



KD240 Face Detect

Field Application Engineer

Adaptive and Embedded Computing Group (AECG)

Revision History

Date	Version	Description
01/26/24	1.1	Add missing step in page 7.
12/21/23	1.0	Initial version for flow introduction.

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KD240 Face Detect

1. 先從以下網站安裝 KD240 的 Ubuntu 22.04

[Install Ubuntu on AMD | Ubuntu](#)

CHOOSE A BOARD

Kria™ K24 SOMs

Kria™ K26 SOMs

Zynq™ UltraScale+™ MPSoC
Development Boards

Versal™ Adaptive SoC Evaluation
Kit

Kria™ K24 SOMs
(KD240)



Ubuntu Server 22.04

The version of optimised Ubuntu Server 22.04 is beta for now, the certified version is coming soon.

Works on:

✓ AMD Kria™ KD240 Drives Starter Kit

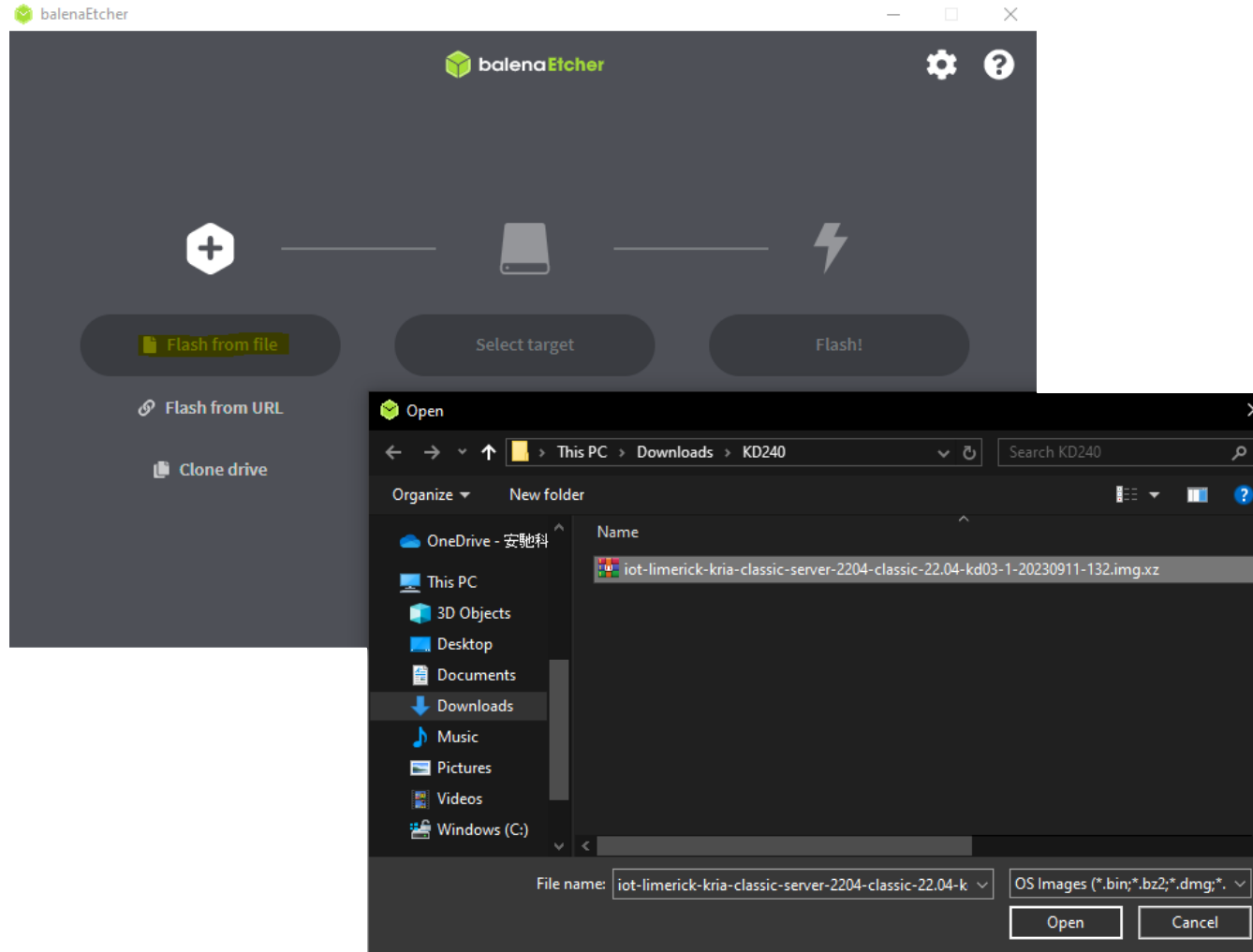
① Please check the [AMD Kria™ Wiki](#) for the platform's latest boot firmware, technical documentation, and the [Ubuntu for AMD-Xilinx Devices Wiki](#) for known issues and limitations.

