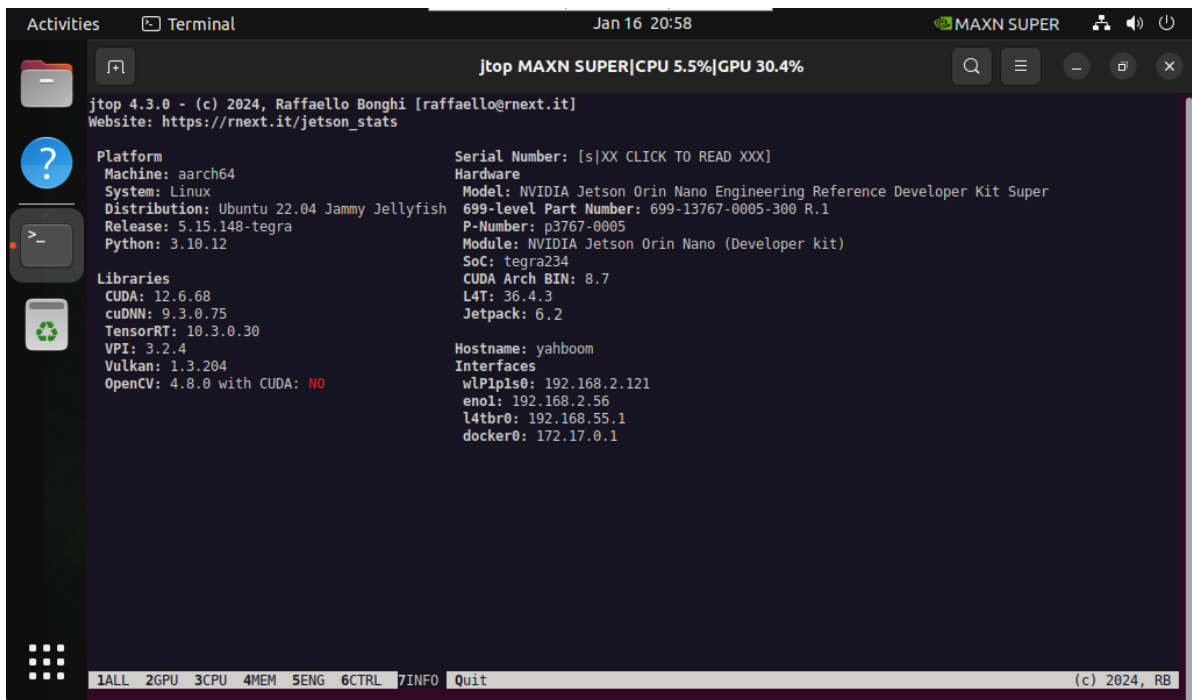


YOLO environment construction

YOLO environment construction

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1. System information



```
Activities  Terminal  Jan 16 20:58  MAXN SUPER  jtop MAXN SUPER[CPU 5.5%|GPU 30.4%]
jtop 4.3.0 - (c) 2024, Raffaello Bonghi [raffaello@rnext.it]
Website: https://rnext.it/jetson_stats

Platform
Machine: aarch64
System: Linux
Distribution: Ubuntu 22.04 Jammy Jellyfish
Release: 5.15.148-tegra
Python: 3.10.12

Serial Number: [s]XX CLICK TO READ XXX[
Hardware
Model: NVIDIA Jetson Orin Nano Engineering Reference Developer Kit Super
699-level Part Number: 699-13767-0005-300 R.1
P-Number: p3767-0005
Module: NVIDIA Jetson Orin Nano (Developer kit)
SoC: tegra234
CUDA Arch BIN: 8.7
L4T: 36.4.3
Jetpack: 6.2

Libraries
CUDA: 12.6.68
cuDNN: 9.3.0.75
TensorRT: 10.3.0.30
VPI: 3.2.4
Vulkan: 1.3.204
OpenCV: 4.8.0 with CUDA: NO

Hostname: yahboom
Interfaces
wlp1s0: 192.168.2.121
eno1: 192.168.2.56
l4tbr0: 192.168.55.1
docker0: 172.17.0.1

1ALL 2GPU 3CPU 4MEM 5ENG 6CTRL 7INFO Quit (c) 2024, RB
```

