

Qualcomm RB5 Robotics Development Platform

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Introduction

The Qualcomm® Robotics RB5 development kit is a platform bringing together Qualcomm Technologies broad expertise in 5G and AI to empower developers and manufacturers to create the next generation of high-compute, low-power robots and drones for the consumer, enterprise, industrial and professional service sectors – and the comprehensive Qualcomm Robotics RB5 Development Kit helps ensure that developers have the customization and flexibility they need to make their visions a commercial reality. With 4G and 5G connectivity speeds via a companion module, the Qualcomm Robotics RB5 platform helps pave the way for the proliferation of 5G in robotics and intelligent systems.

The Qualcomm Robotics RB5 Platform supports the development of smart, power-efficient and cost-effective robots by combining high-performance heterogeneous compute, Qualcomm® Artificial Intelligence (AI) Engine for on-device machine learning, computer vision, vault-like security, multimedia, Wi-Fi and cellular connectivity solutions to help solve common robotics challenges.

- Contains advanced robotics platform Qualcomm® QRB5165 processor.
- Supports widely used Linux based distributions for robotics applications.
- Supports multiple SDKs and tools, including Qualcomm® Neural Processing SDK for AI, Qualcomm® Robotics Vision SDK, Qualcomm® Computer Vision SDK, Qualcomm® Hexagon™ DSP SDK, Robotics Operating System (ROS) 2, and multiple Linux distributions.
- Comprehensive set of demo applications and tutorials to accelerate development of robotics applications.
- Compliance with the 96Board, support for sensors such as multiple cameras, depth sensing solution, GMSL sensor, Ultrasonic Time-of-Flight Sensor with Extended Range, multi-mic and additional sensors like IMU, pressure sensor, magnetometer etc.
- Multiple interfaces and I/Os which can connect multiple sensors.

System on Module (SoM):

The SoM serves as the core computing hardware, encompassing CPU cores, GPU, hardware accelerators, memory, and interfaces for seamless communication—all integrated onto a single printed circuit board (PCB).

Carrier Board:

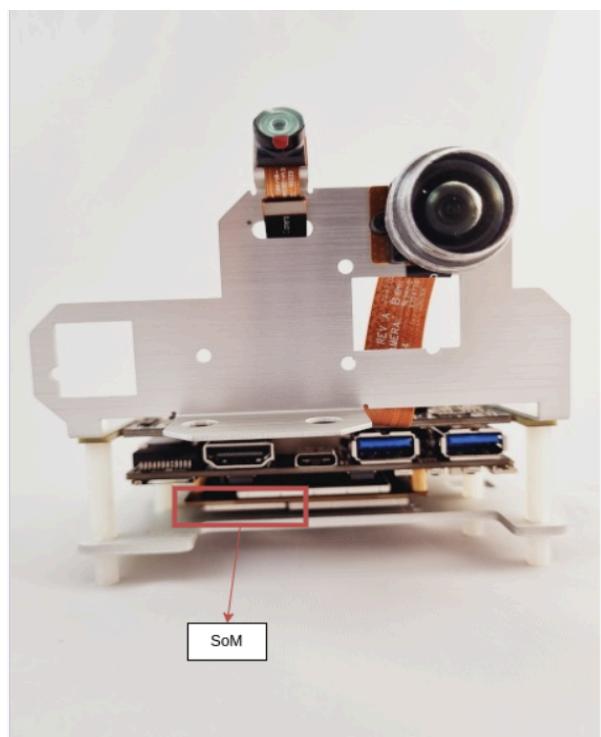
Acting as the physical interface for the SoM, the carrier board can either be a developer kit or a custom-designed board. During the prototyping phase, a developer kit proves invaluable for evaluating the SoM's capabilities. Subsequently, for specific use cases, transitioning to a custom carrier board tailored to unique requirements is common practice. The SoM is housed on the carrier board, and the official carrier board for RB5, known as the mainboard, supports the attachment of various mezzanine modules.

Reference Links: [Thundercomm](#) , [Qualcomm](#)

SOM Overview

The System-on-Module (SoM) for Qualcomm Robotics RB5 is a printed circuit board (PCB) housing critical components such as memory, power management IC, communication interfaces, and the robust heterogeneous computing architecture, featuring the QRB5165 SoC. This SoC integrates the CPU, GPU, DSP AI engine, ISP, Neural Processing Unit (NPU), and a Secure Processing Unit for enhanced security.

Figure 1. shows a picture of the Robotics RB5 SoM.



Graphics Processing Unit (GPU)

The Qualcomm® Adreno™ 650 GPU has the following characteristics:

- Supports the following APIs:
 - For graphics: OpenGL ES 3.2, Vulkan and VulkanCompute, DX12.x
 - For computing: OpenCL 2.0 full profile, DirectCompute

Central Processing Unit (CPU)

The Qualcomm® Kryo™ 585 CPU's cores have the following characteristics:

- 4 high-performance Kryo Gold cores
- 4 low-power Kryo Silver cores

Digital Signal Processor (DSP)

The Hexagon DSP is more efficient in power consumption than the CPU. It is conformed by several DSPs such as the compute DSP (cDSP) which is preferable for compute-intensive tasks such as, video enhancements, virtual reality applications and camera streaming; it also contains an audio DSP (aDSP) and sensor DSP. The Hexagon DSP comes with an Hexagon Tensor Accelerator (15 TOPS) for fixed-point deep convolutional neural networks and

Hexagon Scalar Accelerator to support AI processing and computer vision (CV).

Neural Processing Unit (NPU)

The NPU 230 for neural networks processing in high-performance machine learning. Used along with the Hexagon DSP.

Image Signal Processor (ISP)

The Qualcomm® Spectra 480 ISP can process 2 Gigapixels per second with the quality of 200 megapixel photos, record video at 8K and 4K HDR video capture. Has the following characteristics:

- Real-time sensor input resolution: Up to two 25MP and five 2MP cameras
- 64 MP 30 fps ZSL with a dual ISP

Secure processing Unit (SPU)

The SPU 240 comes with several features such as the following:

- Camera Security
- Crypto Engine
- Cryptographic Accelerator
- Qualcomm Trusted Execution Environment
- Secure Boot & Qualcomm® Crypto Engine Core is FIPS 140-2 certified

Feature	Qualcomm Robotics RB5/RB6
GPU	Adreno GPU 650
CPU	8-core Qualcomm® Kryo™ 585 built on Arm® Cortex® technology, 64-bit CPU
CPU Max Freq	2.842 GHz
Memory	Four-channel PoP high-speed memory – 8 GB LPDDR5 or LPDDR4X SDRAM (4 × 16-bit) designed for a 2750 MHz (LPDDR5) or 2133 MHz (LPDDR4X) clock and system cache. Memory density up to 16GB
Storage	UFS 3.1 gear 4 2 lanes, 128GB
Wireless Connectivity	2x WLAN 2 802.11ax with DBS and Bluetooth® 5.1
Digital Signal Processing	Compute Hexagon DSP v66 at 1.5 GHz with 4x Hexagon Vector eXtensions with an Hexagon Tensor Accelerator delivering 15 TOPS of AI performance (70-100 TOPS in RB6).
Neural Processing Unit	NPU230 for high-performance machine learning
Image Signal Processing	Qualcomm Spectra 480 ISP to support up to 12 cameras by D-PHY and 18 cameras by C-PHY (7 concurrent). It offers six CSI 4-lane interfaces with either D-PHY or C-PHY:
Secure Processing Unit	SPU 240

Carrier Boards

The Qualcomm Robotics RB5 Developer Kit is compliant with the 96Boards open hardware specification to support mezzanine-board expansions, and it supports Linux, Ubuntu, ROS (Robot Operating System) 2 and AWS RoboMaker. The kit comes in two versions, the Core kit and the Vision Kit.

Qualcomm Robotics RB5 Vision Kit includes:

- The mainboard with the RB5 SoM
- Wall power adapter.
- USB Type-C cable
- Vision mezzanine
- Inbuilt Tracking and main camera

The Vision mezzanine board includes the following components:

Camera

1x Main camera sensor IMX577

Interface: MIPI

Resolution/fps: 4056x3040/60fps

1x Tracking camera sensor OV9282

Interface: MIPI

Resolution/fps: 1280x800/120fps or 640x480/180fps

2x GMSL2 camera inputs

Datasheet Link : [Link](#)

Firmware Development

Register into Thundercomm at Thundercomm's official page. This step is necessary to use the SDK Manager. Please check figure 1 and 2 for a guide on where to register.

We are using

OS: Ubuntu 20.04.6 LTS

Release: 20.04

Codename: focal

HENCE FOLLOWING STEPS IN MANUAL README_Linux.txt

STEP 1: For Docker users on any Ubuntu Desktop (18.04, 16.04, etc.), please follow the guide in "On Other Ubuntu Host" for all sections.

STEP 2: Enter a work directory with read-write permissions for sdkmanager. For Docker image users, create the work directory under /home/hostPC/.

STEP 3: If you are using a Linux desktop to flash the device, please run the following command before connecting the device to the desktop - \$ sudo systemctl stop ModemManager

STEP 4: Installing packages :

For Robotics RB5 LU2.0 and RB5N LU2.0 Platform (required OS: Ubuntu 20.04) #

Required packages (minimum version): coreutils 8.30, fakechroot 2.19, fakeroot 1.24, kmod 27-1ubuntu2.1, libc6-arm64-cross 2.31, python 2.7.18, qemu-user-static 1:7.2+dfsg-5ubuntu1, udev 245.4-4ubuntu3.20, unzip 6.0, wget 1.20.3.

Run these commands to create soft links:

```
$ sudo rm -rf /lib/ld-linux-aarch64.so.1
```

```
$ sudo ln -sf /usr/aarch64-linux-gnu/lib/ld-2.31.so /lib/ld-linux-aarch64.so.1
```

```
$ sudo ln -sf /bin/bash /bin/sh
```

```
$ sudo dpkg -P qemu-user-static
```

```
$ wget
```

http://archive.ubuntu.com/ubuntu/pool/universe/q/qemu/qemu-userstatic_6.2+dfsg-2ubuntu6_amd64.deb

```
$ sudo dpkg -i qemu-user-static_6.2+dfsg-2ubuntu6_amd64.deb
```

STEP 5: Install the dependency libraries to the host computer

```
$ sudo apt-get install coreutils fakechroot fakeroot kmod libc6-arm64-cross python2.7  
qemu-user-static wget udev openssh-server -y
```

Generate Ubuntu Docker Image

NOTE: Different OS versions require different Docker images.

#Robotics RB5 LU2.0 and RB5N LU2.0 Platform#

For an Ubuntu 16.04 or 18.04 host, an Ubuntu 20.04 Docker image is required.

#RB5LU1.0, RB6, RB1, and RB2 Platforms#

For an Ubuntu 16.04 or 20.04 host, an Ubuntu 18.04 Docker image is required.