[Download 22.04](#)

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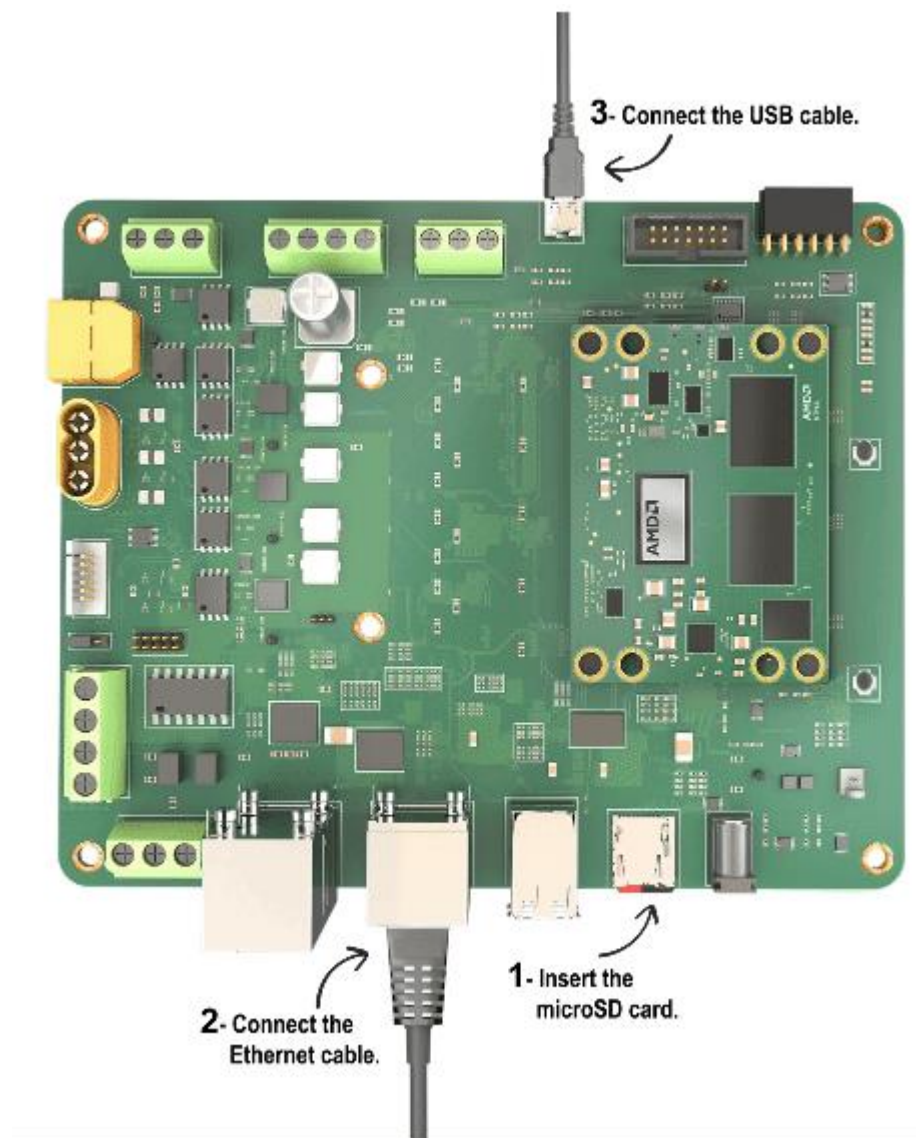
2. 使用 balenaEtcher 燒錄到 SD Card 內

[Setting up the SD Card Image \(xilinx.com\)](https://www.xilinx.com)