2. Preliminary preparation

```
sudo apt update
sudo apt install python3-pip -y
sudo pip install -U pip
```

3. Install Ultralytics

```
sudo pip3 install ultralytics[export]
```

```
sudo reboot
```

4. Configure GPU acceleration

Since we have already installed torch 2.5.0 and torchvision 0.20 in the previous tutorial, there is no need to run the torch and torchvision installation commands here, only the other software packages need to be installed.

torch

```
sudo pip3 install
https://github.com/ultralytics/assets/releases/download/v0.0.0/torch-
2.5.0a0+872d972e41.nv24.08-cp310-cp310-linux_aarch64.whl
```

torchvision

```
sudo pip3 install
https://github.com/ultralytics/assets/releases/download/v0.0.0/torchvision-
0.20.0a0+afc54f7-cp310-cp310-linux_aarch64.whl
```

cuSPARSElt

```
wget
https://developer.download.nvidia.com/compute/cuda/repos/ubuntu2204/arm64/cuda-
keyring_1.1-1_all.deb
sudo dpkg -i cuda-keyring_1.1-1_all.deb
sudo apt-get update
sudo apt-get -y install libcusparselt0 libcusparselt-dev
```

onnxruntime-gpu

```
sudo pip3 install
https://github.com/ultralytics/assets/releases/download/v0.0.0/onnxruntime_gpu-
1.20.0-cp310-cp310-linux_aarch64.whl
```

Note: Using onnxruntime-gpu requires installing a specific version of numpy. If it is not 1.23.5, you can run the following command to install the specified version

```
sudo pip3 install numpy==1.23.5
```

4. Verify the installation

Verifying Ultralytics

```
python3 -c "import ultralytics; print(ultralytics.__version__)"
```

Verifying Torch

```
python3 -c "import torch; print(torch.__version__);
print(torch.cuda.is_available())"
```

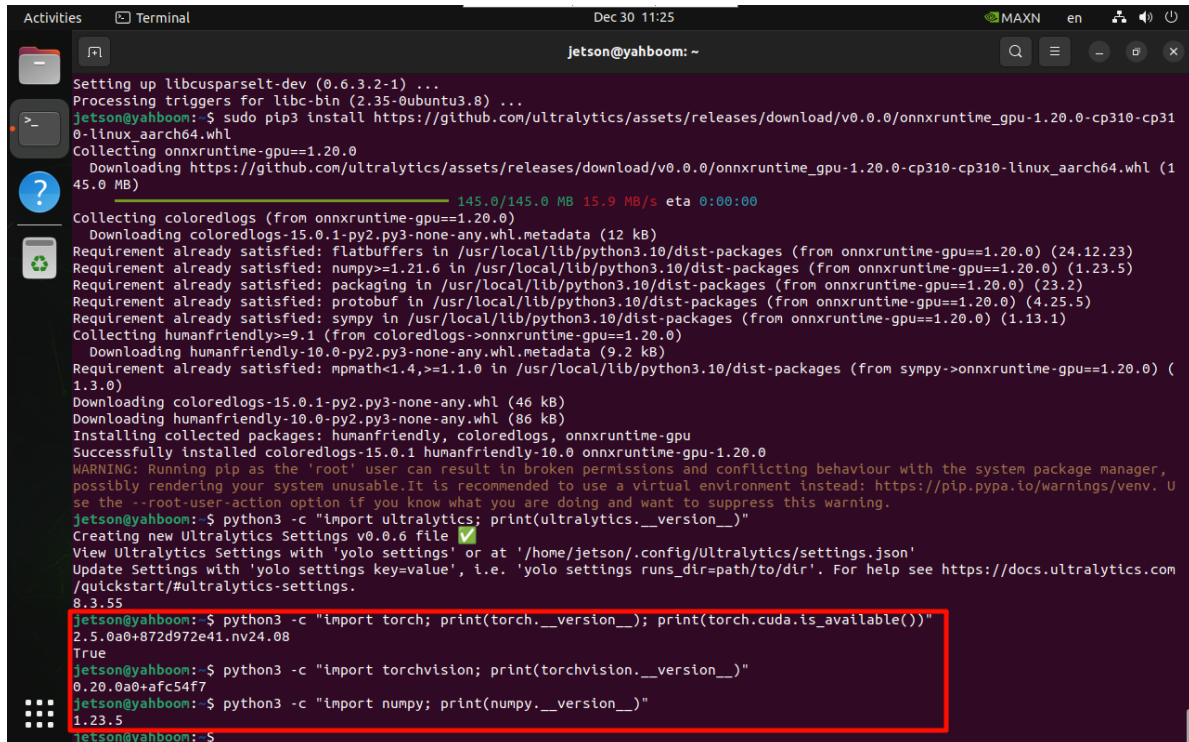
Verifying Torchvision

```
python3 -c "import torchvision; print(torchvision.__version__)"
```