STEP 6: Install qemu-user-static, openssh-server and udev to the host PC.

```
$ sudo apt-get install qemu-user-static openssh-server udev -y
```

STEP 7: # Generate Ubuntu 18.04 docker image {since we are using 20.04 ubuntu)

```
$ ln -sf Dockerfile_18.04 Dockerfile  
$ sudo docker build -t ubuntu:18.04-sdkmanager .
```

STEP 8: On Ubuntu Docker

1. Create Docker container

```
# Ubuntu 18.04 docker image #  
$ sudo docker run -v /home/${USER}:/home/hostPC/ --privileged -v /dev:/dev -v  
/run/udev:/run/udev -d --name sdkmanager_container -p 36000:22  
ubuntu:18.04-sdkmanager
```

STEP 9: 2. Launch sdk manager in Docker container

```
$ sudo docker exec -it sdkmanager_container sdkmanager
```

STEP 10: General

1. Provide Thundercomm login credentials

Credential Checking ...

Enter your Thundercomm username:

Enter your Thundercomm password:

Provide a working directory when asked for target directory (for example "/home/user")

Note: For Docker users, provide the work directory as /home/hostPC/[working directory]

STEP 11: Select a desired product

Select your product:

- 1: RB1
- 2: RB2
- 3: RB5
- 4: RB5N(Non-Pop)
- 5: RB6

Select one number of product(1 | 2 | 3 ...) to continue with:

STEP 12: Select a desired platform for Robotics RBx device

Choose a platform for Robotics RBx device

Enter 1 to use LU platform, 2 to use LE platform:

STEP 13: LU PLATFORM ##

1. Type the number of available version for image repack, for example, "1"

You chose LU platform

Enter 1 to use LU1.0 platform, 2 to use LU2.0 platform:

2. Type the number of available version for image repack, for example, "1"

You chose LU1.0 platform

Checking the current version of release ...

Available versions:

1: QRB5165.UBUN.x.x-xxxxxx (latest version)

Recommended version: QRB5165.UBUN.x.x-xxxxxx

Select one number of available version (1) to continue with:

STEP 14:Type "1" when below message was shown to start downloading LU resources and image repacking, or type "help" for more information

SDK has been successfully set up and is ready to be used

Type 'help' for commands

> help

commands:

help = Show usage help for LU platform

1 = Download LU resources and generate system.img with current release

2 = Flash full build (require system.img generation first)

q = exit sdk manager

You will see the following message once the images are built successfully

Move sparse images to full_build ...done

You may proceed to flash full_build to your device

NOTE: The repack process might take up to 40 minutes.

FLASH RBx DEVICE

On Ubuntu Host and On Ubuntu Docker

1. Disconnect the device from PC before flashing full build, and follow the operation steps below:

- 1) Power off the device (unplug power cable and USB cable)
- 2) Plug in the power on device (12V)
- 3) Press and hold F_DL key, and connect board to PC via a type-C USB (It will switch the device to EDL mode)
- 4) Release F_DL key after the board is connected to PC
- 5) Start flashing process from the SDK manager (command 2: "Flash full build")
- 6) SDK manager will detect the device and start flash process automatically
- 7) Wait for the flashing process to be finished, the board will reboot automatically.

2. Enter the command below in a new terminal window on Host PC after the device successfully boots up:

```
$ adb wait-for-device shell
```

Modes in RB5

Connecting the board in USB flashing mode (aka EDL mode)

Steps to set up the board in the EDL Mode. EDL Mode is used for recovering/flashing the board over USB.

1. Power off the board and unplug the USB type-C cable.

2. Set the switch DIP_SW_0 to "0 1 1 0 0 0", please check figure 1 and 2. This configuration means that the board debug UART is enabled and that the board will power on automatically when main power is asserted.
3. Press button 18, it is marked with "F_DL". This button is located on the back of the board. Please check figure 3 and 4.
4. While pressing the F_DL button, power on the device with the proper power supply. Do NOT stop pressing the button.
5. While pressing the F_DL button, plug in the USB type-C cable between the board and the host computer. Stop pressing the F_DL button.
6. To check if everything went well, you can check the USB connections with dmesg.
dmesg | grep usb
It will show something like:
[281089.835630] usb 2-1: Qualcomm USB modem converter now attached to ttyUSB0

Fastboot mode

Set up a board for it to be ready to be flashed. For this, we will show the steps to boot your RB5/RB6 into fastboot mode.

1. With the board powered off (unplugged from power), set the BOOT_CONFIG DIP Switch in the board to '0-0-0-0'; in other words, every switch should be in "OFF" position. Please check Figure 1 for reference on how to configure the DIP SWITCH.
 - Disconnect the power cable from the board and check no USB cable is connected either.
 - Hold down the "VOL-" button while connecting the power supply.
 - Tap the "ON/OFF" button while continuing to hold the "VOL-" button, at least 5 seconds after plugging the power cable.
 - Release "VOL-" button.
 - Connect the USB3 Type C cable between the host PC and the RB5/RB6 board.

2. Check if the board is connected and in fastboot mode by opening a terminal in the host computer and running the following command:

```
user@desktop:~/work/QRB5_Exploration/Linaro$ sudo fastboot devices
```

```
3b73cc0      fastboot
```

You can also check the USB connections with dmesg, using the following command:

```
user@desktop:~/work/QRB5_Exploration/Linaro$ dmesg | grep -i usb
```

```
[281714.226579] usb 2-1: Product: Android  
[281714.226582] usb 2-1: Manufacturer: Google  
[281714.226585] usb 2-1: SerialNumber: 3b73cc0
```

Accessing the Board Through ADB

ADB (Android Debug Bridge) is a command-line tool for communicating to a device with ADB enabled. The tool works as client/server communication, where the client can send commands to a device, the server is in charge of connecting to the device and a Daemon that actually executes the commands sent by the client. ADB allows actions such as file sharing between computer and device and running shell commands on the device.

1. Install adb tools

```
sudo apt install android-tools-fastboot -y
```

2. Connect the USB type-C cable to the board, and the other end to your host PC. Connect the power cable to the board.

3. In your host PC type the following command to check if the device is registered:

```
adb devices
```

It should look something like the following when the device is registered:

```
$ adb devices
```

List of devices attached

```
3b73cc0    device
```

```
adb root
```

4. Once the device is registered type the following command to enter the board:

```
adb shell
```

Using Serial Console

UART (Universal Asynchronous Receiver/Transmitter) is a circuit in charge of transmitting and receiving information in serial form. The communication is done exclusively between two devices which typically handle data in parallel form, so the UART does the conversion from one to the other.

1. Make sure the board is powered off and disconnected. Turn on the SW2 on the DIP Switch 0 to enable the USB debug and turn on SW3 to enable auto power up,

the rest of the switches can be in any position you prefer. See Figure 1 to locate the switches.

2. Connect the microUSB cable to the USB debug port, see Figure 2 for its location on the board, and the other end to a USB port on your host PC.

Connect the power supply to the power connector on the board and the other end to the power outlet. The board will boot up in around 5 seconds. Once it finishes the boot process, a device file with the name ttyUSB0 in the /dev directory.

Open a serial console tool in your host PC. In this case, Minicom will be used, the parameters for the serial communication to access the board are the following:

- a. Baud rate: 115200
 - b. Data bits: 8
 - c. Stop bits: 1
 - d. Parity: None
 - e. Flow control: None
3. Open a terminal in your host PC and type:
 4. minicom -D /dev/ttyUSB0 -8 -b 11520
 5. You will be prompted to insert the credentials to access the board, see Figure 3.
The default credentials for Thundercomm official images are:
User: root
Password: oelinux123

Using SSH

SSH (Secure Socket Shell) is a network protocol that provides secure access, by authentication and data encryption during transmission, between two computers in an open network. The protocol allows navigation on a remote computer's filesystem, access to resources and file transferring.

1. To access the board with ADB with your host PC and already have an internet connection in the board, to install ADB follow the step in Wifi Setup or Ethernet Connection utility must be installed

2. In your host PC, type the following command to access the board:

```
adb shell  
# apt-get install openssh-server
```

3. Type the following commands to enable SSH access to the board:

```
# echo "PermitRootLogin yes" >> /etc/ssh/sshd_config  
# service ssh restart
```

Accessing the board with SSH

1. First, make sure both the board and the computer are connected to the same local network.
2. Connect over Serial console or adb
3. Once connected to the board, write the following command to check the IP address of the board:

```
ifconfig eth0
```

4. SSH into the board with the following command, where <ipaddress>

```
ssh root@<ipaddress>
```

Device Setup

Wi-Fi Setup

Access the board with ADB

1. In your host PC, create a file named `wpa_supplicant.conf` with the following content, and replace the text inside the "<>" symbols with your information:

```
network={  
    ssid=""  
    proto=WPA2  
    key_mgmt=WPA-PSK  
    pairwise=TKIP CCMP  
    group=TKIP CCMP  
    psk=""  
}
```

2. Using ADB, transfer the file into the board :

```
adb shell mount -o remount,rw /  
adb push wpa_supplicant.conf /data/misc/wifi/  
adb shell sync
```

3. Reboot the board with the following command so that the WiFi connection gets initialized:

```
adb reboot
```

4. Once the device is up again, after a few seconds, verify that the WiFi is up in the `wlan0` interface:

```
adb shell
```

```
# ifconfig wlan0
```

If there is no internet connection and the ip address is not assigned, use the following command:

```
# wpa_supplicant -Dnl80211 -iwlan0 -c /data/misc/wifi/wpa_supplicant.conf -ddd &
```

HDMI Setup

Connect an HDMI cable to the board's HDMI port and the other end to a HDMI monitor.

2. In your host PC, type the following command to access the board:

```
adb shell
```

3. Type the following commands to enable HDMI display:

```
# mkdir -p /usr/bin/weston_socket
# export XDG_RUNTIME_DIR=/usr/bin/weston_socket
# export LD_LIBRARY_PATH=/usr/lib:/usr/lib/aarch64-linux-gnu/
# weston --tty=1 --connector=29 --idle-time=0
```

You should now see the weston display on your monitor.

Neural Processing SDK

The Neural Processing SDK for Artificial Intelligence provides a set of tools to work on Machine Learning/AI Applications on the RB5.

PREREQUISITES

The Neural Processing SDK runs on the host computer, not in the Robotics RB5 platform. The host computer must have:

- Required Operating System (OS): Ubuntu Linux 18.04.
- Python: Version 3.6
- One of the following frameworks: Caffe and Caffe2, TensorFlow, ONNX, PyTorch, or TensorFlow Lite.

First, install and check the requirements needed to work with the Neural Processing SDK. Install Python 3.6 Later, Install frameworks we are going to see how to install each of the supported frameworks to develop ML models. Finally, Get the Neural Processing SDK & download the Neural Processing SDK.

Install Python3.6 (DEFAULT)

1. Run the following command to check the version of Python 3:

```
$ python3 --version
```

```
Python 3.6.9
```

If that is not your case, please continue with step 2. Do NOT delete any of the versions of Python already installed in your Ubuntu host computer for any reason. This could break your Ubuntu install.

- 2.** Run the next commands in your host computer to download and install Python 3.6

```
sudo apt-get update  
sudo apt-get install python3.6
```

You can check if the installation was successful with the commands from step 1.

Make Python3.6 default version

Python version 3.6 should be the one pointed when you run commands like `python` or check `/usr/bin/python`. To achieve this, you can use the following steps:

- 1. Create a list of alternatives for Python with the following commands:**

```
sudo update-alternatives --install /usr/bin/python python  
/usr/bin/python2.7 1  
sudo update-alternatives --install /usr/bin/python python  
/usr/bin/python3.6 2
```

- 2. Check the list you just created with the next command:**

```
update-alternatives --list python
```

- 3. Select the Python version 3.6:**

```
sudo update-alternatives --config python
```

Install packages

We need some Ubuntu and Python packages to work with the Neural Processing SDK, everyone of them is listed in the command below.