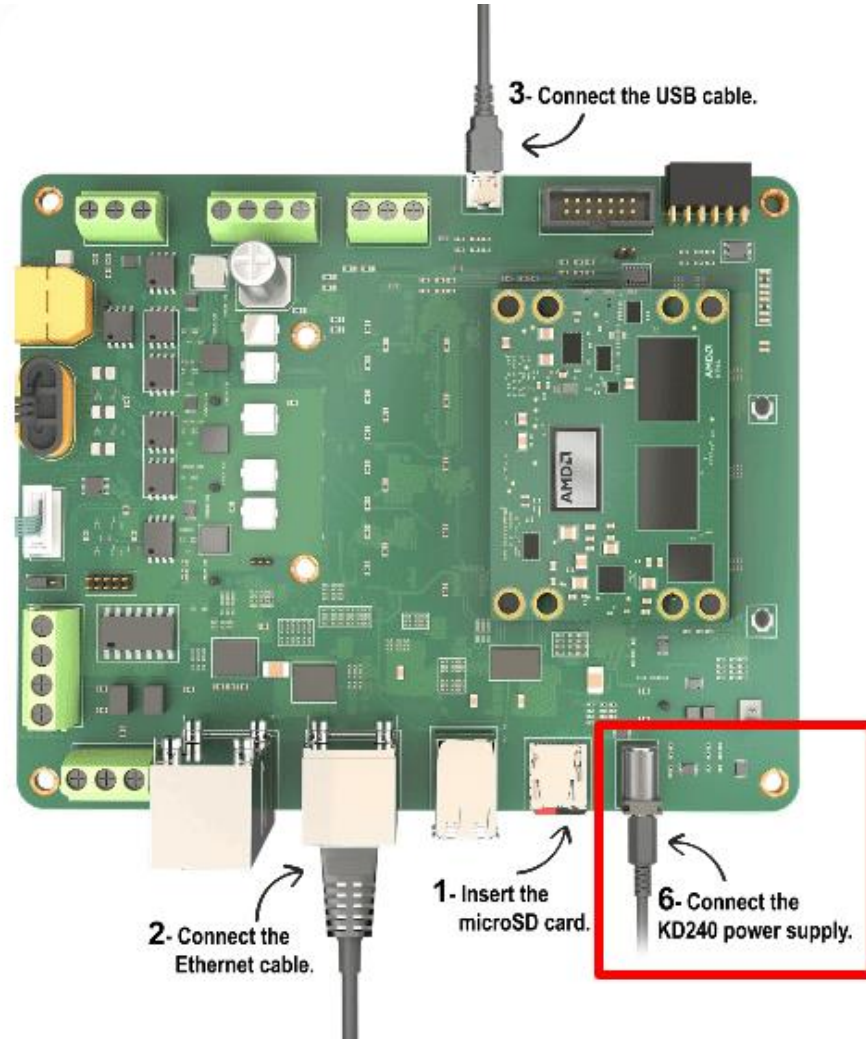
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3. 依照下面方式插入到 KD240 的 SD Card 槽中



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4. 上電並透過 MobaXterm 與 KD240 透過 UART 溝通



```
2. COM17 (USB Serial Port (COM1) x +
kria login: ubuntu
Password:
You are required to change your password immediately (administrator enforced).
Changing password for ubuntu.
Current password:
New password:
Retype new password:
Welcome to Ubuntu 22.04.3 LTS (GNU/Linux 5.15.0-9002-xilinx-zynqmp aarch64)

* Documentation: https://help.ubuntu.com
* Management: https://landscape.canonical.com
* Support: https://ubuntu.com/advantage

System information as of Thu Dec 21 05:15:06 UTC 2023

System load: 0.11962890625    Processes:           122
Usage of /: 6.2% of 28.21GB    Users logged in:     0
Memory usage: 10%             IPv4 address for eth0: 10.8.3.232
Swap usage: 0%

Expanded Security Maintenance for Applications is not enabled.

1 update can be applied immediately.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
```

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5. 登入帳號與密碼皆為 `ubuntu`，第一次輸入密碼後會叫你改成自己的密碼
6. 登入後一定要先進行以下指令