Verify Numpy

```
python3 -c "import numpy; print(numpy.__version__)"
```

Note: The ultralytics version will be updated later, please refer to the version information queried in the system



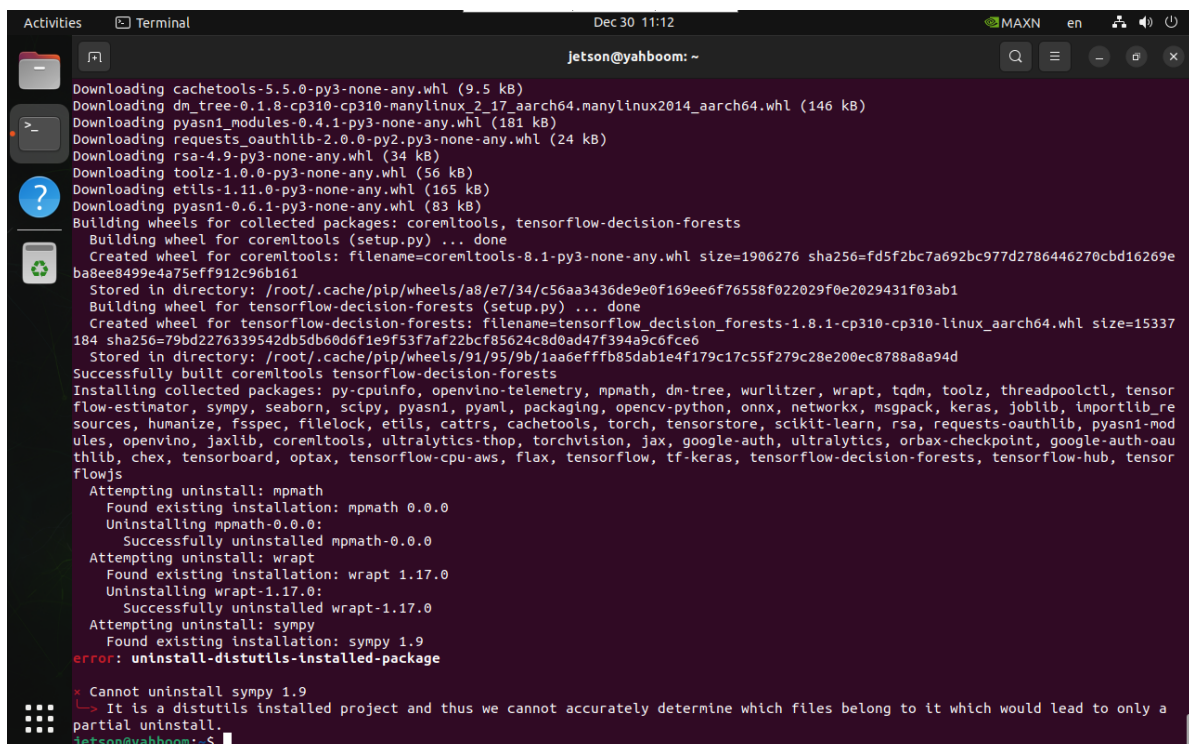
```
Activities Terminal Dec 30 11:25 jetson@yahboom: ~
Setting up libcusparselt-dev (0.6.3.2-1) ...
Processing triggers for libc-bin (2.35-0ubuntu3.8) ...
jetson@yahboom:~$ sudo pip3 install https://github.com/ultralytics/assets/releases/download/v0.0.0/onnxruntime_gpu-1.20.0-cp310-cp310-linux_aarch64.whl
Collecting onnxruntime-gpu==1.20.0
  Downloading https://github.com/ultralytics/assets/releases/download/v0.0.0/onnxruntime_gpu-1.20.0-cp310-cp310-linux_aarch64.whl (145.0 MB)
    145.0/145.0 MB 15.9 MB/s eta 0:00:00
Collecting coloredlogs (from onnxruntime-gpu==1.20.0)
  Downloading coloredlogs-15.0.1-py2.py3-none-any.whl.metadata (12 kB)
Requirement already satisfied: flatbuffers in /usr/local/lib/python3.10/dist-packages (from onnxruntime-gpu==1.20.0) (24.12.23)
Requirement already satisfied: numpy>=1.21.6 in /usr/local/lib/python3.10/dist-packages (from onnxruntime-gpu==1.20.0) (1.23.5)
Requirement already satisfied: packaging in /usr/local/lib/python3.10/dist-packages (from onnxruntime-gpu==1.20.0) (23.2)
Requirement already satisfied: protobuf in /usr/local/lib/python3.10/dist-packages (from onnxruntime-gpu==1.20.0) (4.25.5)
Requirement already satisfied: sympy in /usr/local/lib/python3.10/dist-packages (from onnxruntime-gpu==1.20.0) (1.13.1)
Collecting humanfriendly>=9.1 (from coloredlogs->onnxruntime-gpu==1.20.0)