- 1. Run the following command to install the SDK's dependencies.**

```
sudo apt-get install python3-dev python3-matplotlib python3-numpy  
python3-proto3 python3-scipy python3-skimage python3-sphinx wget zip
```

Install frameworks

As mentioned, you need one of the following frameworks to work with the Neural Processing SDK: Caffe and Caffe2, TensorFlow, ONNX, PyTorch, or TensorFlow Lite. In this section, we are showing you how to install any of them.

Caffe and Caffe2

For Caffe: `sudo apt install caffe-cpu`
`caffe --version`

TensorFlow

To install TensorFlow: `$ python3.6 -m pip install tensorflow==2.3`

```
$ python3.6 -m pip show tensorflow
```

ONNX

To install ONNX: \$ python3.6 -m pip install onnx

```
$ python3.6 -m pip show onnx
```

PyTorch

To install PyTorch: \$ python3.6 -m pip install torch torchvision torchaudio
--extra-index-url <https://download.pytorch.org/whl/cpu>
\$ python3.6 -m pip show torch

TensorFlow Lite

To install TensorFlow Lite: \$ python3.6 -m pip install tflite==2.3.0
\$ python3.6 -m pip show tflite

Get the Neural Processing SDK

1. Download the SDK's Linux version on your host computer.

The Xs are the version number of the SDK we downloaded.

2. After the download is complete, a zip file with a name similar to snpe-<version>.zip is visible . To unzip it, run the following command:

```
unzip -X snpe-<version>.zip
```

Eg: If you downloaded version 2.05.0: unzip -X snpe-2.5.0.4052.zip

3. Verify that the downloading was successful by checking the files in the directory. For this, you can run the following commands:

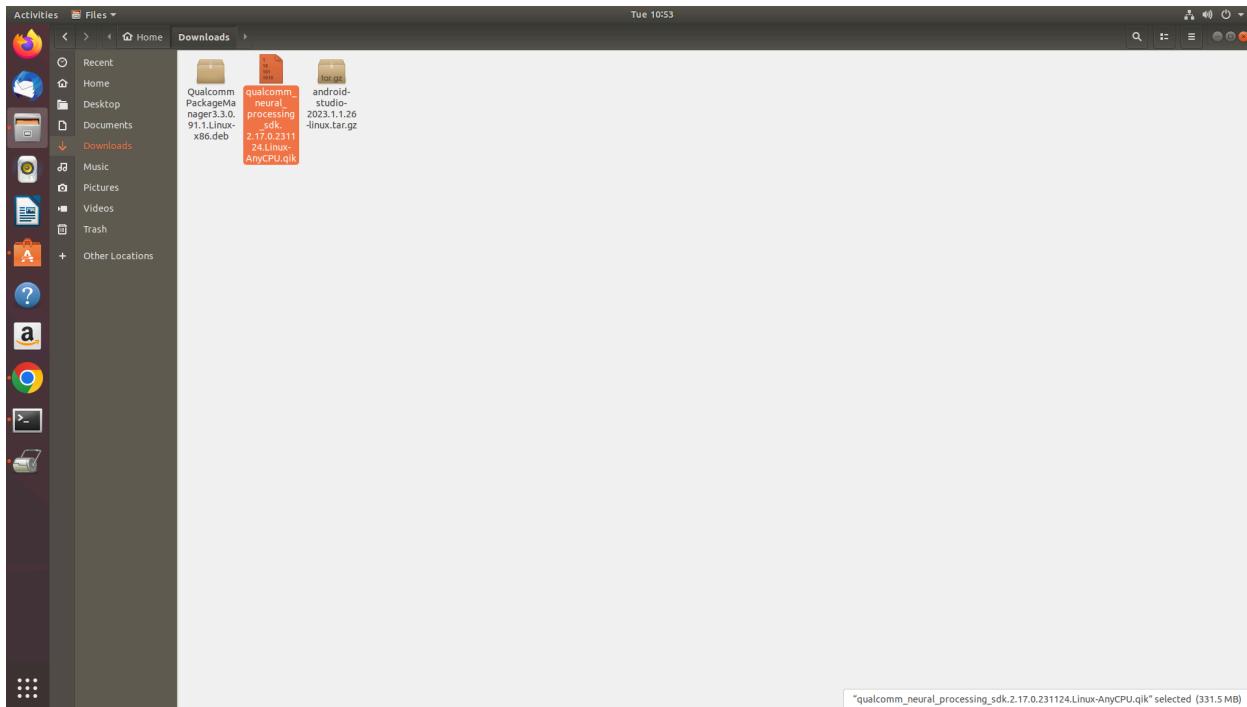
```
$ cd snpe-2.5.0.4052/  
$ ls
```

Download and install Android Studio. Android Studio provides a set of tools like a SDK and NDK to work with the Neural Processing SDK.

On Linux 18.04

1) QP3 tools installation (so that we can use qpi commands) - Qualcomm Manager

2) Download data file for extraction



```
Tue 10:49
tihan@tihan-MS-7C37: ~/Downloads

File Edit View Search Terminal Help
tihan@tihan-MS-7C37:~/Downloads$ unzip qualcomm_neural_processing_sdk.2.17.0.231124.Linux-AnyCPU.qik -d ~/snpe-sdk
unzip: cannot find or open qualcomm_neural_processing_sdk.2.17.0.231124.Linux-AnyCPU.qik, qualcomm_neural_processing_sdk.2.17.0.231124.Linux-AnyCPU.qik.zip or qualcomm_neural_processing_sdk.2.17.0.231124.Linux-AnyCPU.qik.ZIP, period.
tihan@tihan-MS-7C37:~/Downloads$ cd Downloads$ ls
qualcomm_neural_processing_sdk.2.17.0.231124.Linux-AnyCPU.qik
tihan@tihan-MS-7C37:~/Downloads$ sudo unzip qualcomm_neural_processing_sdk.2.17.0.231124.Linux-AnyCPU.qik -d ~/snpe-sdk
Archive: qualcomm_neural_processing_sdk.2.17.0.231124.Linux-AnyCPU.qik
  End-of-central-directory signature not found. Either this file is not
  a zipfile, or it constituted one disk of a multi-part archive. In the
  latter case the central directory and zipfile comment will be found on
  the last disk(s) of this archive.
unzip: cannot find zipfile directory in one of qualcomm_neural_processing_sdk.2.17.0.231124.Linux-AnyCPU.qik or
in [snpe-sdk].qualcomm_neural_processing_sdk.2.17.0.231124.Linux-AnyCPU.qik.zip, and cannot find qualcomm_neural_processing_sdk.2.17.0.231124.Linux-AnyCPU.qik.ZIP, period.
tihan@tihan-MS-7C37:~/Downloads$ ls
android-studio-2023.1.1.26-linux.tar.gz
qualcomm_neural_processing_sdk.2.17.0.231124.Linux-AnyCPU.qik
tihan@tihan-MS-7C37:~/Downloads$ sudo unzip qualcomm_neural_processing_sdk.2.17.0.231124.Linux-AnyCPU.qik -d ~/snpe-sdk
[sudo] password for tihan:
[sudo] password for tihan:
Archive: qualcomm_neural_processing_sdk.2.17.0.231124.Linux-AnyCPU.qik
  End-of-central-directory signature not found. Either this file is not
  a zipfile, or it constituted one disk of a multi-part archive. In the
  latter case the central directory and zipfile comment will be found on
  the last disk(s) of this archive.
unzip: cannot find zipfile directory in one of qualcomm_neural_processing_sdk.2.17.0.231124.Linux-AnyCPU.qik or
  qualcomm_neural_processing_sdk.2.17.0.231124.Linux-AnyCPU.qik.zip, and cannot find qualcomm_neural_processing_sdk.2.17.0.231124.Linux-AnyCPU.qik.ZIP, period.
tihan@tihan-MS-7C37:~/Downloads$ file qualcomm_neural_processing_sdk.2.17.0.231124.Linux-AnyCPU.qik
qualcomm_neural_processing_sdk.2.17.0.231124.Linux-AnyCPU.qik: data
tihan@tihan-MS-7C37:~/Downloads$ tar -xvf qualcomm_neural_processing_sdk.2.17.0.231124.Linux-AnyCPU.qik -C ~/snpe-sdk
tar: This does not look like a tar archive
tar: Skipping to next header
tar: Exiting with failure status due to previous errors
tihan@tihan-MS-7C37:~/Downloads$ qpm-cll --login blessy.thomas@admin.lith.ac.in
qpm-cll command not found
tihan@tihan-MS-7C37:~/Downloads$ qpm-cll --login blessy.thomas@admin.lith.ac.in
qpm-cll:
[Info] : Login is successful
[Info] : Fetching product catalog ...
[Info] : Product catalog refreshed successfully
tihan@tihan-MS-7C37:~/Downloads$ qpm-cll --license-activate qualcomm_neural_processing_sdk
[Info] : Activating license : qualcomm_neural_processing_sdk
[Info] : Activation activation is successful ActivationId=[bf2eac73-932d-11ee-ba71-026b10d3716b]
tihan@tihan-MS-7C37:~/Downloads$
```

