

# MinerAI environment installation

This guideline is provided for users to install Python environment with libraries used at server, facilitating the running of the test code.

The environment can be installed in two ways.

- Install the environment directly on your PC:
  - o Advantages: easy and familiar to those who have worked with Python
  - o Disadvantages: there may be difference to the actual running environment due to different OS (the actual environment in which the server runs your code is Ubuntu Server 18.04)
- Using Docker to install:
  - o Advantages: the code environment is similar to the actual running environment
  - o Disadvantages: installing Docker may be difficult for some older OS

Installation instructions:

- Python 3.6.9 (Ubuntu) – Python 3.7.4 (windows)
- Tensorflow 1.14.0 or Tensorflow 2.2.0
- Keras 2.3.1
- Numpy 1.18.4
- Pandas 0.15
- PyTorch 1.5.0
- Joblib 0.16.0
- Ray 0.8.6
- ray[rllib]
- ray[tune]
- requests 2.24.0
- semver 2.10.2
- tf-agents 0.3.0 (version 0.5.0 if use Tensorflow 2.2.0)
- tensorflow-probability 0.10.0 (if use tf-agents 0.5.0)
- Pyqlearning v1.2.4
- Mushroom-RL v1.4.0
- Gym 0.17.2
- opencv-python 4.2.0.34
- prettytable 0.7.2
- jacs 0.1.7

## 1. Installing directly

### a. Windows

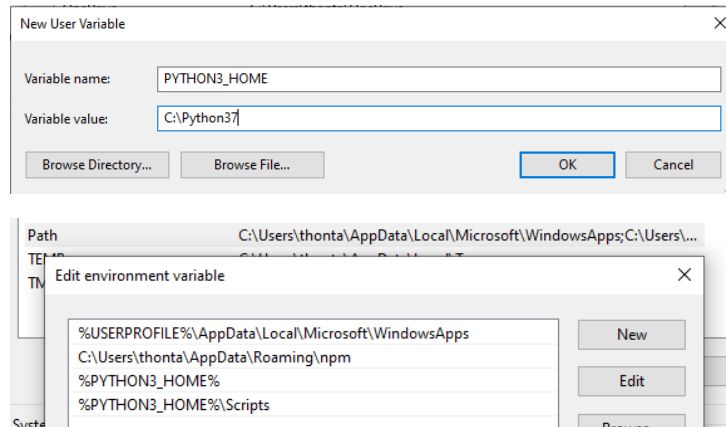
- i. Install Python 3.7.4:

Download the executable installer relevant to the OS on your PC at:

<https://www.python.org/downloads/release/python-374/>

(The download link is located in the Files section at the bottom of the page)

Install and set Windows environment variables to PYTHON\_HOME /,  
PYTHON\_HOME / Scripts



Verify the installation, make sure the version is 3.7.4

```
D:\>python37 -V
Python 3.7.4
```

ii. Install pip3

Run the following command to install: ***python37 -m pip install --upgrade pip***

Verify the installation, make sure pip3 is installed in Python37

```
D:\>which pip3
/cydrive/c/Python37/Scripts/pip3
```

iii. Install virtualenv

Run the following command to install: ***pip3 install virtualenv***

Verify the installation, make sure virtualenv is installed in Python37

```
D:\>which virtualenv
/cydrive/c/Python37/Scripts/virtualenv
```

iv. Install libraries

In order not to affect the normal Python environment, the installation will be done in a virtual environment.

- Change the current directory to the directory you want to install and create a virtual environment:

***virtualenv -p python37 {env\_name}***

{env\_name}: an environment's name of your choice. For example, if you want to name the environment as Miner, the installation command will be ***virtualenv -p python37 miner***

- Activate the virtual environment

***.\{env\_name}\Scripts\activate***

- Install libraries:

***pip3 install numpy==1.18.4***

***pip3 install keras==2.3.1***

***pip3 install pandas==1.0.4***

***pip3 install tensorflow==1.14.0***

***pip3 install torch==1.5.0+cpu torchvision==0.6.0+cpu -f  
[https://download.pytorch.org/whl/torch\\_stable.html](https://download.pytorch.org/whl/torch_stable.html)***

***pip3 install joblib==0.16.0***

***pip3 install ray==0.8.6***

***pip3 install ray[rllib]***

***pip3 install ray[tune]***

***pip3 install requests==2.24.0***

***pip3 install semver==2.10.2***

***pip3 install tf-agents==0.3.0***

***pip3 install Pyqlearning==v1.2.4***

***pip3 install Mushroom-RL==v1.4.0***

***pip3 install gym==0.17.2***

***pip3 install opencv-python==4.2.0.34***

***pip3 install prettytable==0.7.2***

***pip3 install yacs==0.1.7***

If you use tensorflow 2.2.0, run below command after installing tf-agents 0.5.0:

***pip3 install tensorflow-probability==0.10.0***

- Run code: the code is run in the virtual environment set up in the previous step, therefore, make sure to activate the virtual environment in advance.

## **b. Ubuntu 18.04**

### **i. Install Python 3.6.9**

Installation commands:

***apt-get update***

***apt-get install python3***

(See here on how to install in other OS versions:

<https://askubuntu.com/questions/865554/how-do-i-install-python-3-6-using-apt-get>)

Verify if the right version is installed:

```
root@8ab45972b8ea:/# python3 -V
Python 3.6.9
```

ii. Install pip

Run the following command to install: ***python3 -m pip install --upgrade pip***

Or: ***sudo apt install python3-pip***

iii. Install virtualenv

Run the following command to install: ***pip3 install virtualenv***

iv. Install libraries

In order not to affect the normal Python environment, the installation will be done in a virtual environment.

