Jetson Nano

Setup & Installation

【110上】嵌入式系統技術實驗課程

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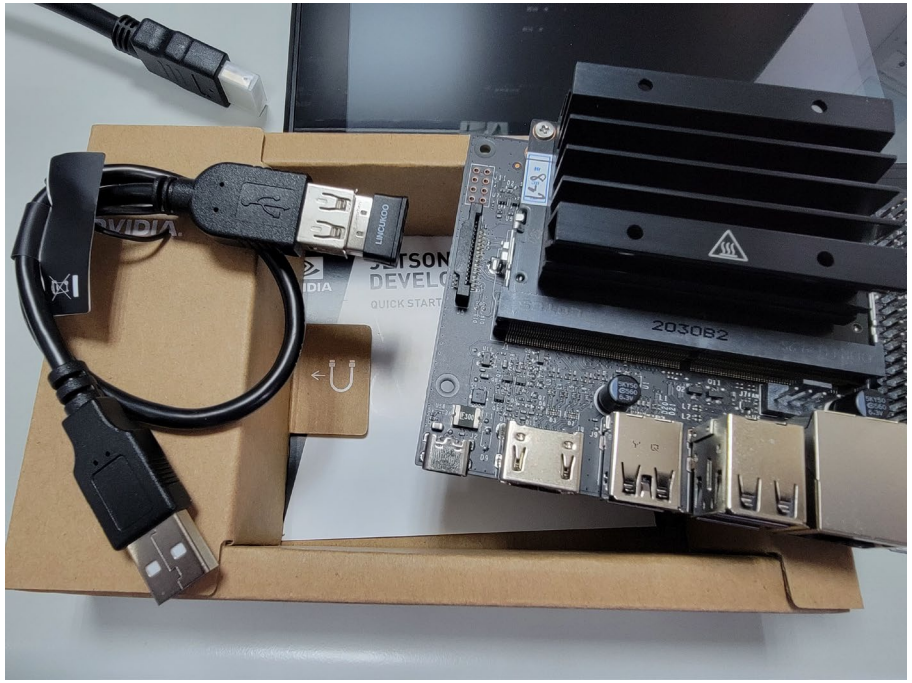
Check Your Equipments

- Check if you miss anything

A 32G micro-SD card and a webcam

7-inch Touch Screen



USB-C Power Adapter

HDMI to mini-HDMI
(Not needed for Nano)

Micro USB cable & Wi-Fi card

Jetson Nano

HDMI Cable & Monitor Power Cable

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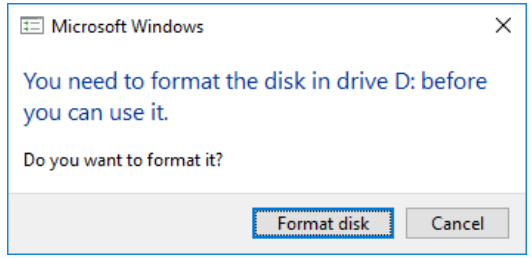
Flash Image

- All details for different OS can be found here:
  - https://developer.nvidia.com/embedded/learn/get-started-jetson-nano-2gb-devkit#write
  - Don’t use the NVIDIA official image. Download this system image I prepared instead (Almost 10GB, NYCU G-Suite required), the flashing process is the same
  - Flash image with Windows is easier and much recommended
  - For Windows user, after you format with SD Card Formatter, during Etcher flash process, if you see some windows pop up like this, just cancel all of them, do not format disk again.



