

Install TensorFlow

Today's goal is to install the TensorFlow GPU version. To install the TensorFlow GPU version, you need to successfully configure CUDA. However, before installing TensorFlow GPU, you also need to install some installation packages that are necessary for machine learning.

Note: The factory image has already installed tensorflow, so there is no need to install it.

Because Jetson Orin NX and Jetson Orin Nano use Docker technology, there is currently no function to install TensorFlow GPU. Therefore, this course is only valid for Jetson Nano motherboards.

1. Install pip

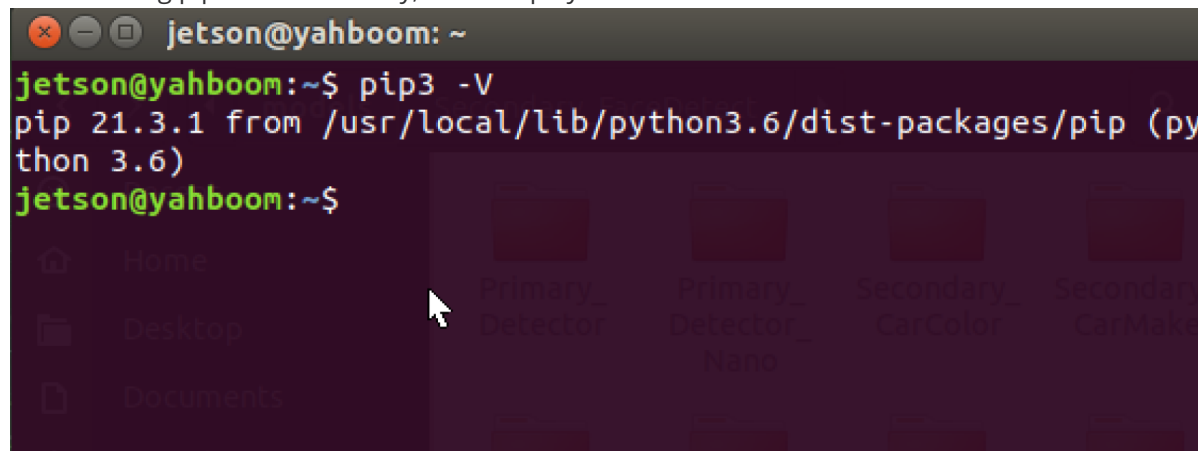
Because Python 3.6 is already installed in Jetson Nano, installing pip is relatively simple

```
sudo apt-get install python3-pip python3-dev
```

After installation, pip is an older version and needs to be upgraded to the latest version

```
python3 -m pip install --upgrade pip
```

After running pip3 -V successfully, it will display

A terminal window titled 'jetson@yahboom: ~' with a dark background. The prompt is 'jetson@yahboom:~\$'. The user has entered 'pip3 -V', and the output is 'pip 21.3.1 from /usr/local/lib/python3.6/dist-packages/pip (python 3.6)'. The prompt is now 'jetson@yahboom:~\$'. On the right side of the terminal, there is a faint, semi-transparent grid of icons representing different file types or folders, with labels like 'Primary_Detector', 'Primary_Detector_Nano', 'Secondary_CarColor', and 'Secondary_CarMaker'.

2. Install those packages that are very important in the field of machine learning

```
sudo apt-get install python3-numpy
```

(It is an extension library of the Python language that supports a large number of dimensional arrays and matrix operations. In addition, it also provides a large number of mathematical function libraries for array operations.)

```
sudo apt-get install python3-scipy
```

(Scipy is a commonly used software package for mathematics, science, and engineering that can handle interpolation, integration, optimization, image processing, numerical solution of ordinary differential equations, signal processing, and other problems.)

```
sudo apt-get install python3-pandas
```

(pandas is a tool based on NumPy that was created to solve data analysis tasks. Pandas incorporates a large number of libraries and some standard data models, providing the tools needed to efficiently operate large data sets. Pandas provides a large number of functions and methods that allow us to process data quickly and easily. You will soon find that it is one of the important factors that make Python a powerful and efficient data analysis environment.)

```
sudo apt-get install python3-matplotlib
```

(Matplotlib is a Python 2D plotting library that produces publication-quality graphics in a variety of hardcopy formats and cross-platform interactive environments)

```
sudo apt-get install python3-sklearn
```

