
| Subtotal | | | | 1884576 | | | | | | |
| Value Stream | 1 | 1 | 64 | 0 | | | | | | |
| Adv Stream | 1 | 1 | 64 | 0 | | | | | | |
| Value Flat | | | 64 | 0 | | | | | | |
| Adv Flat | | | 64 | 0 | | | | | | |
| Value FC | | | 1 | 65 | | | | | | |
| Adv FC | | | 7 | 455 | | | | | | |
| Final Output | | | 7 | 0 | | | | | | |
| Total Params | | | | 1885096 | | | | | | |

Installing gym_super_mario_bros

After Gym is installed and imported, follow these steps to see a demo environment render.

```
!pip install gym_super_mario_bros

from nes_py.wrappers import BinarySpaceToDiscreteSpaceEnv
import gym_super_mario_bros
from gym_super_mario_bros.actions import SIMPLE_MOVEMENT
env = gym_super_mario_bros.make('SuperMarioBros-v2')
env = BinarySpaceToDiscreteSpaceEnv(env, SIMPLE_MOVEMENT)

done = True
for step in range(5000):
    if done:
        state = env.reset()
        state, reward, done, info = env.step(env.action_space.sample())
        env.render()

env.close()
```