

YOLO Environment Setup

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Cannot uninstall sympy

Error Phenomenon

Solution

CSI Camera Cannot Be Called

Verify Environment

References

1. System Information

```
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
wlp1p1s0: 192.168.2.121
eno1: 192.168.2.56
l4tbr0: 192.168.55.1
docker0: 172.17.0.1

(c) 2024, RB
```

2. Prerequisites

```
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

Install the following software packages including torch 2.5.0, torchvision 0.20, cuSPARSElt, and onnxruntime-gpu:

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's not version 1.23.5, you can run the following command to install the specified version

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

5. Verify Installation

Verify Ultralytics

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

Verify Torch

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

Verify 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. Refer to the version information queried in the system for the actual version.

```
Activities Terminal Dec 30 11:25 MAXN en 🔍
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 / 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+afc54f7
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 MAXN en 🔍 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
ba8ee8499e4a75eff912c96b161
    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=15337
184 sha256=79bd2270339542db5db6dd0f1e9f53f7af22bcf85624c8d0ad47f394a9c6fce6
    Stored in directory: /root/.cache/pip/wheels/91/95/9b/1aa6efffb85dab1ef179c17c55f279c28e200ec8788a8a94d
Successfully built coremltools tensorflow-decision-forests
Installing collected packages: py-cpuinfo, openvino-telemetry, mpmath, dm-tree, wurlitzer, wrapt, tqdm, toolz, threadpoolctl, tensorflow-estimator, sympy, seaborn, scipy, pyasn1, pyyaml, packaging, opencv-python, onnx, networkx, msgpack, keras, joblib, importlib_resources, humanize, fsspec, filelock, etils, cattr, cachetools, torch, tensorstore, scikit-learn, rsa, requests-oauthlib, pyasn1-modules, openvino,jaxlib, coremltools, ultralytics-thop, torchvision, jax, google-auth, ultralytics, orbx-checkpoint, google-auth-oauthlib, chex, tensorflow, optax, tensorflow-cpu-aws, flax, tensorflow, tensorflow-decision-forests, tensorflow-hub, tensorflow
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: untrusted-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: ~
```

Solution

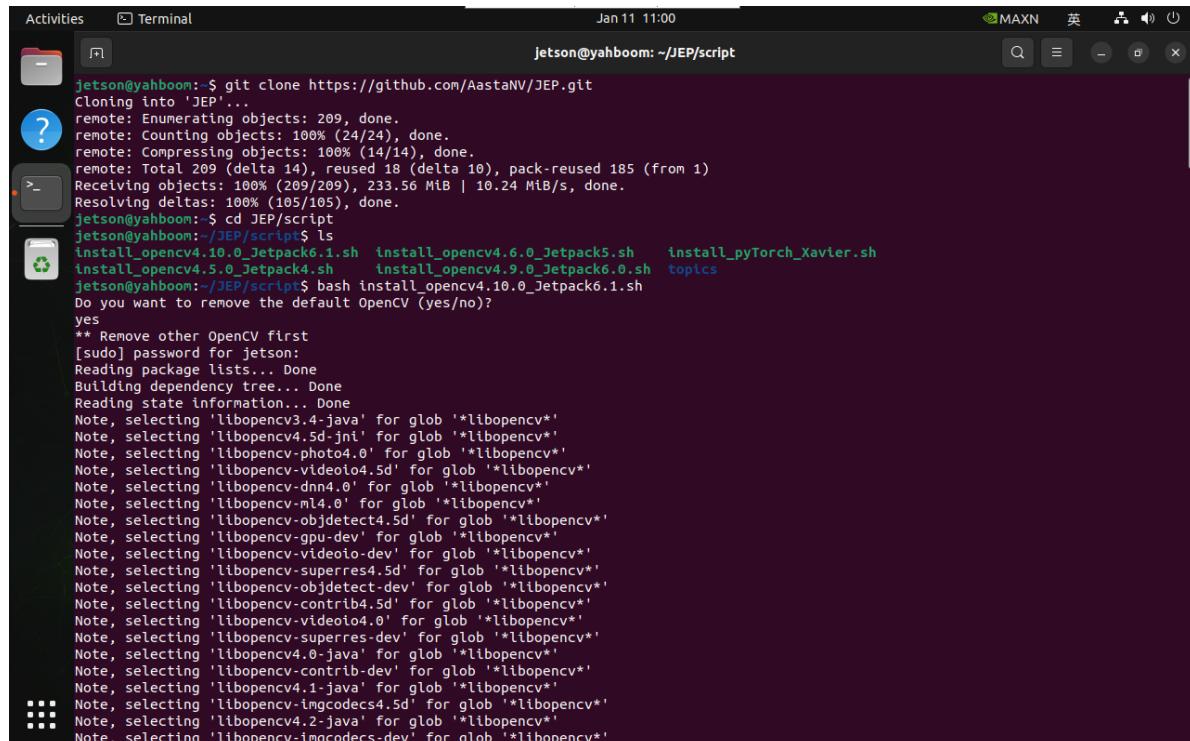
Uninstall python3-sympy: After uninstallation is complete, reinstall PyTorch

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

CSI Camera Cannot Be Called

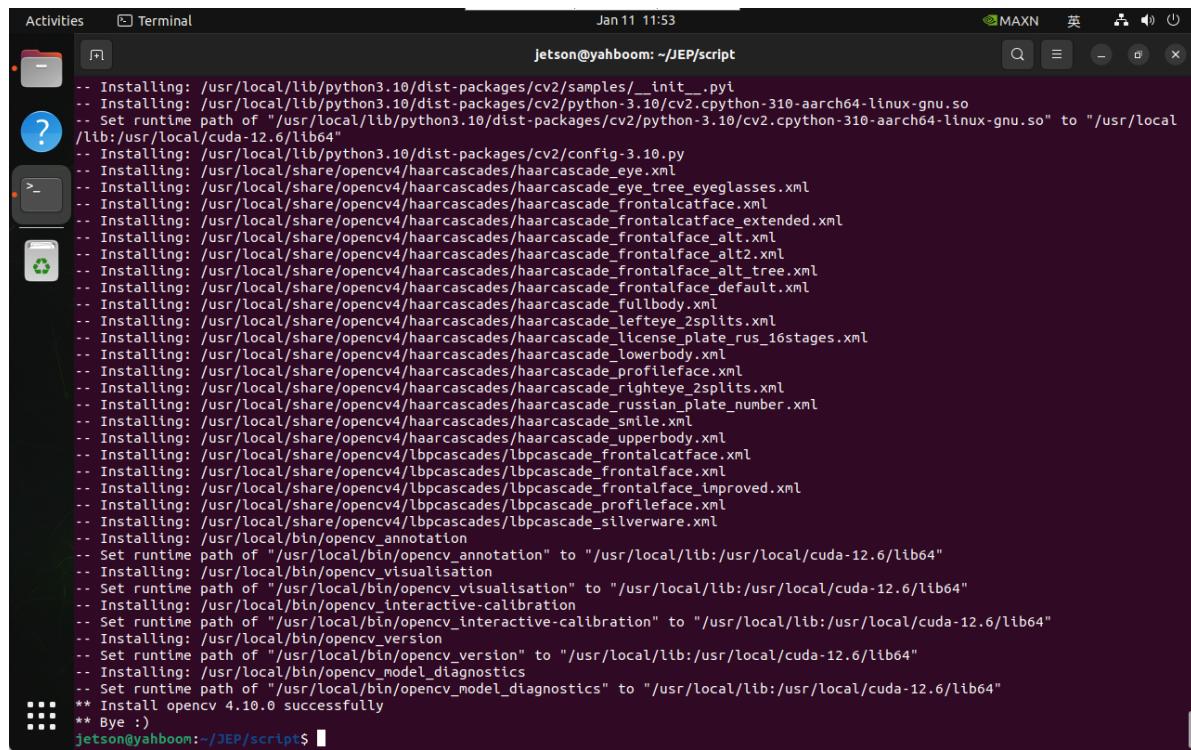
Compile OpenCV from source and enable GStreamer support: The entire process is basically automatic installation. It is recommended to uninstall the old version and install the new version (the script automatically enables CUDA and GStreamer functions)

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



The screenshot shows a terminal window on a Linux system (Ubuntu) with a dark theme. The window title is 'Terminal'. The command entered is 'git clone https://github.com/AastaNV/JEP.git' followed by 'cd JEP/script' and 'bash install_opencv4.10.0_Jetpack6.1.sh'. The terminal output shows the cloning of the repository, navigating to the script directory, and executing the setup script. The script performs several tasks, including removing old OpenCV versions, updating package lists, building dependency trees, and selecting specific OpenCV packages. It also handles CUDA and GStreamer dependencies. A prompt asks if the user wants to remove the default OpenCV, to which the user responds 'yes'. The terminal concludes with a note about selecting specific OpenCV packages.