Neural processing SDK

```

Activities Terminal Tue 11:38
tihan@tihan-MS-7C37: ~/Downloads

File Edit View Search Terminal Help
the last disk(s) of this archive.
unzip: cannot find zipfile directory in one of qualcomm_neural_processing_sdk.2.17.0.231124.Linux-AnyCPU.qtk or
      qualcomm_neural_processing_sdk.2.17.0.231124.Linux-AnyCPU.qtk.zip, and cannot find qualcomm_neural_processing_sdk.2.17.0.231124.Linux-AnyCPU.qtk.ZIP, period.
tihan@tihan-MS-7C37:~/Downloads$ ls
andromd-studio-2023.1.1.26-linux.tar.gz
qualcomm_neural_processing_sdk.2.17.0.231124.Linux-AnyCPU.qtk
tihan@tihan-MS-7C37:~/Downloads$ sudo unzip qualcomm_neural_processing_sdk.2.17.0.231124.Linux-AnyCPU.qtk -d ~/snpe-sdk
[sudo] password for tihan:
Sorry, try again.
[sudo] password for tihan:
Archive:  qualcomm_neural_processing_sdk.2.17.0.231124.Linux-AnyCPU.qtk
End-of-central-directory signature not found. Either this file is not
a zipfile, or it was never a disk file of a multi-part archive. In the
latter case the central directory and zipfile comment will be found on
the last disk(s) of this archive.
unzip:  cannot find zipfile directory in one of qualcomm_neural_processing_sdk.2.17.0.231124.Linux-AnyCPU.qtk or
      qualcomm_neural_processing_sdk.2.17.0.231124.Linux-AnyCPU.qtk.zip, and cannot find qualcomm_neural_processing_sdk.2.17.0.231124.Linux-AnyCPU.qtk.ZIP, period.
tihan@tihan-MS-7C37:~/Downloads$ tar xf qualcomm_neural_processing_sdk.2.17.0.231124.Linux-AnyCPU.qtk -C ~/snpe-sdk
tar: This does not look like a tar archive
tar: Skipping to next header
tar: Exiting with failure status due to previous errors
tihan@tihan-MS-7C37:~/Downloads$ qpm-clt --login tihan@tihan.lith.ac.in
qpm-clt: command not found
tihan@tihan-MS-7C37:~/Downloads$ qpm-clt --login tihan@tihan.lith.ac.in

Password:
[Info] : Login is successful
[Info] : Fetching product catalog ...
[Info] : Product catalog refreshed successfully
tihan@tihan-MS-7C37:~/Downloads$ qpm-clt --license-activate qualcomm_neural_processing_sdk
[Info] : Activating license : qualcomm_neural_processing_sdk
[Info] : License activation is successful ActivationId:[bf2eac73-932d-11ee-ba71-02bb10d3716b]
tihan@tihan-MS-7C37:~/Downloads$ qpm-clt --extract qualcomm_neural_processing_sdk.2.17.0.231124.Linux-AnyCPU.qtk
-----
Access to and use of tools managed by the Qualcomm Package Manager are subject to the terms and conditions of the corresponding agreement(s) in place with Qualcomm Technologies, Inc. or its affiliates. Unauthorized access or use is prohibited. Information such as tool version, operating system, user ID, company ID, IP address, computer mac address, date, timestamp, or features and functions of our tools that you may use can be collected for internal business purposes or tool improvements and is subject to the Qualcomm Privacy Policy [http://www.qualcomm.com/site/privacy]. By accessing or using this tool, you agree to the foregoing.
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Accept and continue with installation [y/n] : y
[Info] : Config File Present
[Info] : Checking environment
[Info] : Checking previous version
[Info] : Checking dependencies
[Info] : Preparing system
[Info] : Extracting files
[Info] : Configuring system
[Info] : Finishing
[Info] : SUCCESS: Installed qualcomm_neural_processing_sdk.Core at /opt/qcom/aistack/snpe/2.17.0.231124
tihan@tihan-MS-7C37:~/Downloads$
```

Fig3: Installed SDK.

Brief 8k record

Gigapixel speed ISP powered by top of the line Qualcomm® Spectra™ **480 ISP** with ability to process **2 Gigapixels** per second. This Gigapixel speed delivers new camera features including 8K video recording, 7 camera concurrency, capture 200-megapixel photos, and simultaneously capture 4K HDR video and 64 MP (with zero shutter lag) photos.

Up to 200 MP Photo Capture:

- Your camera can take really huge photos, up to 200 megapixels. More megapixels mean more detail in your pictures.

Up to 25 MP Dual Camera @ 30 FPS with Zero Shutter Lag:

- It can handle two cameras working together, and each camera can capture photos up to 25 megapixels. They can do this at a rate of 30 frames per second, and there's no delay when you press the button to take a photo (Zero Shutter Lag).

Up to 64 MP Single Camera @ 30 FPS with Zero Shutter Lag:

- If you're using just one camera, it can capture really high-quality photos, up to 64 megapixels. Again, it can do this at 30 frames per second, and there's no delay when taking photos.
- Support for 12 Cameras by D-PHY and 18 Cameras by C-PHY (7 Concurrent):
- Your device can connect to different cameras. Using something called D-PHY, it can connect to up to 12 cameras, and using C-PHY, it can connect to up to 18 cameras. And the cool thing is, it can work with 7 cameras at the same time (concurrent), meaning it can use data from all these cameras simultaneously.

REFERENCE DOCUMENTATION :

https://developer.ridgerun.com/wiki/index.php/Qualcomm_Robotics_RB5/AI_hardware_acceleration/Neural_Processing_SDK/

1) Making Python3- 3.6.9 the default version. Installing necessary dependencies

2) Installing frameworks : Caffe and Caffe2, TensorFlow, ONNX, PyTorch, or TensorFlow Lite.

```
Activities Terminal Tilde 1155 Ethen@Ethen-M5-7C7: ~
File Edit View Search Terminal Help
Setting up libpython3.6-devamido4 (3.6.9-1-18.04ubuntu1.12) ...
Setting up python3-skimage-lib:and04 (0.13.1-2) ...
Setting up gfortran-4.8 4.8.5-1ubuntu1 ...
Update alternatives: using /usr/bin/g++ to provide /usr/bin/c++ (c++) in auto mode
Setting up python3-tk:and04 (3.6.9-1-18.04) ...
Setting up python3-pil:and04 (3.6.9-1-18.04) ...
Setting up python3-pygments:and04 (2.1.1-18.04) ...
Setting up python3-matplotlib (2.1.1-1ubuntu3) ...
Setting up libpython3-dev:and04 (3.6.7-1-18.04) ...
Setting up libpython3.6-dev:and04 (3.6.7-1-18.04) ...
Setting up python3-dev (3.6.7-1-18.04) ...
Setting up python3-skimage (0.13.1-2) ...
Processing triggers for libc-bin (2.27-0ubuntu1) ...
/sbin/lldconfig.real: file /usr/lib/x86_64-linux-gnu/liblbdap_r-2.4.so.2 is truncated
/sbin/lldconfig.real: file /usr/lib/x86_64-linux-gnu/liblbdap_r-2.4.so.2.10.8 is truncated
/sbin/lldconfig.real: file /usr/lib/x86_64-linux-gnu/liblbdap_r-2.4.so.2.10.8 is truncated

?
Processing triggers for man-db (2.8.3-2) ...
Processing triggers for shared-mime-info (1.9.2) ...
Processing triggers for Fontconfig (2.12.6-0ubuntu2) ...
Processing triggers for libfontenc1 (1.4.3-1ubuntu1) ...
Setting up docutils-common (0.14+dfsg3) ...
Processing triggers for sgml-base (1.29) ...
Setting up docutils-writer (0.14+dfsg3) ...
update-alternatives: using /usr/share/docutils/scripts/python3/rst-buildhtml to provide /usr/bin/rst-buildhtml (rst-buildhtml) in auto mode
update-alternatives: using /usr/share/docutils/scripts/python3/rst2html to provide /usr/bin/rst2html (rst2html) in auto mode
update-alternatives: using /usr/share/docutils/scripts/python3/rst2man to provide /usr/bin/rst2man (rst2man) in auto mode
update-alternatives: using /usr/share/docutils/scripts/python3/rst2tex to provide /usr/bin/rst2tex (rst2tex) in auto mode
update-alternatives: using /usr/share/docutils/scripts/python3/rst2latex to provide /usr/bin/rst2latex (rst2latex) in auto mode
update-alternatives: using /usr/share/docutils/scripts/python3/rst2man to provide /usr/bin/rst2man (rst2man) in auto mode
update-alternatives: using /usr/share/docutils/scripts/python3/rst2xml to provide /usr/bin/rst2xml (rst2xml) in auto mode
update-alternatives: using /usr/share/docutils/scripts/python3/rst2odt_prepstyles to provide /usr/bin/rst2odt_prepstyles (rst2odt_prepstyles) in auto mode
update-alternatives: using /usr/share/docutils/scripts/python3/rst2pseudoxml to provide /usr/bin/rst2pseudoxml (rst2pseudoxml) in auto mode
update-alternatives: using /usr/share/docutils/scripts/python3/rst2texetex to provide /usr/bin/rst2texetex (rst2texetex) in auto mode
update-alternatives: using /usr/share/docutils/scripts/python3/rst2xml to provide /usr/bin/rst2xml (rst2xml) in auto mode
update-alternatives: using /usr/share/docutils/scripts/python3/rstipephtml to provide /usr/bin/rstipephtml (rstipephtml) in auto mode
Setting up python3-sphinx (1.6.7-1ubuntu1) ...
Ethen@Ethen-M5-7C7: ~$ sudo apt install caffe-cpu
[sudo] password for Ethen: 
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  cdk libcdk1 libcdk1-data liblabeledllo2 libbarpack2 liblboost-python1.65.1 liblcaffe-cpu1 liblcharls1 liblbdap25 libhdapclient05 libpepsi01 libfreenix1 liblbyfa0 libgdal20
  libgdbm8.2 libiges-3.6.2 libiges5 1 libigl005 liblhdflib1 liblklmldomi liblkmlempine1 liblleveldb1 liblndb1 libminizip1
  libmybind2 libnetcdf2 libnbc1 libnbigd3.2 libnbigp5-core0 libnbigp5-ungproc3-2 libnbigp5 libnbigp5 libpython3.6 libnbigt1 libsocket++ libspatialite1 libtiff5
  libunwind8 libvips1 libxkbcommon1 libxkbcommon1 libxkbcommon1 libxkbcommon1 libxkbcommon1 libxkbcommon1 libxkbcommon1 libxkbcommon1 libxkbcommon1 libxkbcommon1
  python3-flask python3-hspy python3-lblib python3-ipython python3-ipython-genutils python3-leveldb python3-lmql python3-nuexpr python3-pandas python3-pandas python3-picklehere
  python3-prompt-toolkit python3-simplegeneric python3-tables python3-tables python3-traitlets python3-wcwidth python3-webcodings
Suggested packages:
  liblcaffe-cpu-dev libcaffe-doc cython-doc geotiff-bin gdal-bin libgeotiff-epsg liblhdflib4-dev dev-hd4-tools liblwmvdbc libodc-postgresql tsldbsrc unxodbc libgd1-bin python-doc python-tk
  python2.7-doc binfmt-support python-hSpy-doc python3-genshi python3-xml-dbg python-xml-doc python-pandas-doc python3-netCDF4 vtables
The following NEW packages will be installed:
  liblcaffe-cpu-dev liblcaffe-doc cython-doc geotiff-bin gdal-bin libgeotiff-epsg liblhdflib4-dev dev-hd4-tools liblwmvdbc libodc-postgresql tsldbsrc unxodbc libgd1-bin python-doc python-tk
```

```
Activities Terminal Tue 12:12 tian@tian-MS-7C37:~/Downloads

File Edit View Search Terminal Help

Inflating: snpe-2.5.0-4052/lib/python/snpe/_util.py
Inflating: snpe-2.5.0-4052/lib/python/snpe/_util/_util.so
Inflating: snpe-2.5.0-4052/lib/x86_64-linux-clang/libbsMPF.so
Inflating: snpe-2.5.0-4052/lib/x86_64-linux-clang/liblbtpprepare.so
Inflating: snpe-2.5.0-4052/models/vgg/scripts/create_file_list.py
Inflating: snpe-2.5.0-4052/models/vgg/scripts/setup_VGG.py
Inflating: snpe-2.5.0-4052/models/vgg/scripts/vgg_raws.py
Inflating: snpe-2.5.0-4052/modules/alexnet/data/notice_sgn.jpg
Inflating: snpe-2.5.0-4052/modules/alexnet/data/alexnet_raws.jpg
Inflating: snpe-2.5.0-4052/modules/alexnet/data/chairs.jpg
Inflating: snpe-2.5.0-4052/modules/alexnet/data/frash_bin.jpg
Inflating: snpe-2.5.0-4052/modules/alexnet/scripts/alexnet_rows.py
Inflating: snpe-2.5.0-4052/modules/alexnet/scripts/show_alexnet_classifications.py
Inflating: snpe-2.5.0-4052/modules/inception_v3/scripts/alexnet_raws.py
Inflating: snpe-2.5.0-4052/modules/inception_v3/scripts/create_Inceptionv3.py
Inflating: snpe-2.5.0-4052/modules/inception_v3/scripts/inceptionv3_raws.py
Inflating: snpe-2.5.0-4052/modules/inception_v3/scripts/inceptionv3_functions.py
Inflating: snpe-2.5.0-4052/modules/mnist/data/28x28x3_rawEx1.raw
Inflating: snpe-2.5.0-4052/modules/mnist/data/28x28x3_rawEx3.raw
Inflating: snpe-2.5.0-4052/modules/mnist/data/28x28x3_rawEx5.raw
Inflating: snpe-2.5.0-4052/modules/mnist/data/Ex3.jpg
Inflating: snpe-2.5.0-4052/modules/mnist/data/Ex5.jpg
Inflating: snpe-2.5.0-4052/modules/mnist/data/image_list.txt
Inflating: snpe-2.5.0-4052/modules/mnist/data/NOTICE.txt
Inflating: snpe-2.5.0-4052/modules/mnist/scripts/interpretRawLeNetOutput.py
Inflating: snpe-2.5.0-4052/modules/spoken_digit/NOTICE.txt
Inflating: snpe-2.5.0-4052/modules/spoken_digit/interpreterRawNNOutput.py
Inflating: snpe-2.5.0-4052/modules/spoken_digit/input_list.txt
Inflating: snpe-2.5.0-4052/modules/word/rnn/input_list.txt
Inflating: snpe-2.5.0-4052/modules/word/rnn/belling_the_cat.txt
Inflating: snpe-2.5.0-4052/modules/word/rnn/infERENCE.py
Inflating: snpe-2.5.0-4052/modules/word/rnn/NOTICE.txt
Inflating: snpe-2.5.0-4052/share/SnpeDuo/utils/duooperation.cpp
Inflating: snpe-2.5.0-4052/share/SnpeDuo/utils/duooperation.h
Inflating: snpe-2.5.0-4052/share/SnpeDuo/utils/duodpshared.h
Inflating: snpe-2.5.0-4052/share/SnpeDuo/utils/duodpmacros.h
Inflating: snpe-2.5.0-4052/share/SnpeDuo/utils/duodpmacros.h
Inflating: snpe-2.5.0-4052/share/SnpeDuo/utils/duodpmacros.h
Inflating: snpe-2.5.0-4052/share/SnpeDuo/utils/duobuffer.h
Inflating: snpe-2.5.0-4052/NOTICE.txt
Inflating: snpe-2.5.0-4052/RELEASENotes.txt
Inflating: snpe-2.5.0-4052/README.pdf
tian@tian-MS-7C37:~/Downloads
```