  Downloading humanfriendly-10.0-py2.py3-none-any.whl.metadata (9.2 kB)
Requirement already satisfied: mpmath<1.4,>=1.1.0 in /usr/local/lib/python3.10/dist-packages (from sympy->onnxruntime-gpu==1.20.0) (1.3.0)
Downloading coloredlogs-15.0.1-py2.py3-none-any.whl (46 kB)
Downloading humanfriendly-10.0-py2.py3-none-any.whl (86 kB)
Installing collected packages: humanfriendly, coloredlogs, onnxruntime-gpu
Successfully installed coloredlogs-15.0.1 humanfriendly-10.0 onnxruntime-gpu-1.20.0
WARNING: Running pip as the 'root' user can result in broken permissions and conflicting behaviour with the system package manager, possibly rendering your system unusable. It is recommended to use a virtual environment instead: https://pip.pypa.io/warnings/venv. Use the --root-user-action option if you know what you are doing and want to suppress this warning.
jetson@yahboom:~$ python3 -c "import ultralytics; print(ultralytics.__version__)"
Creating new Ultralytics Settings v0.0.6 file ✓
View Ultralytics Settings with 'yolo settings' or at '/home/jetson/.config/Ultralytics/settings.json'
Update Settings with 'yolo settings key=value', i.e. 'yolo settings runs_dir=path/to/dir'. For help see https://docs.ultralytics.com/quickstart/#ultralytics-settings.
8.3.55
jetson@yahboom:~$ python3 -c "import torch; print(torch.__version__); print(torch.cuda.is_available())"
2.5.0a0+872d972e41.nv24.08
True
jetson@yahboom:~$ python3 -c "import torchvision; print(torchvision.__version__)"
0.20.0a0+afe54f7
jetson@yahboom:~$ python3 -c "import numpy; print(numpy.__version__)"
1.23.5
jetson@yahboom:~$
```