- Change the current directory to the directory you want to install and create a virtual environment:

***virtualenv -p python3 {env\_name}***

{env\_name}: an environment's name of your choice For example, if you want to name the environment as Miner, the installation command will be ***virtualenv -p python3 miner***

- Activate the virtual environment

***cd {env\_name}/bin***

***source ./activate***

- Install libraries:

***pip3 install numpy==1.18.4***

***pip3 install keras==2.3.1***

***pip3 install pandas==0.15***

***pip3 install tensorflow==1.14.0***

***pip3 install torch==1.5.0+cpu torchvision==0.6.0+cpu -f***

***[https://download.pytorch.org/whl/torch\\_stable.html](https://download.pytorch.org/whl/torch_stable.html)***

***pip3 install joblib==0.16.0***

***pip3 install ray==0.8.6***

***pip3 install ray[rllib]***

***pip3 install ray[tune]***

***pip3 install requests==2.24.0***

***pip3 install semver==2.10.2***

***pip3 install tf-agents==0.3.0***

***pip3 install Pyqlearning==v1.2.4***

***pip3 install Mushroom-RL==v1.4.0***

```
pip3 install gym==0.17.2  
pip3 install opencv-python==4.2.0.34  
pip3 install prettytable==0.7.2  
pip3 install yacs==0.1.7
```

If you use tensorflow 2.2.0, run below command after installing tf-agents 0.5.0:  
**pip3 install tensorflow-probability==0.10.0**

- Run code: the code is run in the virtual environment set up in the previous step, therefore, make sure to activate the virtual environment in advance.

## 2. Using Docker

We will provide a Docker image which has installed all the environments similar to the actual server environment.

In this section, we will show you how to install the Docker, and how to use the image we provide.

### a. Install Docker

You can easily look for comprehensive and detailed instructions to install Docker on the internet. Below are just some examples.

#### i. Windows:

- Windows 10: Visit the link below to download the installer and install on your PC.  
<https://hub.docker.com/editions/community/docker-ce-desktop-windows/>
- Windows 7: Follow the instructions at: <https://webme.ie/how-to-install-docker-on-windows-7/>

#### ii. Ubuntu:

- Ubuntu 18.04: Follow the instructions at:  
<https://www.digitalocean.com/community/tutorials/how-to-install-and-use-docker-on-ubuntu-18-04>
- Ubuntu 16.04: Follow the instructions at:  
<https://docs.docker.com/engine/install/ubuntu/>

### b. Use Docker image

#### i. Pull image:

Execute the following command to pull image: **docker pull codelearnio/miner-ai:training-v6**

Verify if the image has been successfully pulled by the following command: **docker images -a**

The displayed information will include the Docker image with the following details:

D:\>docker images -a				
REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
codelearnio/miner-ai	training	b71e2ea7dec6	12 minutes ago	2.45GB

## ii. Use image

This section will instruct you to use some basic commands in Docker container.

For other commands, refer to the following link:

<https://docs.docker.com/engine/reference/commandline/docker/>

### 1. Create and run the Docker container from the existing image:

Create and run the Docker container with the provided Docker image by the following command: ***docker run -it -v {WORKING\_DIR}:/v b71e2ea7dec6***

Note: {WORKING\_DIR} is the path to the directory where your source is located;

For example: if you put the source code in **D: \ MinerAI** directory, the run command will be: ***docker run -it -v D:\MinerAI:/v b71e2ea7dec6***

You can name the container by adding parameters: ***--name = {name}***

Change the current directory to the binded directory: ***cd /v***

Check the files binded to the container: ***ls***

```
D:\>docker run -it -v D:\projects\GameAI\Miner-Training-Local-CodeSample:/v --name=miner b71e2ea7dec6
root@f39ab8375c62:/# cd /v
root@f39ab8375c62:/v# ls
DQNModel.py  GameSocketDummy.py  Memory.py  MinerState.py  TrainingClient.py  bot2.py
data         GameSocket.py        MinerEnv.py  UntrainedModel  bot1.py            bot3.py
root@f39ab8375c62:/v#
```

Then execute run ***python3*** command with your source code without any additional installation.

For example: ***python3 TrainingClient.pyt***

### 2. Check the existing containers: ***docker container ls -a***

```
D:\>docker container ls -a
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS          NAMES
2f3d9797c028   b71e2ea7dec6  "/bin/bash"            6 seconds ago Up 6 seconds             modest_sutherland
f39ab8375c62   b71e2ea7dec6  "/bin/bash"            2 minutes ago Exited (0) 16 seconds ago miner
```

As shown above, there are 2 containers initialized from the image

***b71e2ea7dec6***: container ***2f3d9797c028*** is up running while container

***f39ab8375c62*** has stopped

### 3. Attach to a running Docker: ***docker attach {container\_id}***

```
D:\>docker attach 2f3d9797c028
root@2f3d9797c028:/#
```

Note: You can replace {container\_id} with {container\_name}

### 4. Start a stopped Docker container: ***docker start -a {container\_id}***

```
D:\>docker start -a miner
root@f39ab8375c62:/# _
```

### 5. Stop a running container: ***docker stop {container\_id}***

### 6. Remove a Docker container: ***docker rm {container\_id}***

## iii. How to use Tensorflow 2.2.0

Tensorflow 2.2.0 is installed on virtualenv **tf2**, so if you want to use tensorflow 2.2.0, you have to use below commands to activate the virtualenv before running python command.

```
#!/bin/bash
workingDir=${PWD}
cd /tf2/bin
source ./activate
cd $workingDir
```

An example of run.sh in case of using tf2.2.0:

```
#!/bin/bash
workingDir=${PWD}
cd /tf2/bin
source ./activate
cd $workingDir
python3 TestingAgent.py $1 $2
```

**Note: If you are using Windows operating system, remember to convert style of run.sh from Windows-style to UNIX-style line endings.**