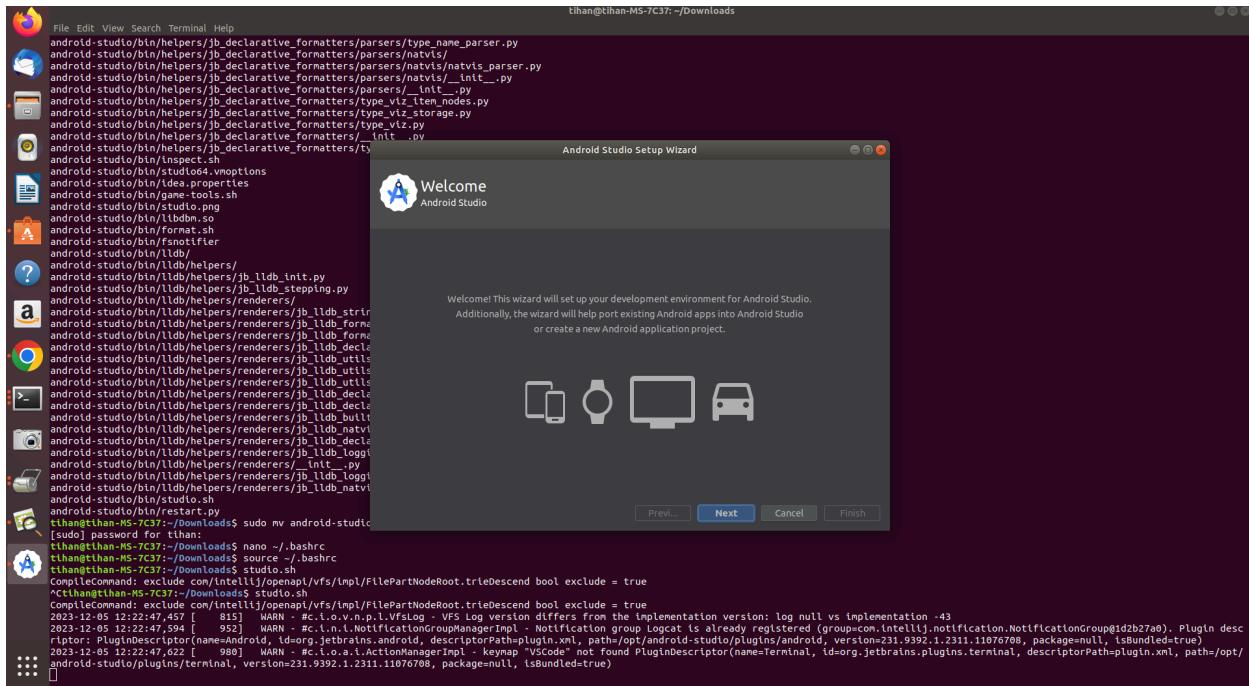
```
cd snpe-2.5.0.4052/
```

```
Activities Terminal - Title: Tc13
tianhan@tianhan-M5-7C37: ~/Downloads/snpe-2.5.0.4052
File Edit View Search Terminal Help
In�ating: snpe-2.5.0.4052/vgg/vgg/scripts/show_vgg_classifications.py
In�ating: snpe-2.5.0.4052/models/vgg/setup_VGG.py
In�ating: snpe-2.5.0.4052/models/alexnet/data/notices/sign.jpg
In�ating: snpe-2.5.0.4052/models/alexnet/data/notices/char1.jpg
In�ating: snpe-2.5.0.4052/models/alexnet/data/notices/char2.jpg
In�ating: snpe-2.5.0.4052/models/alexnet/scripts/clean AlexNet_raws.py
In�ating: snpe-2.5.0.4052/models/alexnet/scripts/show AlexNet_classifications.py
In�ating: snpe-2.5.0.4052/models/inception_v3/scripts>Show_Inceptionv3_classifications.py
In�ating: snpe-2.5.0.4052/models/inception_v3/scripts/setup_Inceptionv3.py
In�ating: snpe-2.5.0.4052/models/inception_v3/scripts/ude_setup_functions.py
In�ating: snpe-2.5.0.4052/models/mnist/data/28x28x1_rms/sx5.raw
In�ating: snpe-2.5.0.4052/models/mnist/data/28x28x1_rms/ex9.raw
In�ating: snpe-2.5.0.4052/models/mnist/data/28x28x1_rms/ex9.raw
In�ating: snpe-2.5.0.4052/models/mnist/data/Fw9.jpg
In�ating: snpe-2.5.0.4052/models/mnist/data/Fw9.jpg
In�ating: snpe-2.5.0.4052/models/mnist/scripts/InterpolateRawImageOutput.py
In�ating: snpe-2.5.0.4052/models/spknet/dstl/NOTICE.txt
In�ating: snpe-2.5.0.4052/models/spknet/dstl/prune_lopenningInput.py
ext�ating: snpe-2.5.0.4052/models/spknet/dstl/prune_lopenningInput.sh
In�ating: snpe-2.5.0.4052/models/word/rnn/input/list.sh
In�ating: snpe-2.5.0.4052/models/word/rnn/input/list.txt
In�ating: snpe-2.5.0.4052/models/word/rnn/word/cat.txt
In�ating: snpe-2.5.0.4052/models/word/rnn/word/cat.pv
In�ating: snpe-2.5.0.4052/models/word/rnn/NOTICE.txt
In�ating: snpe-2.5.0.4052/share/snpe0/utils/lddoperation.cpp
In�ating: snpe-2.5.0.4052/share/snpe0/utils/lddoperation.hpp
In�ating: snpe-2.5.0.4052/share/snpe0/utils/ldduooperation.hpp
In�ating: snpe-2.5.0.4052/share/snpe0/utils/ldduoshared.h
In�ating: snpe-2.5.0.4052/share/snpe0/utils/ldduoshared.h
In�ating: snpe-2.5.0.4052/share/snpe0/utils/ldduooperation.cpp
In�ating: snpe-2.5.0.4052/share/snpe0/utils/ldduooperation.hpp
In�ating: snpe-2.5.0.4052/share/snpe0/utils/ldduoshared.h
In�ating: snpe-2.5.0.4052/NOTICE.html
In�ating: snpe-2.5.0.4052/Terminator.html
In�ating: snpe-2.5.0.4052/Terminator.html
tianhan@tianhan-M5-7C37: ~/Downloads/snpe-2.5.0.4052
tianhan@tianhan-M5-7C37: ~/Downloads/snpe-2.5.0.4052
tianhan@tianhan-M5-7C37: ~/Downloads/snpe-2.5.0.4052
```