Update Ubuntu package

- ▣ `sudo apt update`

- ▣ `sudo apt upgrade`

`git clone https://github.com/Xilinx/Kria-PYNQ.git`

`cd Kria-PYNQ`

更改 `install.sh` 242 行 ---> `cp -r pynq_dpu/kd240_notebooks /root/jupyter_notebooks/`

`sudo bash install.sh -b KD240`



**ONE HOUR
LATER...**

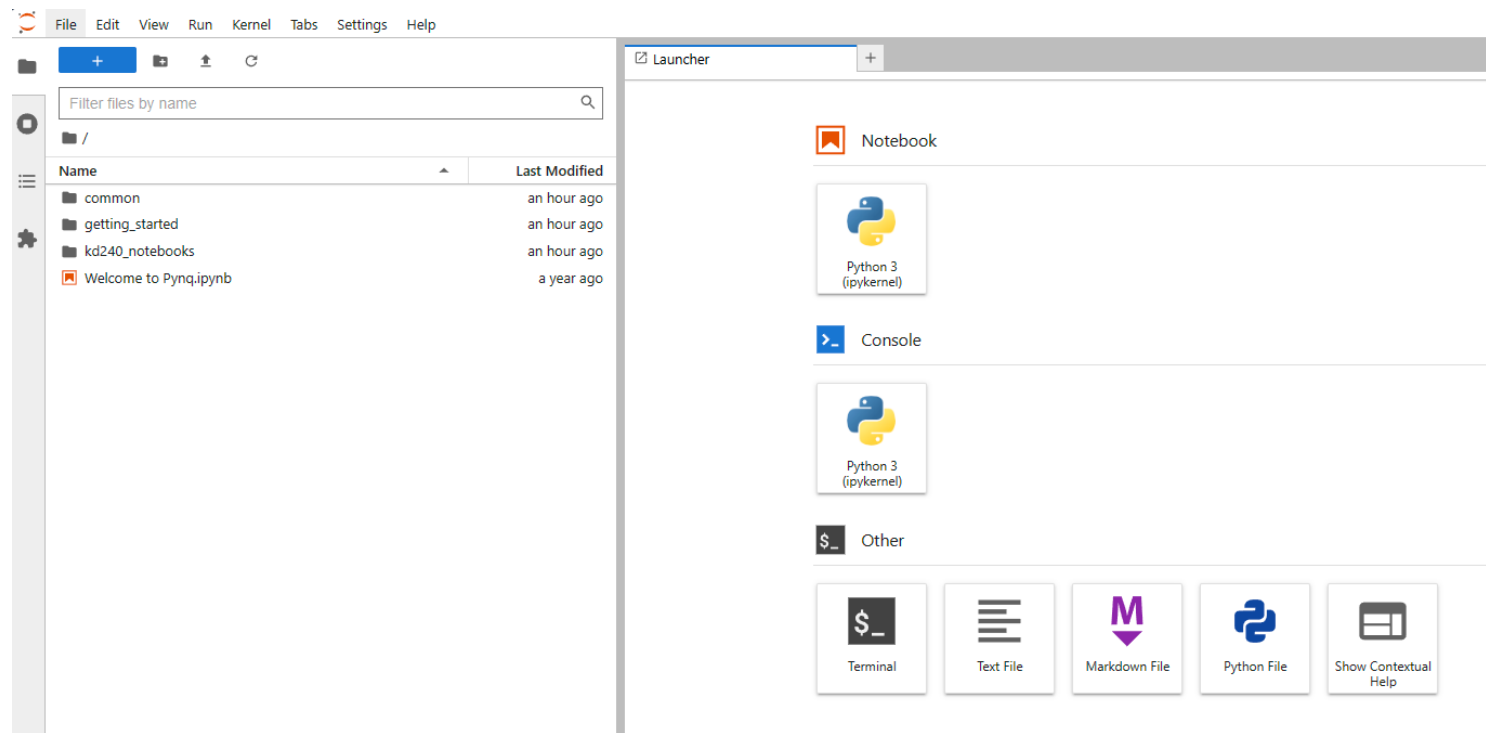
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8. 安裝結束且成功後看到以下訊息

```