Common Errors

Cannot uninstall sympy

Error phenomenon

Unable to uninstall sympy



```
Activities Terminal Dec 30 11:12 jetson@yahboom: ~
Downloading cachetools-5.5.0-py3-none-any.whl (9.5 kB)
Downloading dm-tree-0.1.8-cp310-cp310-manylinux_2_17_aarch64.manylinux2014_aarch64.whl (146 kB)
Downloading pyasn1_modules-0.4.1-py3-none-any.whl (181 kB)
Downloading requests_oauthlib-2.0.0-py2.py3-none-any.whl (24 kB)
Downloading rsa-4.9-py3-none-any.whl (34 kB)
Downloading toolz-1.0.0-py3-none-any.whl (56 kB)
Downloading etils-1.11.0-py3-none-any.whl (165 kB)
Downloading pyasn1-0.6.1-py3-none-any.whl (83 kB)
Building wheels for collected packages: coremltools, tensorflow-decision-forests
  Building wheel for coremltools (setup.py) ... done
  Created wheel for coremltools: filename=coremltools-8.1-py3-none-any.whl size=1906276 sha256=fd5f2bc7a692bc977d2786446270cbd16269e
  Stored in directory: /root/.cache/pip/wheels/a8/e7/34/c56aa3436de9e0f169ee6f76558f022029f0e2029431f03ab1
  Building wheel for tensorflow-decision-forests (setup.py) ... done
  Created wheel for tensorflow-decision-forests: filename=tensorflow_decision_forests-1.8.1-cp310-cp310-linux_aarch64.whl size=15337184 sha256=79bd2276339542db5db60d6f1e9f53f7af22bcf85624c8d0ad47f394a9c0fce0
  Stored in directory: /root/.cache/pip/wheels/91/95/9b/1aa6efffb85dab1e4f179c17c55f279c28e20ec8788a8a94d
Successfully built coremltools tensorflow-decision-forests
Installing collected packages: py-cpuinfo, openvino-telemetry, mpmath, dm-tree, wurlitizer, wrapt, tqdm, toolz, threadpoolctl, tensor
flow-estimator, sympy, seaborn, scipy, pyasn1, pyaml, packaging, opencv-python, onnx, networkx, msgpack, keras, joblib, importlib_re
sources, humanize, fspec, filelock, etils, catrs, cachetools, torch, tensorstore, scikit-learn, rsa, requests-oauthlib, pyasn1-mod
ules, openvino, jaxlib, coremltools, ultralytics-thop, torchvision, jax, google-auth, ultralytics, orbax-checkpoint, google-auth-ou
thlib, chex, tensorboard, optax, tensorflow-cpu-aws, flax, tensorflow, tf-keras, tensorflow-decision-forests, tensorflow-hub, tensor
flowjs
Attempting uninstall: mpmath
  Found existing installation: mpmath 0.0.0
  Uninstalling mpmath-0.0.0:
    Successfully uninstalled mpmath-0.0.0
Attempting uninstall: wrapt
  Found existing installation: wrapt 1.17.0
  Uninstalling wrapt-1.17.0:
    Successfully uninstalled wrapt-1.17.0
Attempting uninstall: sympy
  Found existing installation: sympy 1.9
error: uninstall-distutils-installed-package
* Cannot uninstall sympy 1.9
  ↳ It is a distutils installed project and thus we cannot accurately determine which files belong to it which would lead to only a
partial uninstall.
jetson@yahboom:~$
```

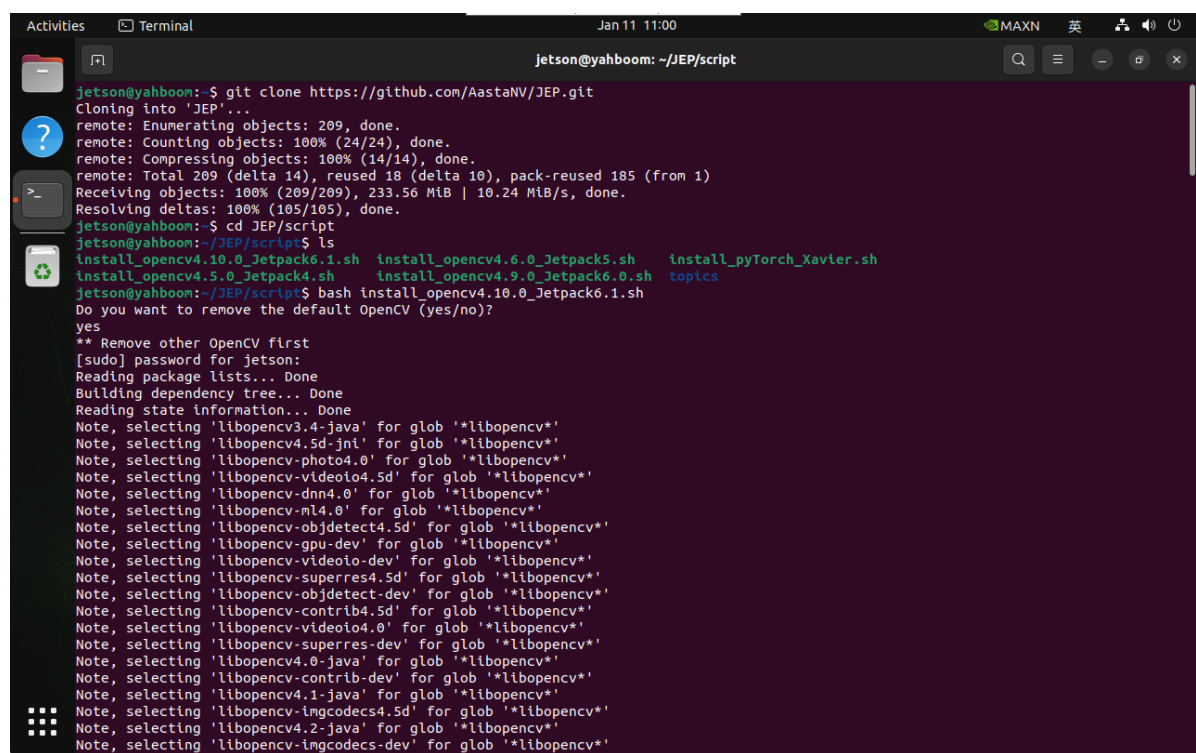
Uninstall python3-sympy: Reinstall PyTorch after uninstallation

```
sudo apt remove python3-sympy -y
```

