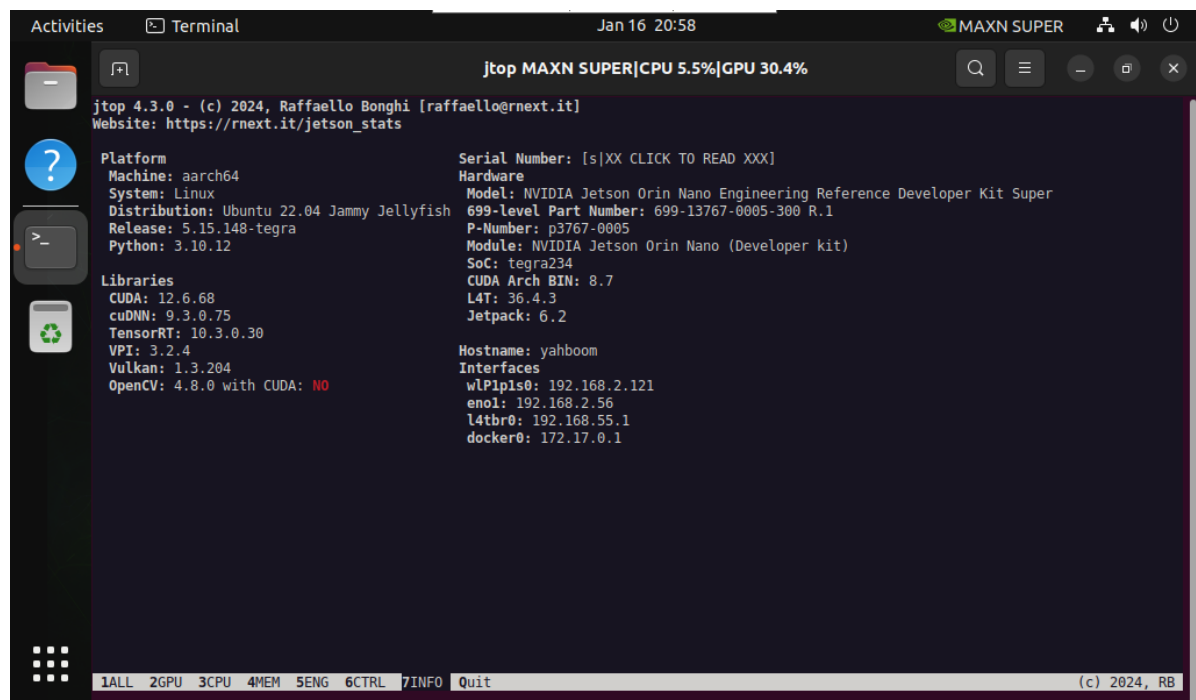


YOLO Environment Setup

YOLO Environment Setup

1. System Information
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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