Installing collected packages: tomli, pluggy, iniconfig, exceptiongroup, pytest
Successfully installed exceptiongroup-1.2.0 iniconfig-2.0.0 pluggy-1.3.0 pytest-7.4.3 tomli-2.0.1
PYNQ Installation completed.

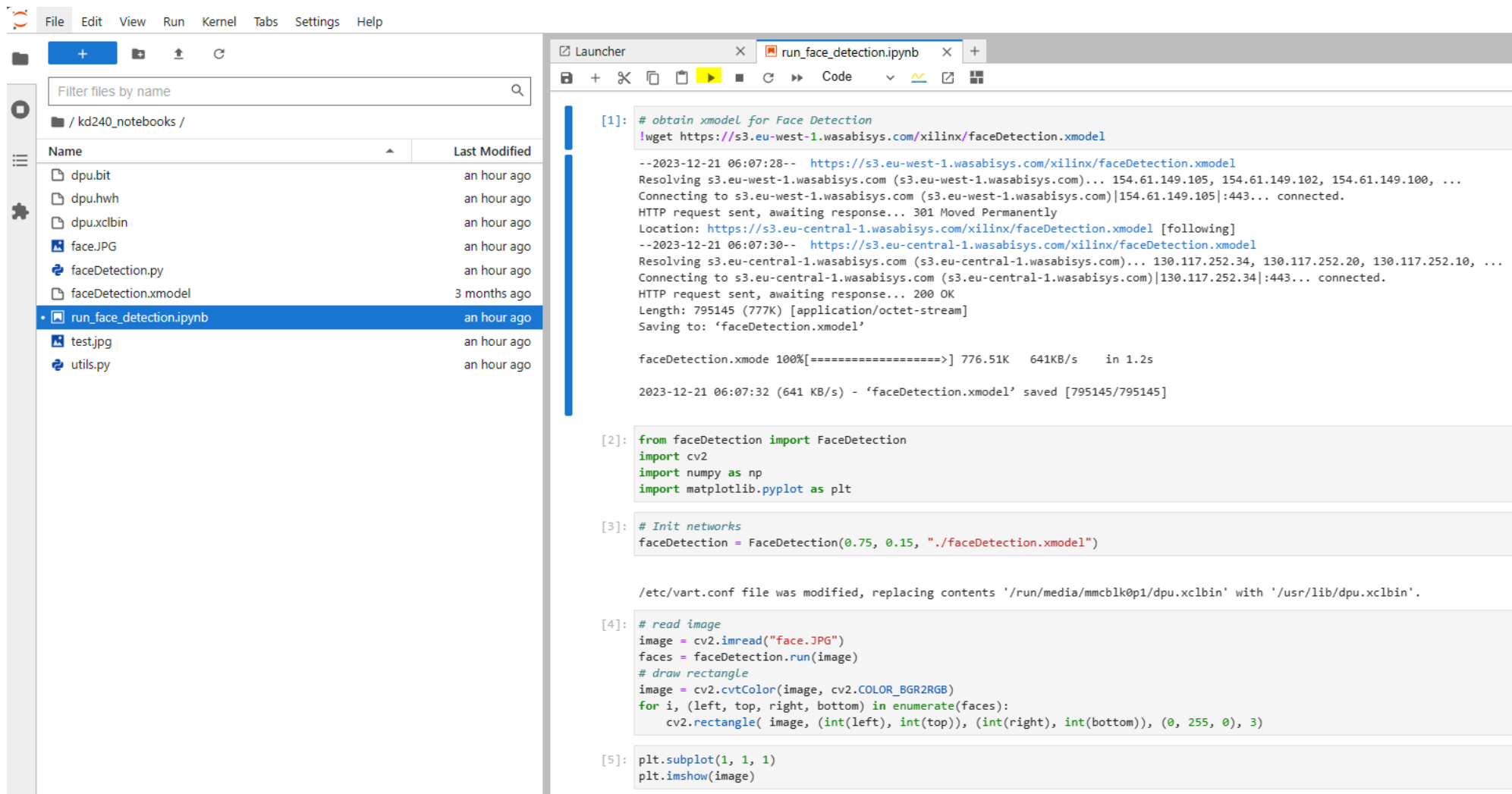
To continue with the PYNQ experience, connect to JupyterLab via a web browser using this url: 10.8.3.232:9090/lab or k
ria:9090/lab - The password is xilinx
```