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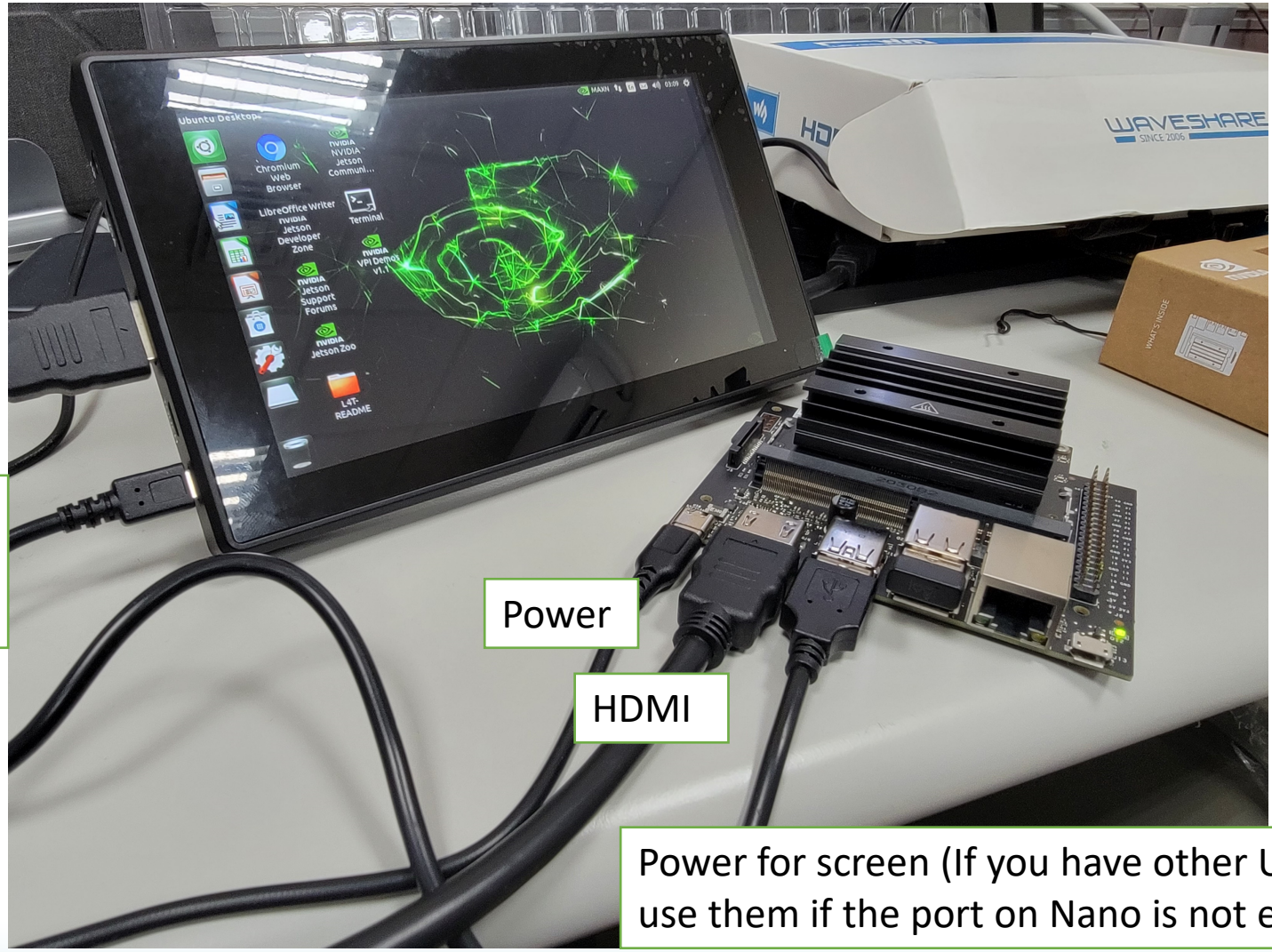
Check Your Setup

- Basic setup looks like this

Do not place the board on metal surface

Here I power monitor with Nano.
If you want to use touch screen, you need another cable.



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Login System

- Remember do not place the board on metal surface to prevent short circuit.
- The Ubuntu installation settings are already done for you, along with some time-consuming process, so just insert SD-card and connect the power cable, you should see the desktop soon
  - There is no on/off switch, connect power and it will turn on.
  - Jetson Nano can be used like a single board computer just like Raspberry Pi.
- If everyone in your group are terrified by Linux system, then you can stop at this point. We will have Lab in person next time, where you can ask TAs for details.

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About This Ubuntu Image

- Start from this page, I assume you are comfortable using Linux
- This embedded operating system is based on Ubuntu 18.04, the SoC is ARM64 architecture
- The username and sudo password are both jetson
- For your final project, you can install whatever software and packages when needed, just keep in mind the disk space on embedded system is precious so get used to it.
  - Use *df –h* command to check the spare space in filesystem, you should have about 5GB available at start
- The image provided is pre-installed with several DNN frameworks and tools:
  - JetPack 4.6.0
  - OpenCV 4.5.3
  - TensorFlow 2.4.1
  - TensorFlow Addons 0.13.0-dev
  - Pytorch 1.9.0
  - TorchVision 0.10.0
  - LibTorch 1.9.0
  - ncnn 20210720
  - MNN 1.2.1
  - JTOP 3.1.1

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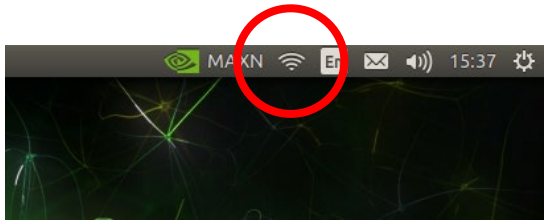
Install PyQt

- Connect to the Internet with Wi-Fi card we provided or Ethernet cable
  - Wi-Fi setting is right to the MAXN button on top right corner



  - Right click on desktop and select “Open Terminal”, and install packages with these commands
    - If asked, the sudo password is jetson

```
sudo apt-get update
sudo apt-get -y install build-essential
sudo apt-get –y install qt5-default
sudo apt-get –y install python3-pyqt5
sudo apt-get install python3-pyqt5.qtmultimedia

# if pip3 needs fix use this command:
pip3 install --upgrade pip
```