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

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

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. 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())"
```

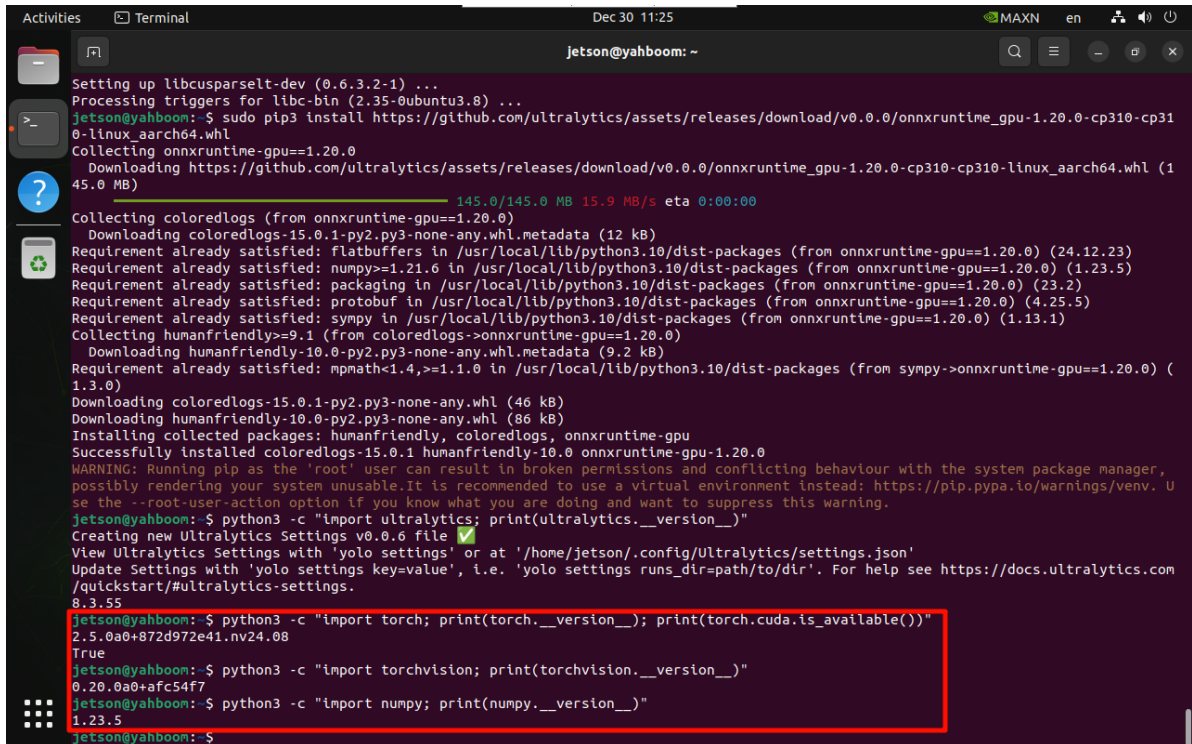
Verify Torchvision

```
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.



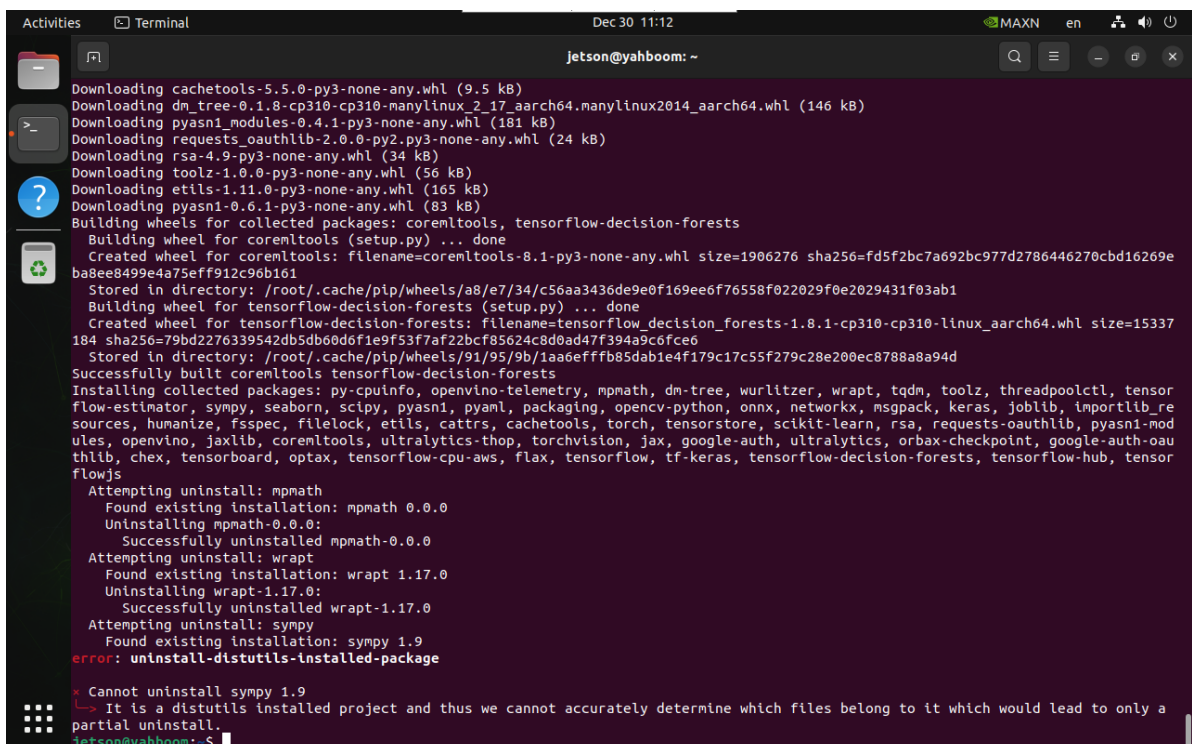
```
Activities Terminal Dec 30 11:25 jetson@yahboom: ~
Setting up libcusparselt-dev (0.6.3.2-1) ...
Processing triggers for libc-bin (2.35-0ubuntu3.8) ...
jetson@yahboom:~$ sudo pip3 install https://github.com/ultralytics/assets/releases/download/v0.0.0/onnxruntime_gpu-1.20.0-cp310-cp310-linux_aarch64.whl
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, fsspec, filelock, etils, cattrs, 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-oau
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:~$
```