9. 在電腦上輸入黃字給予的網址 e.g., 10.8.3.232:9090/lab，並輸入密碼：xilinx 後會看到



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10. 點開 kd240_notebooks，再點開 run_face_detection.ipynb，可以發現會去呼叫 faceDetection.py，並且在 faceDetection.py 中會再去呼叫 utils.py，可以點選圖中黃色撥放鍵逐一執行程式



```
[1]: # obtain xmodel for Face Detection
!wget https://s3.eu-west-1.amazonaws.com/xilinx/faceDetection.xmodel

--2023-12-21 06:07:28-- https://s3.eu-west-1.amazonaws.com/xilinx/faceDetection.xmodel
Resolving s3.eu-west-1.amazonaws.com (s3.eu-west-1.amazonaws.com)... 154.61.149.105, 154.61.149.102, 154.61.149.100, ...
Connecting to s3.eu-west-1.amazonaws.com (s3.eu-west-1.amazonaws.com)|154.61.149.105|:443... connected.
HTTP request sent, awaiting response... 301 Moved Permanently
Location: https://s3.eu-central-1.amazonaws.com/xilinx/faceDetection.xmodel [following]
--2023-12-21 06:07:30-- https://s3.eu-central-1.amazonaws.com/xilinx/faceDetection.xmodel
Resolving s3.eu-central-1.amazonaws.com (s3.eu-central-1.amazonaws.com)... 130.117.252.34, 130.117.252.20, 130.117.252.10, ...
Connecting to s3.eu-central-1.amazonaws.com (s3.eu-central-1.amazonaws.com)|130.117.252.34|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 795145 (777K) [application/octet-stream]
Saving to: 'faceDetection.xmodel'

faceDetection.xmodel 100%[=====] 776.51K  641KB/s  in 1.2s

2023-12-21 06:07:32 (641 KB/s) - 'faceDetection.xmodel' saved [795145/795145]

[2]: from faceDetection import FaceDetection
import cv2
import numpy as np
import matplotlib.pyplot as plt

[3]: # Init networks
faceDetection = FaceDetection(0.75, 0.15, "./faceDetection.xmodel")

/etc/vart.conf file was modified, replacing contents '/run/media/mmcblk0p1/dpu.xclbin' with '/usr/lib/dpu.xclbin'.

[4]: # read image
image = cv2.imread("face.JPG")
faces = faceDetection.run(image)
# draw rectangle
image = cv2.cvtColor(image, cv2.COLOR_BGR2RGB)
for i, (left, top, right, bottom) in enumerate(faces):
    cv2.rectangle( image, (int(left), int(top)), (int(right), int(bottom)), (0, 255, 0), 3)

[5]: plt.subplot(1, 1, 1)
plt.imshow(image)
```

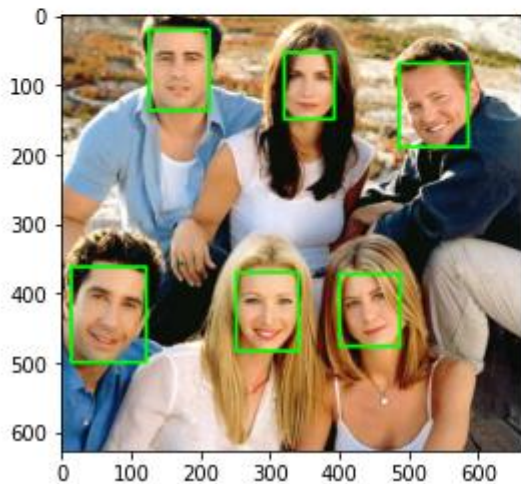
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11. 最後可以發現結果會顯示在畫面上，並且可以自己抓圖片來做測試

```
[4]: # read image
image = cv2.imread("face.JPG") → 改這行換要測試的圖片
faces = faceDetection.run(image)
# draw rectangle
image = cv2.cvtColor(image, cv2.COLOR_BGR2RGB)
for i, (left, top, right, bottom) in enumerate(faces):
    cv2.rectangle( image, (int(left), int(top)), (int(right), int(bottom)), (0, 255, 0), 3)
```

```
[5]: plt.subplot(1, 1, 1)
plt.imshow(image)
```

```
[5]: <matplotlib.image.AxesImage at 0xffff569bb730>
```





APPENDIX: Code Flow