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About Python

- For Linux system, you need to specify python3 and pip3 for all python or pip commands.
  - Normally pip3 is enough to install Python packages, but sometimes if not success, you may need to Google it with Jetson Nano include in your keyword to find the solution.
- Verify your python package, for example OpenCV and PyQt

```
# Enter Python3 interpreter
python3

# Inside python3 interpreter

import cv2
cv2.__version__

from PyQt5.QtCore import QT_VERSION_STR
QT_VERSION_STR
```

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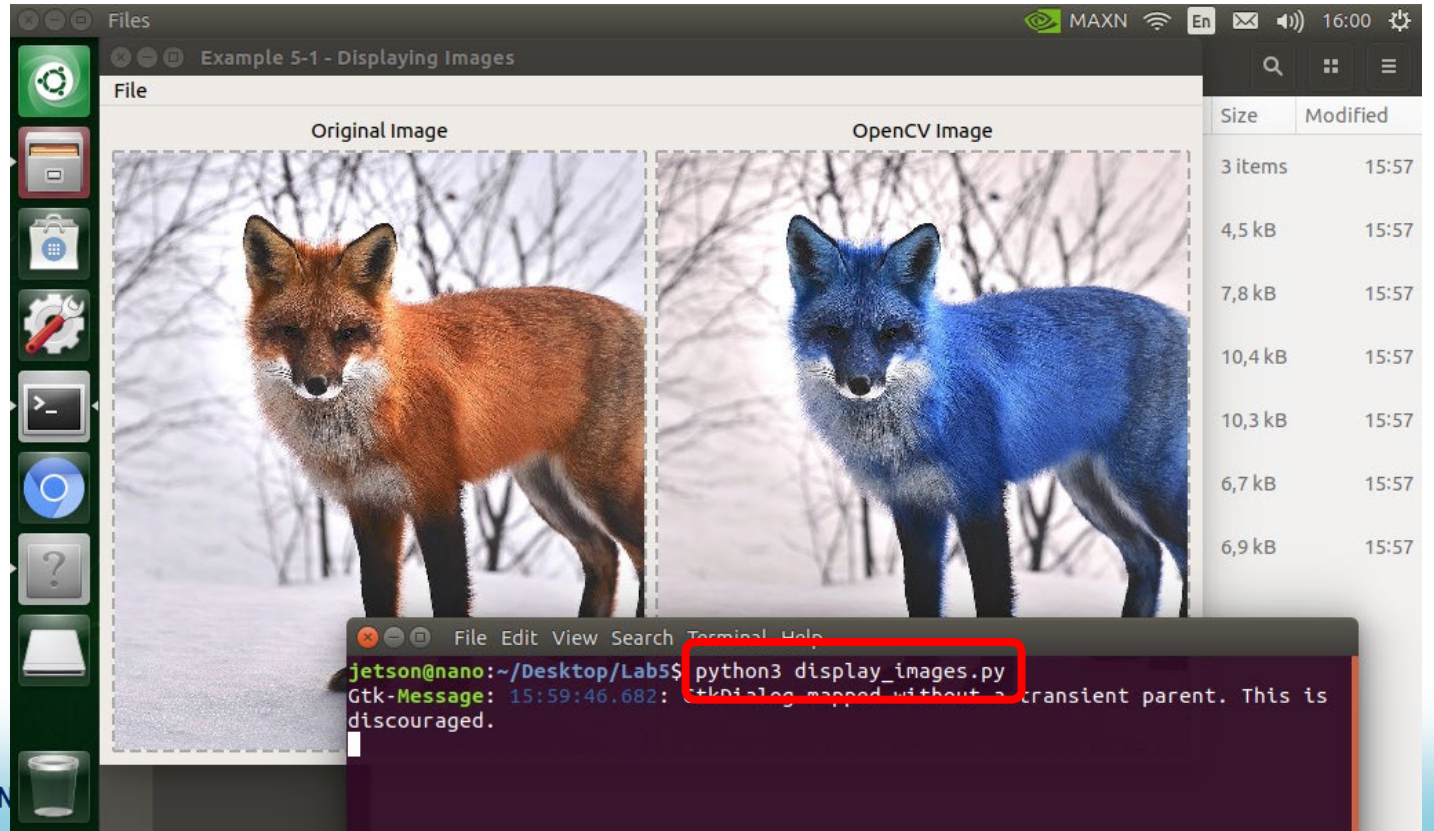
About Python

- Feel free to try previous lab programs on Nano, there are several ways to transfer data to Nano: you can just download them from NewE3, use a USB drive, or SFTP which we will discuss next time
  - Remember to use python3 to run your code



OpenCV + TensorFlow Problem

- Just a small reminder, if your project requires TensorFlow, remember always import cv2 first

```
# Error
import tensorflow
import cv2

# OK
import cv2
import tensorflow
```

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Q&A

- Start from this time, most Lab will be group project, and the time limit will be one week or more, we may change this policy based on every groups' performance.
  - During Lab time you can come to ED414/417 to ask problem in person.
- If you have question, other than sending email to TAs, you can also leave it on Teams, see if anyone have the same problem or how do they solve it.

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