```
jetson@yahboom:~$ git clone https://github.com/AastaNV/JEP.git
Cloning into 'JEP'...
remote: Enumerating objects: 209, done.
remote: Counting objects: 100% (24/24), done.
remote: Compressing objects: 100% (14/14), done.
remote: Total 209 (delta 14), reused 18 (delta 10), pack-reused 185 (from 1)
Receiving objects: 100% (209/209), 233.56 MiB | 10.24 MiB/s, done.
Resolving deltas: 100% (105/105), done.
jetson@yahboom:~$ cd JEP/script
jetson@yahboom:~/JEP/script$ ls
install_opencv4.10.0_Jetpack6.1.sh  install_pyTorch_Xavier.sh
install_opencv4.5.0_Jetpack4.sh    install_opencv4.9.0_Jetpack6.0.sh  topics
jetson@yahboom:~/JEP/script$ bash install_opencv4.10.0_Jetpack6.1.sh
Do you want to remove the default OpenCV (yes/no)?
yes
** Remove other OpenCV first
[sudo] password for jetson:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Note, selecting 'libopencv3.4-java' for glob '*libopencv*'
Note, selecting 'libopencv4.5d-jni' for glob '*libopencv*'
Note, selecting 'libopencv-photo4.0' for glob '*libopencv*'
Note, selecting 'libopencv-videoio4.5d' for glob '*libopencv*'
Note, selecting 'libopencv-dnn4.0' for glob '*libopencv*'
Note, selecting 'libopencv-m14.0' for glob '*libopencv*'
Note, selecting 'libopencv-objectdetect4.5d' for glob '*libopencv*'
Note, selecting 'libopencv-gpu-dev' for glob '*libopencv*'
Note, selecting 'libopencv-videoio-dev' for glob '*libopencv*'
Note, selecting 'libopencv-superres4.5d' for glob '*libopencv*'
Note, selecting 'libopencv-objectdetect-dev' for glob '*libopencv*'
Note, selecting 'libopencv-contrib4.5d' for glob '*libopencv*'
Note, selecting 'libopencv-videoio4.0' for glob '*libopencv*'
Note, selecting 'libopencv-superres-dev' for glob '*libopencv*'
Note, selecting 'libopencv4.0-java' for glob '*libopencv*'
Note, selecting 'libopencv-contrib-dev' for glob '*libopencv*'
Note, selecting 'libopencv4.1-java' for glob '*libopencv*'
Note, selecting 'libopencv-imgcodecs4.5d' for glob '*libopencv*'
Note, selecting 'libopencv4.2-java' for glob '*libopencv*'
Note, selecting 'libopencv-imgcodecs-dev' for glob '*libopencv*'
```

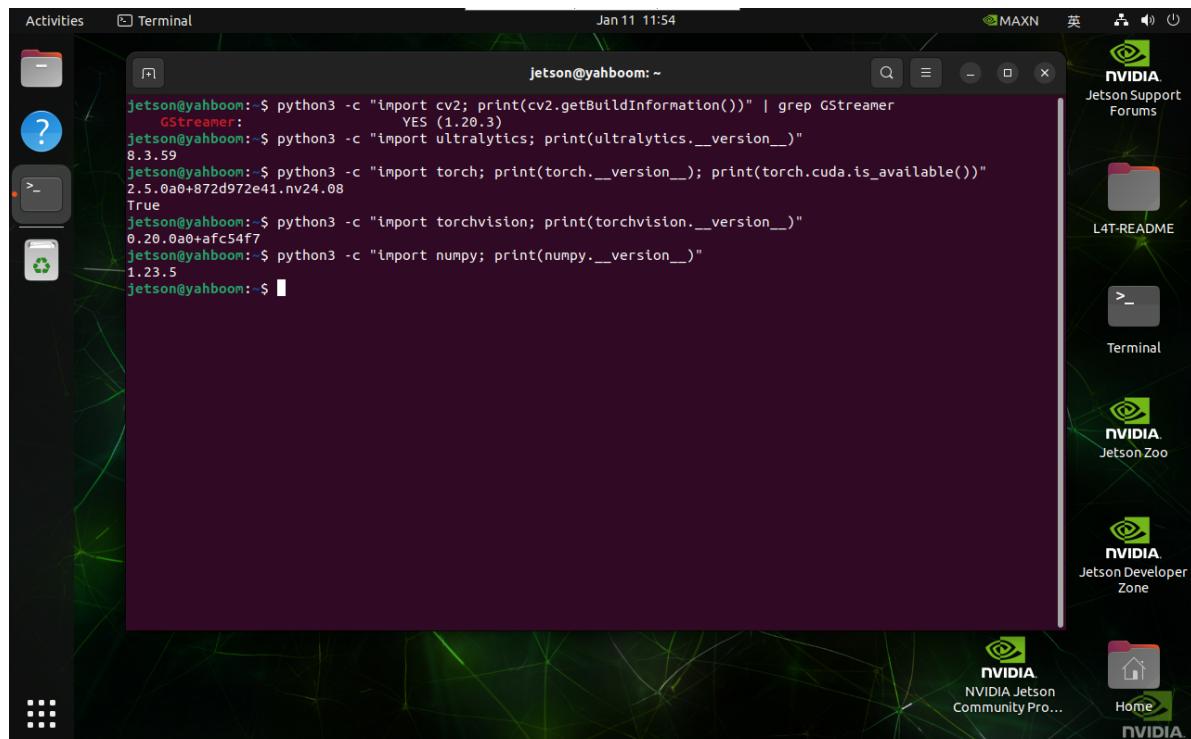


A screenshot of a Linux desktop environment (Ubuntu) showing a terminal window. The terminal window title is "jetson@yahboom: ~/JEP/script". The content of the terminal shows the output of an opencv4 installation command, listing numerous XML files being installed into /usr/local/shareopencv4. The log ends with a message indicating successful installation of OpenCV 4.10.0.