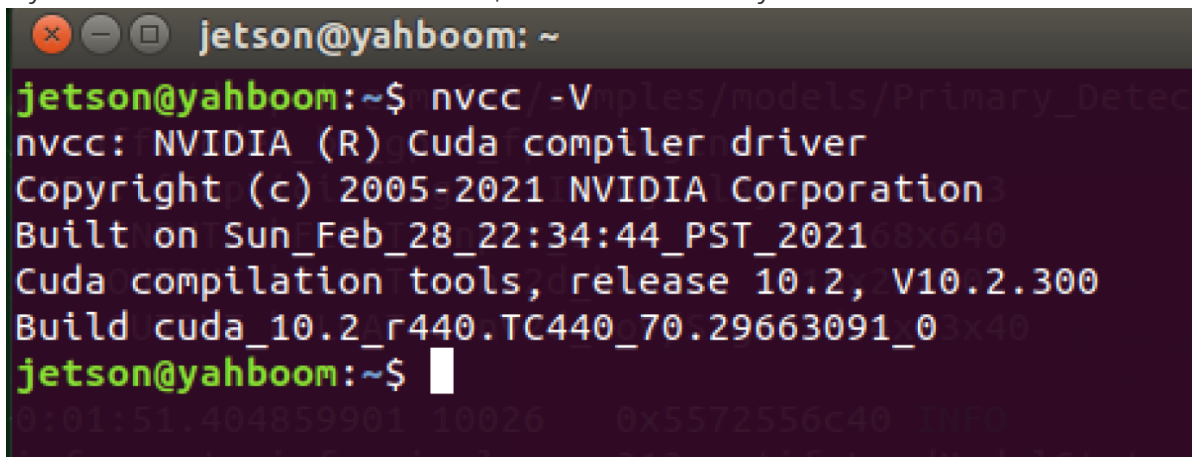
(Simple and efficient data mining and data analysis tool)

3. Install TensorFlow GPU version

(1) Confirm that CUDA has been installed normally

```
nvcc -V
```

If you can see the CUDA version number, it is installed correctly



```
jetson@yahboom: ~$ nvcc -V
nvcc: NVIDIA (R) Cuda compiler driver
Copyright (c) 2005-2021 NVIDIA Corporation
Built on Sun_Feb_28_22:34:44_PST_2021
Cuda compilation tools, release 10.2, V10.2.300
Build cuda_10.2_r440.TC440_70.29663091_0
jetson@yahboom: ~$
```

If an error occurs, refer to this link for a solution

<https://zhuanlan.zhihu.com/p/513220749>

Install the required packages

```
sudo apt-get install libhdf5-serial-dev hdf5-tools libhdf5-dev zlib1g-dev zip
libjpeg8-dev liblapack-dev libblas-dev gfortran
```

Install Python dependencies

```
sudo pip3 install -U numpy==1.16.1 future==0.18.2 mock==3.0.5 h5py==3.10.0
keras_preprocessing==1.1.1 keras_applications==1.0.8 gast==0.2.2 futures protobuf
pybind11
```

3. Install TensorFlow GPU version (online installation is often interrupted, it is recommended to use offline installation)

(3.1) Online installation

`sudo pip3 install --pre --extra-index-url`

<https://developer.download.nvidia.com/compute/redist/jp/v46>

tensorflow

The following is the tensorflow installation instructions on the official website. <https://docs.nvidia.com/deeplearning/frameworks/install-tf-jetson-platform/index.html#install>

(3.2) Offline installation

Because the online installation download is too slow, we can choose to install the offline package. The installation package needs to be downloaded from the Internet. You need to install the corresponding TensorFlow according to the JetPack version of the current system. There is also an offline package in our environment construction attachment, but you need to check whether it matches the jetpack version of your current system.

<https://docs.nvidia.com/deeplearning/frameworks/install-tf-jetson-platform-release-notes/tf-jetson-rel.html#tf-jetson-rel>

2.9.1		22.09, 22.07	
		22.06	5.0.1
2.8.0		22.05, 22.04, 22.03	5.0
2.7.0		22.01	4.6.1
2.6.2		21.12	4.6
2.6.0		21.11, 21.09	
2.5.0		21.08, 21.07	
		21.06	4.5
2.4.0		21.05, 21.04, 21.03, 21.02	
2.3.1		20.12	
		20.12, 20.11, 20.10	4.4.x

1) Upload the WHL file directly to the /home/jetson folder on jetson nano through winSCP software.

2) After uploading, enter the command (pip3 install + your corresponding version installation package)

```
pip3 install xxx.whl
```

During the download, you may also need to install some software packages online. Just click Y (YES) to pass.

3) After the installation is complete, enter the following command to view the version number

```
pip3 list | grep tensorflow
```

```
jetson@yahboom:~$ pip3 list | grep tensorflow
tensorflow                2.5.0+nv21.8
tensorflow-estimator      2.5.0
jetson@yahboom:~$
```

4) Enter the following command to check whether tensorflow is successfully installed.

```
python3
import tensorflow as tf
tf.__version__
```

```
jetson@yahboom:~$ python3
Python 3.6.9 (default, Dec  8 2021, 21:08:43)
[GCC 8.4.0] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> import tensorflow as tf
2024-06-28 19:54:34.810441: I tensorflow/stream_executor/platform/default/dso_loader.cc:53] Successfully opened dynamic library libcudart.so.10.2
>>> tf.__version__
'2.5.0'
>>>
```

No error is reported, which means the installation is successful.

Appendix

Other reference tutorials: <https://blog.csdn.net/yihuajack/article/details/121234463>