CSI camera cannot be called

Compile OpenCV from source code and enable GStreamer support: basically the entire process is automatically installed. It is recommended to uninstall the old version and install the new version (the script automatically enables CUDA and GStreamer functions)

```
git clone https://github.com/AastanV/JEP.git
cd JEP/script
bash install_opencv4.10.0_Jetpack6.1.sh
```



```
Activities Terminal Jan 11 11:53 MAXN 英 人 音 电 开
jetson@yahboom: ~/JEP/script
-- Installing: /usr/local/lib/python3.10/dist-packages/cv2/samples/_init_.pyl
-- Installing: /usr/local/lib/python3.10/dist-packages/cv2/python-3.10/cv2.cpython-310-aarch64-linux-gnu.so
-- Set runtime path of "/usr/local/lib/python3.10/dist-packages/cv2/python-3.10/cv2.cpython-310-aarch64-linux-gnu.so" to "/usr/local/lib:/usr/local/cuda-12.6/lib64"
-- Installing: /usr/local/lib/python3.10/dist-packages/cv2/config-3.10.py
-- Installing: /usr/local/share/opencv4/haarcascades/haarcascade_eye.xml
-- Installing: /usr/local/share/opencv4/haarcascades/haarcascade_eye_tree_eyeglasses.xml
-- Installing: /usr/local/share/opencv4/haarcascades/haarcascade_frontalcatface.xml
-- Installing: /usr/local/share/opencv4/haarcascades/haarcascade_frontalcatface_extended.xml
-- Installing: /usr/local/share/opencv4/haarcascades/haarcascade_frontalface_alt.xml
-- Installing: /usr/local/share/opencv4/haarcascades/haarcascade_frontalface_alt2.xml
-- Installing: /usr/local/share/opencv4/haarcascades/haarcascade_frontalface_alt_tree.xml
-- Installing: /usr/local/share/opencv4/haarcascades/haarcascade_frontalface_default.xml
-- Installing: /usr/local/share/opencv4/haarcascades/haarcascade_fullbody.xml
-- Installing: /usr/local/share/opencv4/haarcascades/haarcascade_lefteye_2splits.xml
-- Installing: /usr/local/share/opencv4/haarcascades/haarcascade_license_plate_rus_16stages.xml
-- Installing: /usr/local/share/opencv4/haarcascades/haarcascade_lowerbody.xml
-- Installing: /usr/local/share/opencv4/haarcascades/haarcascade_profileface.xml
-- Installing: /usr/local/share/opencv4/haarcascades/haarcascade_righteye_2splits.xml
-- Installing: /usr/local/share/opencv4/haarcascades/haarcascade_russian_plate_number.xml
-- Installing: /usr/local/share/opencv4/haarcascades/haarcascade_smile.xml
-- Installing: /usr/local/share/opencv4/haarcascades/haarcascade_upperbody.xml
-- Installing: /usr/local/share/opencv4/lbpcascades/lbpcascade_frontalcatface.xml
-- Installing: /usr/local/share/opencv4/lbpcascades/lbpcascade_frontalface.xml
-- Installing: /usr/local/share/opencv4/lbpcascades/lbpcascade_frontalface_improved.xml
-- Installing: /usr/local/share/opencv4/lbpcascades/lbpcascade_profileface.xml
-- Installing: /usr/local/share/opencv4/lbpcascades/lbpcascade_silverware.xml
-- Installing: /usr/local/bin/opencv_annotation
-- Set runtime path of "/usr/local/bin/opencv_annotation" to "/usr/local/lib:/usr/local/cuda-12.6/lib64"
-- Installing: /usr/local/bin/opencv_visualisation
-- Set runtime path of "/usr/local/bin/opencv_visualisation" to "/usr/local/lib:/usr/local/cuda-12.6/lib64"
-- Installing: /usr/local/bin/opencv_interactive-calibration
-- Set runtime path of "/usr/local/bin/opencv_interactive-calibration" to "/usr/local/lib:/usr/local/cuda-12.6/lib64"
-- Installing: /usr/local/bin/opencv_version
-- Set runtime path of "/usr/local/bin/opencv_version" to "/usr/local/lib:/usr/local/cuda-12.6/lib64"
-- Installing: /usr/local/bin/opencv_model_diagnostics
-- Set runtime path of "/usr/local/bin/opencv_model_diagnostics" to "/usr/local/lib:/usr/local/cuda-12.6/lib64"
** Install opencv 4.10.0 successfully
** Bye :)
jetson@yahboom:~/JEP/script$
```