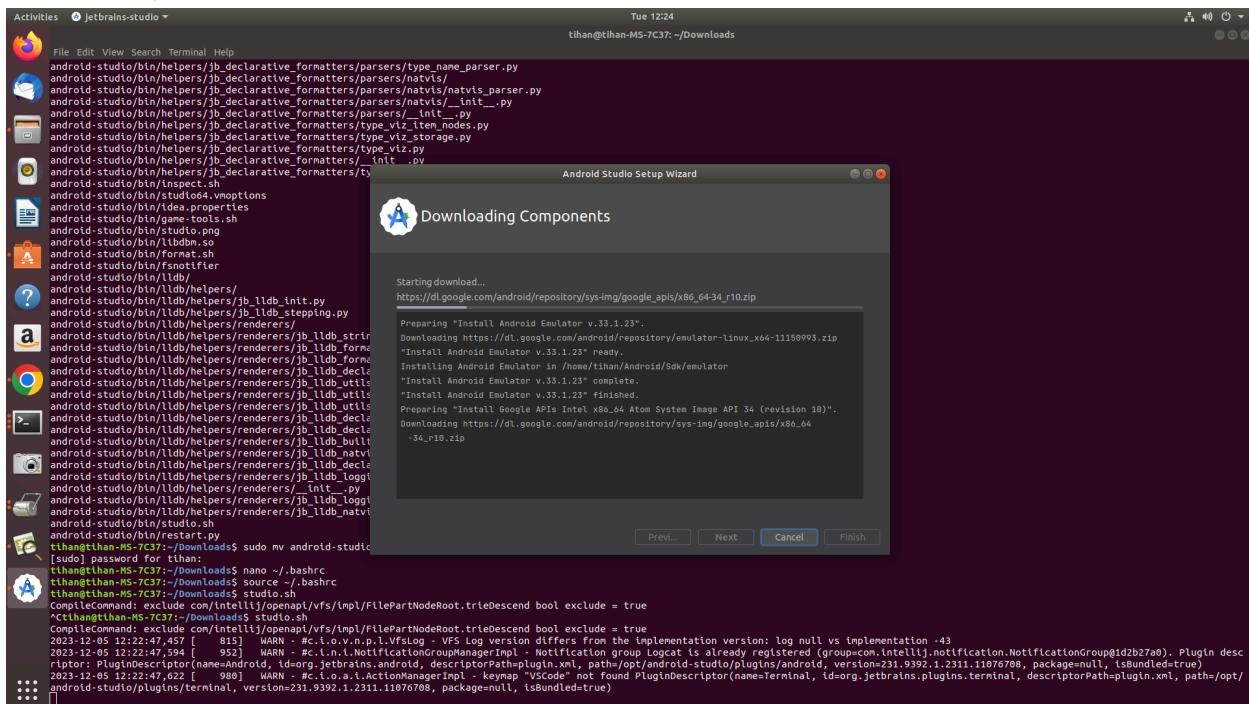
Install android studio

```
Activities Terminal Tue 12:17
tian@tian-MS-7C7:~/Downloads$ cd ..
tian@tian-MS-7C7:~/Downloads$ tar -xvf android-studio-2023.1.1.26-linux.tar.gz
android-studio/
android-studio/plugins/
android-studio/plugins/android/
android-studio/plugins/android/resources/
android-studio/plugins/android/resources/profilers-transform.jar
android-studio/plugins/android/resources/process-tracker-agent/
android-studio/plugins/android/resources/process-tracker-agent-native/
android-studio/plugins/android/resources/process-tracker-agent-native/x86/
android-studio/plugins/android/resources/process-tracker-agent-native/x86_64/
android-studio/plugins/android/resources/process-tracker-agent-native/x86_64/process-tracker
android-studio/plugins/android/resources/process-tracker-agent-native/x86_64/arm64/
android-studio/plugins/android/resources/process-tracker-agent-native/arm64-v7a/
android-studio/plugins/android/resources/process-tracker-agent-native/arm64-v7a/process-tracker
android-studio/plugins/android/resources/process-tracker-agent-native/arm64-v8a/
android-studio/plugins/android/resources/process-tracker-agent-native/arm64-v8a/process-tracker
android-studio/plugins/android/resources/screen-sharing-agent/
android-studio/plugins/android/resources/screen-sharing-agent/x86/
android-studio/plugins/android/resources/screen-sharing-agent/x86/libscreen-sharing-agent.so
android-studio/plugins/android/resources/screen-sharing-agent/x86_64/
android-studio/plugins/android/resources/screen-sharing-agent/x86_64/libscreen-sharing-agent.so
android-studio/plugins/android/resources/screen-sharing-agent/arm64-v7a/
android-studio/plugins/android/resources/screen-sharing-agent/arm64-v7a/libscreen-sharing-agent.so
android-studio/plugins/android/resources/screen-sharing-agent/arm64-v8a/
android-studio/plugins/android/resources/screen-sharing-agent/arm64-v8a/libscreen-sharing-agent.so
android-studio/plugins/android/resources/device-art-resources/
android-studio/plugins/android/resources/device-art-resources/watch_round/
android-studio/plugins/android/resources/device-art-resources/watch_round/mask.png
android-studio/plugins/android/resources/device-art-resources/watch_round/shadow.png
android-studio/plugins/android/resources/device-art-resources/watch_round/fore.png
android-studio/plugins/android/resources/device-art-resources/watch_square/back.png
android-studio/plugins/android/resources/device-art-resources/watch_square/mask.png
android-studio/plugins/android/resources/device-art-resources/watch_square/outline.png
android-studio/plugins/android/resources/device-art-resources/watch_square/outline_fore.png
android-studio/plugins/android/resources/device-art-resources/watch_square/fore.png
android-studio/plugins/android/resources/device-art-resources/watch_square/back_1024.png
android-studio/plugins/android/resources/device-art-resources/automotive_1024/fore.png
android-studio/plugins/android/resources/device-art-resources/automotive_1024/back.png
android-studio/plugins/android/resources/device-art-resources/automotive_1024/layout
android-studio/plugins/android/resources/device-art-resources/pixel_xl/
android-studio/plugins/android/resources/device-art-resources/pixel_xl/port_fore.webp
android-studio/plugins/android/resources/device-art-resources/pixel_xl/land_fore.webp
android-studio/plugins/android/resources/device-art-resources/pixel_xl/land_shadow.webp
android-studio/plugins/android/resources/device-art-resources/pixel_xl/land_back.webp
android-studio/plugins/android/resources/device-art-resources/pixel_xl/land_fore.webp
android-studio/plugins/android/resources/device-art-resources/pixel_xl/port_shadow.webp
android-studio/plugins/android/resources/device-art-resources/pixel_xl/layout
android-studio/plugins/android/resources/device-art-resources/pixel_l/
android-studio/plugins/android/resources/device-art-resources/pixel_l/back.webp
android-studio/plugins/android/resources/device-art-resources/pixel_l/mask.webp
android-studio/plugins/android/resources/device-art-resources/weares_small_round/
```

Installing Android studio



Downloading android studio components



~/Downloads/snpe-2.5.0.4052

Tue 12:39 tihan@tihan-MS-7C37: ~/Downloads/snpe-2.5.0.4052/bin

```
tihan@tihan-MS-7C37:~/Downloads/snpe-2.5.0.4052/bin$ source dependencies.sh
bash: dependencies.sh: Permission denied
tihan@tihan-MS-7C37:~/Downloads/snpe-2.5.0.4052/bin$ sudo source dependencies.sh
sudo: source: command not found
tihan@tihan-MS-7C37:~/Downloads/snpe-2.5.0.4052/bin$ sudo chown $USER:$USER dependencies.sh
sudo: chown: command not found
tihan@tihan-MS-7C37:~/Downloads/snpe-2.5.0.4052/bin$ source dependencies.sh
Checking for python3-dev: Install ok installed
Success: Version of python3-dev matches tested version
Checking for wget: Install ok installed
Success: Version of wget matches tested version
Checking for zip: Install ok installed
Success: Version of zip matches tested version
dpkg-query: no package found matching libc++-9-dev
Checking for libc++-9-dev:
libc++-9-dev is not installed. Adding to list of packages to be installed
  1 package to install, done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  libc++1+9 libc++abi1-9
Suggested packages:
  clang
The following NEW packages will be installed:
  libc++-9-dev libc++1+9 libc++abi1-9
0 upgraded, 3 newly installed, 0 to remove and 333 not upgraded.
Need to get 1,879 kB of archives.
After this operation, 13.3 MB of additional disk space will be used.
Do you want to continue [Y/n]? Y
Get: 1 http://in.archive.ubuntu.com/ubuntu bionic_main amd64 libc++-9-dev amd64 1:9-2~ubuntu18.04.2 [230 kB]
Get: 2 http://in.archive.ubuntu.com/ubuntu bionic_main amd64 libc++1+9 amd64 1:9-2~ubuntu18.04.2 [1,026 kB]
Get: 3 http://in.archive.ubuntu.com/ubuntu bionic_main amd64 libc++-9-dev amd64 1:9-2~ubuntu18.04.2 [623 kB]
Fetched 1,879 kB in 3s (545 kB/s)
Selecting previously unselected package libc++abi1-9:amd64.
(Reading database ... 17809 files and directories currently installed.)
Preparing to unpack .../libc++-9-dev_1:9-2~ubuntu18.04.2_amd64.deb ...
Unpacking libc++abi1-9:amd64 (1:9-2~ubuntu18.04.2) ...
Selecting previously unselected package libc++1+9:amd64.
Preparing to unpack .../libc++1+9-1x3a9-2~ubuntu18.04.2_amd64.deb ...
Unpacking libc++1+9:amd64 (1:9-2~ubuntu18.04.2) ...
Selecting previously unselected package libc++-9-dev:amd64.
Preparing to unpack .../libc++-9-dev_1:9-2~ubuntu18.04.2_amd64.deb ...
Unpacking libc++-9-dev:amd64 (1:9-2~ubuntu18.04.2) ...
Setting up libc++abi1-9:amd64 (1:9-2~ubuntu18.04.2) ...
Setting up libc++1+9:amd64 (1:9-2~ubuntu18.04.2) ...
Processing triggers for libc-bin (2.27-3ubuntu1) ...
/sbin/ldconfig.real: file /usr/lib/x86_64-linux-gnu/libldap-2.4.so.2 is truncated
/sbin/ldconfig.real: file /usr/lib/x86_64-linux-gnu/libldap_r-2.4.so.2.10.8 is truncated
/tihan@tihan-MS-7C37:~/Downloads/snpe-2.5.0.4052/bin$
```

Tue 12:45 tihan@tihan-MS-7C37: ~/Downloads/snpe-2.5.0.4052

```
tihan@tihan-MS-7C37:~/Downloads$ ls
android-studio-2023.1.1-26-linux.tar.gz
QualcommPackageManager3.0.91.1.Linux-x64.deb
fbSearch.pdf
docscreens.png
snpe-2.5.0.4052
snpe-2.5.0.4052.zip
tc-b-13113-2-turbox_c516s_soc_datasheet_v1-3-2.pdf
tihan@tihan-MS-7C37:~/Downloads$ cd snpe-2.5.0.4052/
tihan@tihan-MS-7C37:~/Downloads/snpe-2.5.0.4052$ models
android bin examples lib models ReleaseNotes.txt
benchmarks doc include LICENSE.pdf NOTICE.txt share
tihan@tihan-MS-7C37:~/Downloads/snpe-2.5.0.4052$ source bin/dependencies.sh
Checking for python3-dev: Install ok installed
Success: Version of python3-dev matches tested version
Checking for wget: Install ok installed
Success: Version of wget matches tested version
Checking for zip: Install ok installed
Success: Version of zip matches tested version
Checking for libc++-9-dev: Install ok installed
Success: Version of libc++-9-dev matches tested version
tihan@tihan-MS-7C37:~/Downloads/snpe-2.5.0.4052$ source bin/dependencies.sh
If everything is right, your output should look similar to the following:
Checking for python3-dev: install ok installed
Success: Version of python3-dev matches tested version
Checking for wget: install ok installed
Success: Version of wget matches tested version
Checking for zip: install ok installed
Success: Version of zip matches tested version
Checking for libc++-9-dev: install ok installed
Success: Version of libc++-9-dev matches tested version
If you need to install any package, you can use the following command:
sudo apt install <package>
```

3. Now, we are going to check the system for the Python package dependencies. If any package is missing, please install it.

```
source bin/check_python_depends.sh
```