Solution

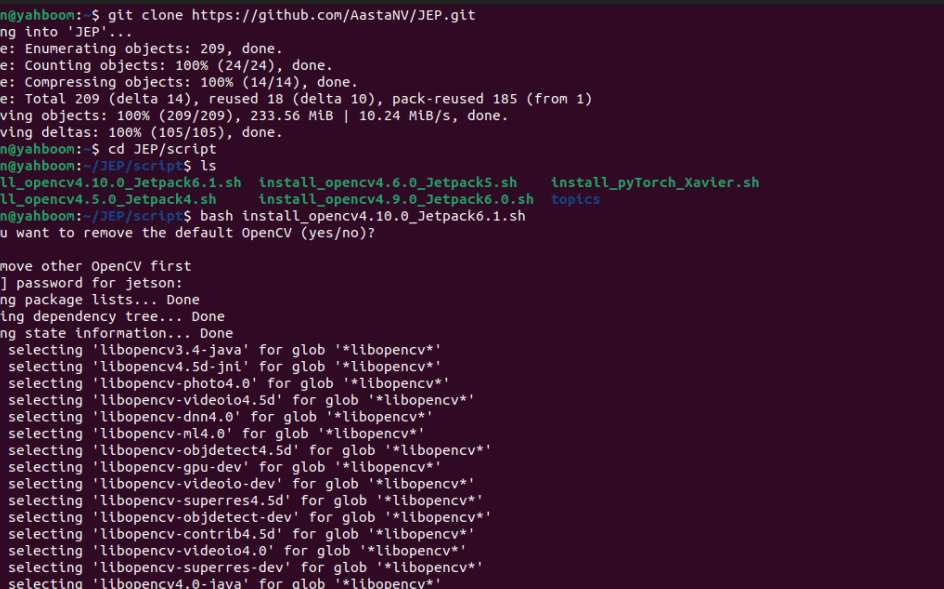
Uninstall python3-sympy: After uninstallation is complete, reinstall PyTorch

```
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
```



```

Activities  Terminal  Jan 11 11:00
jseton@yahboom: ~/JEP/script

jseton@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.
jseton@yahboom:~$ cd JEP/script
jseton@yahboom:~/JEP/script$ ls
install_opencv4.10.0_Jetpack6.1.sh  install_opencv4.6.0_Jetpack5.sh  install_pyTorch_Xavier.sh
install_opencv4.5.0_Jetpack4.sh      install_opencv4.9.0_Jetpack6.0.sh  topics
jseton@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 jseton:
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-ml4.0' for glob '*libopencv*'
Note, selecting 'libopencv-objdetect4.5d' 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-objdetect-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*'

```

```
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 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:~$
```

```
Activities  Terminal  Jan 21 21:39  MAXN SUPER  en  [Icons]

jtop MAXN SUPER|CPU 3.7%|GPU 0.0%  [Search] [Menu] [Window] [Close]

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

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

References

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

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