```
-- Installing: /usr/local/lib/python3.10/dist-packages/cv2/samples/_init__.pyi
-- 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/lbp cascades/lbp cascade_frontalcatface.xml
-- Installing: /usr/local/share/opencv4/lbp cascades/lbp cascade_frontalface.xml
-- Installing: /usr/local/share/opencv4/lbp cascades/lbp cascade_improved.xml
-- Installing: /usr/local/share/opencv4/lbp cascades/lbp cascade_profileface.xml
-- Installing: /usr/local/share/opencv4/lbp cascades/lbp cascade_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 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
```



A screenshot of a Linux desktop environment (Ubuntu) showing a terminal window. The terminal window title is "jetson@yahboom: ~". The content of the terminal shows the execution of several Python commands to verify the environment. It prints the build information for GStreamer, the version of Ultralytics library, the version and availability of PyTorch, the version of PyTorchVision, and the version of NumPy. The terminal also includes a jtop command at the end.

```
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

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

Hardware
Serial Number: [s|XX CLICK TO READ XXX]
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

Hostname: yahboom
Interfaces
enP8p1s0: 192.168.2.116
docker0: 172.17.0.1

1ALL 2GPU 3CPU 4MEM 5ENG 6CTRL 7INFO 8QUIT
```

References

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

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