Cookies help us deliver our services. By using our services, you agree to our use of cookies. [OK](#)

```
Activities Terminal * Tue 14:04 tihan@tihan-MS-7C37: ~/Downloads/snpe-2.5.0.4052/bin  
File Edit View Search Terminal Help  
Reading state information... Done  
The following additional packages will be installed:  
  libc++1+9 libc++abi1+9  
Suggested packages:  
  clang  
The following NEW packages will be installed:  
  libc++1+9-dev libc++1+9 libc++abi1+9  
0 upgraded, 3 newly installed, 0 to remove and 333 not upgraded.  
Need to get 1,879 kB of archives.  
After this operation, 13.3 MB of additional disk space will be used.  
Do you want to continue? [Y/n] y  
Get:1 http://in.archive.ubuntu.com/ubuntu bionic-updates/universe amd64 libc++abi1+9 amd64 1:9-2~ubuntu18.04.2 [238 kB]  
Get:2 http://in.archive.ubuntu.com/ubuntu bionic-updates/universe amd64 libc++1+9 amd64 1:9-2~ubuntu18.04.2 [1,026 kB]  
Get:3 http://in.archive.ubuntu.com/ubuntu bionic-updates/universe amd64 libc++1+9-dev amd64 1:9-2~ubuntu18.04.2 [623 kB]  
Fetched 1,879 kB in 3s (545 kB/s)  
Selecting previously unselected package libc++abi1+9:amd64.  
(Reading database ... 179464 files and directories currently installed.)  
Unpacking libc++abi1+9:amd64 (1:9-2~ubuntu18.04.2) ...  
Selecting previously unselected package libc++1+9:amd64.  
Preparing to unpack .../libc++1+9_1%3d9-2~ubuntu18.04.2_amd64.deb ...  
Unpacking libc++1+9:amd64 (1:9-2~ubuntu18.04.2) ...  
Selecting previously unselected package libc++1+9-dev:amd64.  
Preparing to unpack .../libc++1+9-dev_1%3d9-2~ubuntu18.04.2_amd64.deb ...  
Unpacking libc++1+9-dev:amd64 (1:9-2~ubuntu18.04.2) ...  
Setting up libc++1+9:amd64 (1:9-2~ubuntu18.04.2) ...  
Setting up libc++1+9-dev:amd64 (1:9-2~ubuntu18.04.2) ...  
Processing triggers for libc-bin (2.27-3ubuntu1) ...  
/sbin/ldconfig.real: file /usr/lib/x86_64-linux-gnu/libldap_r-2.4.so.2 is truncated  
/sbin/ldconfig.real: file /usr/lib/x86_64-linux-gnu/libldap_r-2.4.so.2.10.8 is truncated  
tihan@tihan-MS-7C37:~/Downloads/snpe-2.5.0.4052/bin$ source bin/dependencies.sh  
bash: bin/dependencies.sh: No such file or directory  
tihan@tihan-MS-7C37:~/Downloads/snpe-2.5.0.4052/bin$ source ./dependencies.sh  
bash: ./dependencies.sh: No such file or directory  
tihan@tihan-MS-7C37:~/Downloads/snpe-2.5.0.4052/bin$ ls  
aarch64-android-clang9.0 aarch64-oe-linux-gcc8.2 aarch64-oe-linux-gcc9.3 aarch64-ubuntu-gcc7.5 arm-android-clang8.0 check_python_depends.sh dependencies.sh envsetup.sh x86_64-linux-clang  
bash: bin/check_python_depends.sh: No such file or directory  
tihan@tihan-MS-7C37:~/Downloads/snpe-2.5.0.4052/bin$ source check_python_depends.sh  
bash: check_python_depends.sh: Permission denied  
tihan@tihan-MS-7C37:~/Downloads/snpe-2.5.0.4052/bin$ chmod +x check_python_depends.sh  
chmod: changing permissions of 'check_python_depends.sh': Operation not permitted  
tihan@tihan-MS-7C37:~/Downloads/snpe-2.5.0.4052/bin$ sudo chmod +x check_python_depends.sh  
tihan@tihan-MS-7C37:~/Downloads/snpe-2.5.0.4052/bin$ source check_python_depends.sh  
bash: check_python_depends.sh: Permission denied  
tihan@tihan-MS-7C37:~/Downloads/snpe-2.5.0.4052/bin$ sudo chown $USER:$USER check_python_depends.sh  
tihan@tihan-MS-7C37:~/Downloads/snpe-2.5.0.4052/bin$ source check_python_depends.sh  
tihan@tihan-MS-7C37:~/Downloads/snpe-2.5.0.4052/bin$ Supported versions of Python are 3.6. Found. Instead: 2.7  
tihan@tihan-MS-7C37:~/Downloads/snpe-2.5.0.4052/bin$
```

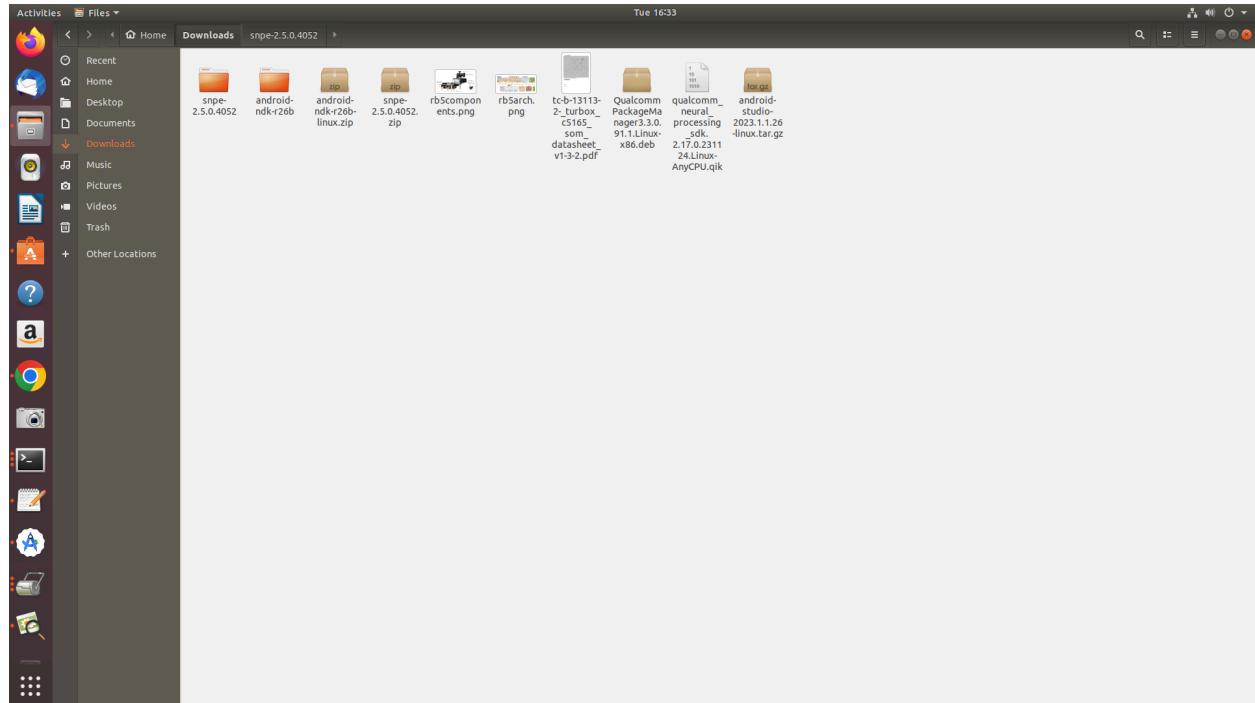
```
Activities Terminal * Tue 14:10 tihan@tihan-MS-7C37: ~/Downloads/snpe-2.5.0.4052  
File Edit View Search Terminal Help  
Press <enter> to keep the current choice[*], or type selection number: 0  
Reading state information... Done  
Building dependency tree  
Reading state information... Done  
python3-numpy is already the newest version (1:1.13.3-2ubuntu1).  
python3-sphinx is already the newest version (1:6.7~ubuntu1).  
zlib is already the newest version (3.0.4-1).  
python3-pygments is already the newest version (2.1.1-2ubuntu3).  
python3-scipy is already the newest version (0.19.1-ubuntu1).  
python3-skimage is already the newest version (0.13.1-2).  
python3-dev is already the newest version (3.6.7-1-18.04).  
python3-protobuf is already the newest version (3.0.0-9.ubuntu1.1).  
wget is already the newest version (1:19.4-1ubuntu2.2).  
On the system, 0 were installed, 0 to remove and 333 not upgraded.  
tihan@tihan-MS-7C37:~/Downloads/snpe-2.5.0.4052$ caffe --version  
caffe version 1.0.6  
tihan@tihan-MS-7C37:~/Downloads/snpe-2.5.0.4052$ python3.6 -m pip install tflite==2.3.0  
Collecting tflite==2.3.0  
  Downloading https://files.pythonhosted.org/packages/52/27/ad85e415b6b22f72e40bd67e10c9479a3080b936ccca177a3611a1792e1ff/tflite-2.3.0-py2.py3-none-any.whl  
    Collecting flatbuffers (from tflite==2.3.0)  
      Using cached https://files.pythonhosted.org/packages/0f/12/d5c79ee252793ffe845d58a913197bfa02ae9ab5c9bc3dc4b58d477b9e7/flatbuffers-23.5.26-py2.py3-none-any.whl  
        collecting numpy (from tflite==2.3.0)  
          Using cached https://files.pythonhosted.org/packages/45/b2/0c7545bb7a38754d63048c769688a0d947328125d81bf12beaa692c3ae3/numpy-1.19.5-cp36-cp36m-manylinux1_x86_64.whl  
            Installing collected packages: flatbuffers, numpy, tflite  
              Success: installed flatbuffers 23.5.26 numpy 1.19.5 tflite 2.3.0  
tihan@tihan-MS-7C37:~/Downloads/snpe-2.5.0.4052$ source bin/check_python_depends.sh  
Supported version of Python found: 3.6  
Checking for python3-numpy: install ok installed  
WARNING: It appears the python module numpy is installed on this system using the apt-get distribution as well as pip. If you encounter errors, please use only one distribution.  
=====  
Checking for python-sphinx:  
sphinx installed via pip Version: 1.6.7  
=====  
Checking for python3-scipy: install ok installed  
WARNING: It appears the python module scipy is installed on this system using the apt-get distribution as well as pip. If you encounter errors, please use only one distribution.  
=====  
Checking for python3-pygments: install ok installed  
WARNING: It appears the python module pygments is installed on this system using the apt-get distribution as well as pip. If you encounter errors, please use only one distribution.  
=====  
Checking for python3-skimage: install ok installed  
WARNING: It appears the python module scikit-image is installed on this system using the apt-get distribution as well as pip. If you encounter errors, please use only one distribution.  
=====  
Checking for python3-protobuf:  
protoBuf installed via pip Version: 3.0.0  
=====  
Checking for python3-yaml: install ok installed  
WARNING: It appears the python module pyyaml is installed on this system using the apt-get distribution as well as pip. If you encounter errors, please use only one distribution.  
=====  
Checking for python3-nak0: install ok installed  
WARNING: It appears the python module nak0 is installed on this system using the apt-get distribution as well as pip. If you encounter errors, please use only one distribution.  
=====  
tihan@tihan-MS-7C37:~/Downloads/snpe-2.5.0.4052$
```