Verify the environment

```
python3 -c "import cv2; print(cv2.getBuildInformation())" | grep GStreamer
python3 -c "import ultralytics; print(ultralytics.__version__)"
python3 -c "import torch; print(torch.__version__);
print(torch.cuda.is_available())"
python3 -c "import torchvision; print(torchvision.__version__)"
python3 -c "import numpy; print(numpy.__version__)"
jtop
```

```
Activities Terminal Jan 11 11:54 MAXN 英 人 音 电 开
jetson@yahboom: ~
jetson@yahboom:~$ python3 -c "import cv2; print(cv2.getBuildInformation())" | grep GStreamer
GStreamer: YES (1.20.3)
jetson@yahboom:~$ python3 -c "import ultralytics; print(ultralytics.__version__)"
8.3.59
jetson@yahboom:~$ python3 -c "import torch; print(torch.__version__); print(torch.cuda.is_available())"
2.5.0a0+872d972e41.nv24.08
True
jetson@yahboom:~$ python3 -c "import torchvision; print(torchvision.__version__)"
0.20.0a0+afc54f7
jetson@yahboom:~$ python3 -c "import numpy; print(numpy.__version__)"
1.23.5
jetson@yahboom:~$
```

```
jtop 4.3.1 - (c) 2024, Raffaello Bonghi [raffaello@rnext.it]
Website: https://rnext.it/jetson_stats

Platform
Machine: aarch64
System: Linux
Distribution: Ubuntu 22.04 Jammy Jellyfish
Release: 5.15.148-tegra
Python: 3.10.12

Serial Number: [s|XX CLICK TO READ XXX]
Hardware
Model: NVIDIA Jetson Orin Nano Engineering Reference Developer Kit Supe
699-level Part Number: 699-13767-0005-300 R.1
P-Number: p3767-0005
Module: NVIDIA Jetson Orin Nano (Developer kit)
SoC: tegra234
CUDA Arch BIN: 8.7
L4T: 36.4.3
Jetpack: 6.2

Libraries
CUDA: 12.6.85
cuDNN: 9.6.0.74
TensorRT: 10.7.0.23
VPI: 3.2.4
Vulkan: 1.3.204
OpenCV: 4.10.0 with CUDA: YES

Hostname: yahboom
Interfaces
enP8p1s0: 192.168.2.116
docker0: 172.17.0.1

1ALL 2GPU 3CPU 4MEM 5ENG 6CTRL 7INFO Quit (c) 2024, RB
```

References

<https://docs.ultralytics.com/guides/nvidia-jetson/>

<https://github.com/AastaNV/JEP>