Download dependencies

Activities Terminal Tuan:MS-7C37: ~/Downloads/snpe-2.5.0.4052/bin
tuan@tuan-MS-7C37: ~/Downloads/snpe-2.5.0.4052/bin

```
File Edit View Search Terminal Help
Collecting Jinja2==2.3 (from sphinx==2.2.1)
  Downloading https://files.pythonhosted.org/packages/20/9a/e5d9ec41927401e41aa8af6d16e78b6e12bca4699d417f646a9610a07e/Jinja2-3.0.3-py3-none-any.whl (133kB)
    14KB 10.6MB/s
Collecting setuptools (from sphinx==2.2.1)
  Using cached https://files.pythonhosted.org/packages/b0/3a/88b210db08e56854d0bcf4b38e165e03b3e377e13987746f825790f3df5bf/setuptools-59.6.0-py3-none-any.whl
    100B | 102KB 12.9MB/s
Collecting snowballstemmer==1.1 (from sphinx==2.2.1)
  Downloading https://files.pythonhosted.org/packages/ed/dc/c02e01294f7265e63a7315fe08b0dd1df7dacbf80a80d4ba84b96d0fb9e/snowballstemmer-2.2.0-py2.py3-none-any.whl (93kB)
    100B | 102KB 12.9MB/s
Collecting babel==2.0 >=1.3 (from sphinx==2.2.1)
  Downloading https://files.pythonhosted.org/packages/92/f7/06301a699261c1d52f7339d169554d09b20b1723a040c2dc1559ef588/Babel-2.11.0-py3-none-any.whl (9.5MB)
    100B | 9.5MB 277KB/s
Collecting imagesize (from sphinx==2.2.1)
  Downloading https://files.pythonhosted.org/packages/ff/d2/85c4c919272577931d407be5a5d71c20f0b616d31a0bef0ae45bb79abd/imagesize-1.4.1-py2.py3-none-any.whl
Collecting sphinxcontrib-qthelp (from sphinx==2.2.1)
  Downloading https://files.pythonhosted.org/packages/2b/14/05f9206ef49cfccaaaf5bd224c7cd43dc3a433d94e024d29c6cd/sphinxcontrib_qthelp-1.0.3-py2.py3-none-any.whl (90kB)
    100B | 90KB 12.8MB/s
Collecting sphinxcontrib-devhelp (from sphinx==2.2.1)
  Downloading https://files.pythonhosted.org/packages/99/5d/e5d43a521387f1b8df5fsf1d099605992f2537zb9b985ce4ee8/sphinxcontrib_devhelp-1.0.2-py2.py3-none-any.whl (84kB)
    100B | 92KB 13.4MB/s
Collecting sphinxcontrib-htmlhelp (from sphinx==2.2.1)
  Downloading https://files.pythonhosted.org/packages/53/a0/c854ef09500e2f5642dcba0f73d7f87d7046d37627229d8654cc71c95/sphinxcontrib_htmlhelp-2.0.0-py2.py3-none-any.whl (100kB)
    100B | 102KB 12.4MB/s
Collecting requests==2.5.0 (from sphinx==2.2.1)
  Downloading https://files.pythonhosted.org/packages/2d/41/08076519c00e41bc0ffa18a8fbcd3bf3e2b62af0435d269a0d0f40564d/requests-2.27.1-py2.py3-none-any.whl (63kB)
    100B | 71KB 12.3MB/s
Collecting alabaster==0.8 >=0.7 (from sphinx==2.2.1)
  Downloading https://files.pythonhosted.org/packages/54/88/c708fc61120ab6615d0b082cb770f9fc1429d3f913a456c182cf4658f7/alabaster-0.7.13-py3-none-any.whl
Collecting sphinxcontrib-serializinghtml (from sphinx==2.2.1)
  Downloading https://files.pythonhosted.org/packages/c6/77/54de45c60d0f01c1037e3c93249b040c8f8078fd9a79530eb0242abeea/sphinxcontrib_serializinghtml-1.1.5-py2.py3-none-any.whl (94kB)
    100B | 102KB 14.2MB/s
Collecting pybarsing==3.0.5,=>=2.6.2 (from packaging->sphinx==2.2.1)
  Downloading https://files.pythonhosted.org/packages/39/99/8486ed85fc0b3d8a4ce92d2d9126fd96b0008ea213167940a2475/pybarsing-3.1.1-py3-none-any.whl (103kB)
Collecting MarkupSafe==2.0 (from Jinja2>=2.3, sphinx==2.2.1)
  Downloading https://files.pythonhosted.org/packages/fc/d6/57f9a97e64471e3a0f857483bd63b63e2c14de30494383b6d45fa97e/MarkupSafe-2.0.1-cp36-cp36-manylinux1_x86_64.whl
Collecting pytz==2015.7 (from babel==2.0, >=1.3, sphinx==2.2.1)
  Downloading https://files.pythonhosted.org/packages/32/d2/aa7f7effd9a24a1449a11f09d74a9c7ef9a79fbef9994261fc2/pytz-2015.3.post1-py2.py3-none-any.whl (502kB)
Collecting charset_normalizer==2.0.0; python_version == "3" (from requests==2.5.0, >=2.2.1)
  Downloading https://files.pythonhosted.org/packages/63/23/24af8880eba0697a0f3650ac750778862d34941a4beb58706715726/charset_normalizer-2.0.12-py3-none-any.whl
Collecting certifi==2017.4.17 (from requests==2.5.0, >=2.2.1)
  Downloading https://files.pythonhosted.org/packages/64/02/428ef07068be8fa3716b576e4ab01f91d25968918ea187077a386fc4f42/certifi-2017.4.17-py3-none-any.whl (162kB)
    100B | 103KB 9.0MB/s
Collecting idna==2.5; python_version == "2.5, 3.0 -> sphinx==2.2.1
  Downloading https://files.pythonhosted.org/packages/c3/7a/e82b5cfc5a03dfde0d596ea6bfb506448a0710ea50336604fb45a94/ldna-3.6-py3-none-any.whl (61kB)
    100B | 71KB 12.8MB/s
Collecting urllib3<1.27, >=1.21.1 (from requests==2.5.0, >=2.2.1)
  Downloading https://files.pythonhosted.org/packages/b0/53/aa91e1630dfde15b2da899ecf13314e1e49c05278cc644581f77f17fd/urllib3-1.26.18-py2.py3-none-any.whl (143kB)
    100B | 153KB 16.2MB/s
Installing collected packages: docutils, Jinja2, MarkupSafe, pygments, sphinxcontrib-applehelp, pygments, sphinxcontrib-jmath, MarkupSafe, Jinja2, setuptools, snowballstemmer, pytz, babel, imagesize, sphinxcontrib-qthelp, sphinxcontrib-devhelp, sphinxcontrib-htmlhelp, charset-normalizer, certifi, ldna, urllib3, requests, alabaster, sphinxcontrib-serializinghtml, sphinx
Successfully installed Jinja2-3.0.3 MarkupSafe-2.0.1 Pygments-2.14.0 alabaster-0.7.13 babel-2.11.0 certifi-2023.11.17 charset-normalizer-2.0.12 docutils-0.18.1 ldna-3.6 imagesize-1.4.1 packaging-21.3 pyperclip-3.1.1 pytz-2023.3.requests-postfix-2.27.1 setuptools-59.6.0 snowballstemmer-2.2.0 sphinx-2.1 sphinxcontrib-applehelp-1.0.2 sphinxcontrib-serializinghtml-1.1.5 urllib3-1.26.18
tuan@tuan-MS-7C37: ~/Downloads/snpe-2.5.0.4052/bin
```

```
cd /opt/android-studio/bin
```



1. JDK
 2. Eclipse IDE
 3. Android SDK Downloader

4. Android ADT
5. Android SDK platform support
6. Cygwin Environment
7. Android NDK
- 8.

Point a) ~/Downloads/snpe-2.5.0.4052\$

To install : <https://developer.qualcomm.com/software/qualcomm-computer-vision-sdk/setting-up>

Very imp `sudo vi /etc/apt/apt.conf.d/10sandbox`

In the file, add the following line:

```
APT::Sandbox::User "root";
```

```
cp -r /yolov5/* /new1/
```

```
tihan@tihan-MS-7C37:~/yolov5_docker
```

```

tihan@tihan-MS-7C37:~
```

```

File Edit View Search Terminal Tabs Help
```

```

README.md      data      pyproject.toml  tutorial.ipynb
README.zh-CN.md detect.py    requirements.txt
sh-5.0# cd data
sh-5.0# ls
Argonne.yaml   ImageNet1000.yaml coco.yaml scripts
Globalheatz00.yaml Objrcf365.yaml coco128-seg.yaml xvview.yaml
ImageNet.yaml   SKU-110K.yaml coco128.yaml
ImageNet10.yaml VOC.yaml   hyps
ImageNet100.yaml VlsDrone.yaml images
sh-5.0# cd ..
sh-5.0# ls
bus.jpg        zidane.jpg
sh-5.0# pwd
/yolov5/data/images
sh-5.0# cd ..
sh-5.0# ls
CITATION.cff  __pycache__  export.py    runs      val.py
CONTRIBUTING.md benchmarks.py hubconf.py segment    yol
LICENSE        classify    models     train.py  yolov5s.pt
README.md      data       pyproject.toml tutorial.ipynb
sh-5.0# python3 detect.py --source /yolov5/data/images/zidane.jpg --weights yolov5
sh-5.0# python3 detect.py --source /yolov5/data/images/zidane.jpg --weights yolov5s
detect: weights=[yolov5], source=/yolov5/data/images/zidane.jpg, data=data/coco128.yaml, imgsz=[640, 640], conf_thres=0.25, iou_thres=0.45, max_det=1000, device=, view_img=False, save_txt=False, save_csv=False, save_conf=False, save_crop=False, nosave=False, classes=None, agnostic_nms=False, augment=False, visualize=False, update=False, project=runs/detect, name=exp, exist_ok=False, line_thickness=3, hide_labels=False, hide_conf=False, half=False, dnn=False, vid_stride=1
YOLOv5 ⚡ v7.0-283-g975d9278 Python-3.8.10 torch-2.2.0 CPU
```

```

Traceback (most recent call last):
  File "detect.py", line 309, in <module>
    main(opt)
  File "detect.py", line 304, in main
    File "", line 1, in <module>
    File "/usr/local/lib/python3.8/dist-packages/torch/utils/_contextlib.py", line 115, in decorate_context
      return func(*args, **kwargs)
    File "detect.py", line 115, in run
      model = DetectMultiBackend(weights, device=device, dnn=dnn, data=data, fp16=half)
    File "/yolov5/models/common.py", line 532, in DetectMultiBackend
      raise NotImplementedError(f"Backend {backend} is not supported format")
NotImplementedError: Backend yolov5 is not a supported format
sh-5.0# python3 detect.py --source /yolov5/data/images/zidane.jpg --weights yolov5s.pt
detect: weights=[yolov5s.pt], source=/yolov5/data/images/zidane.jpg, data=data/coco128.yaml, imgsz=[640, 640], conf_thres=0.25, iou_thres=0.45, max_det=1000, device=, view_img=False, save_txt=False, save_csv=False, save_conf=False, save_crop=False, nosave=False, classes=None, agnostic_nms=False, augment=False, visualize=False, update=False, project=runs/detect, name=exp, exist_ok=False, line_thickness=3, hide_labels=False, hide_conf=False, half=False, dnn=False, vid_stride=1
YOLOv5 ⚡ v7.0-283-g975d9278 Python-3.8.10 torch-2.2.0 CPU
```

```

Fusing layers...
YOLOv5s summary: 213 layers, 722585 parameters, 0 gradients, 16.4 GFLOPs
Image 1/1 /yolov5/data/images/zidane.jpg: 384x640 2 persons, 2 ties, 1112.5ms
Speed: 12.0ms pre-process, 1112.5ms inference, 12.8ms NMS per image at shape (1, 3, 640, 640)
Results saved to runs/detect/exp4
```

```

sh-5.0#
```