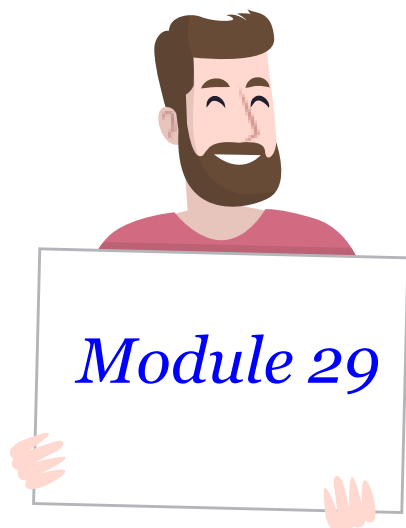




OpenVino介紹與安裝實務



designed by  freepik

Estimated time:
45 min.



資訊工業策進會 Institute for Information Industry

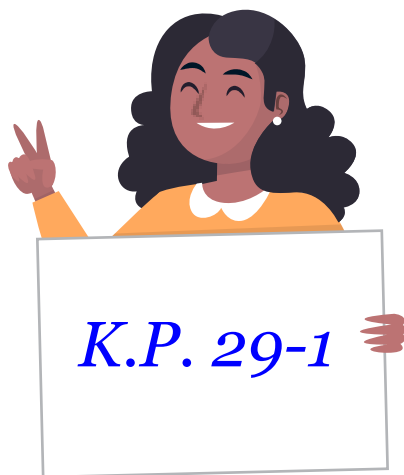
學習目標

- 29-1:OpenVino入門
- 29-2:OpenVino安裝
- 29-3:OpenVino對Intel GPU的支援



29-1: OpenVino入門

- OpenVino介紹
- OpenVino支援的框架
- OpenVino的運作架構



designed by freepik

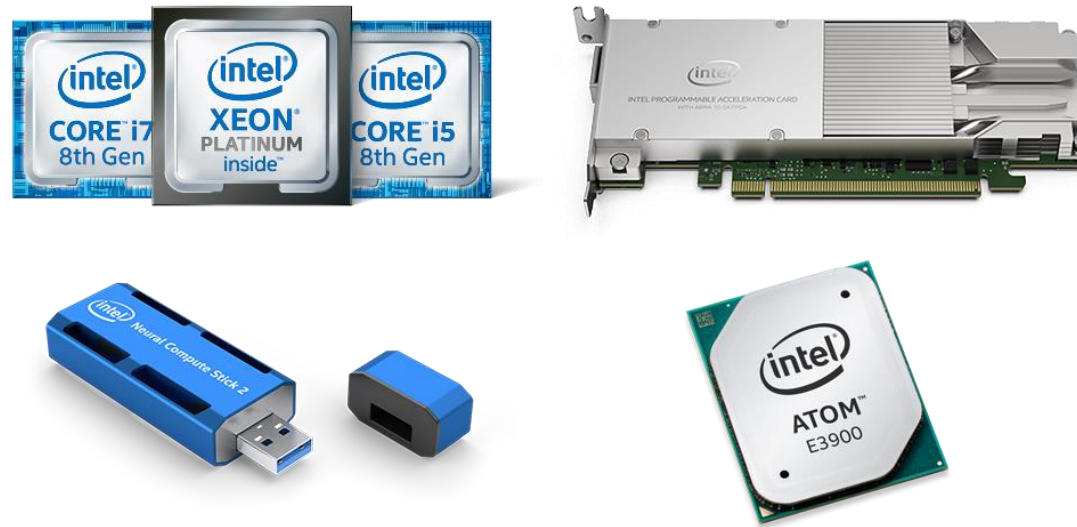
OpenVino介紹

- 是由Intel於2018所發布的開源電腦視覺推論及神經網路工具包，全名為Open Visual Inference and Neural network Optimization
- 可完美整合OpenCV，使得影像識別應用的開發更為方便，且透過特有的優化器使得影像推論等效率更加提升



OpenVino介紹

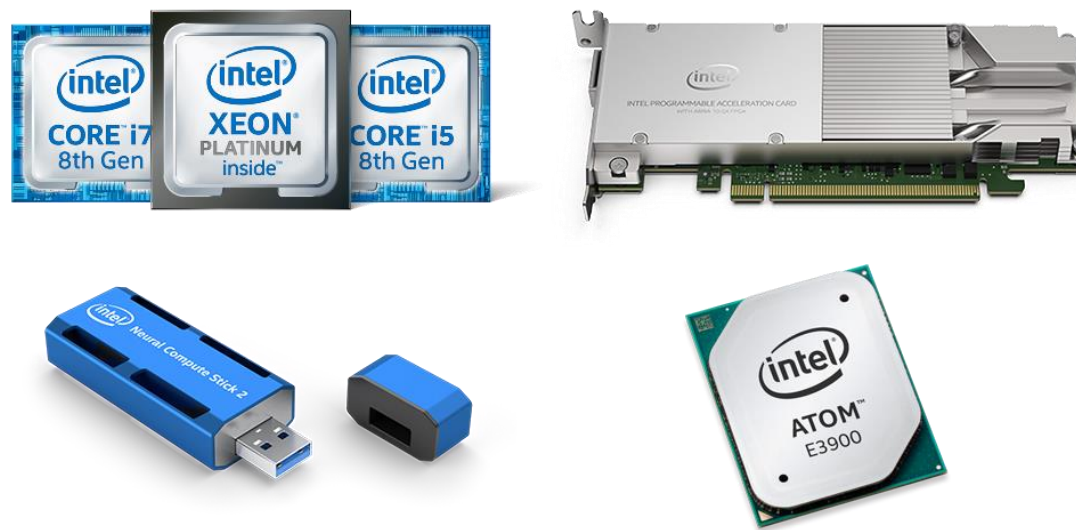
- OpenVino是跨平台的套件，支援系統從Windows、Mac OS、Linux等傳統PC平台，甚至到Raspbian等邊緣裝置系統也可使用
- 目前支援C++與Python等程式語言



圖片來源: <https://software.intel.com/en-us/openvino-toolkit/hardware>

OpenVino介紹

- 支援Intel自家的GPU、FPGA晶片進行加速，大幅降低對高價GPU的依賴
- 透過Movidius運算棒等硬體或特定ATOM的IPU晶片，大幅提升在邊緣裝置上的執行效能



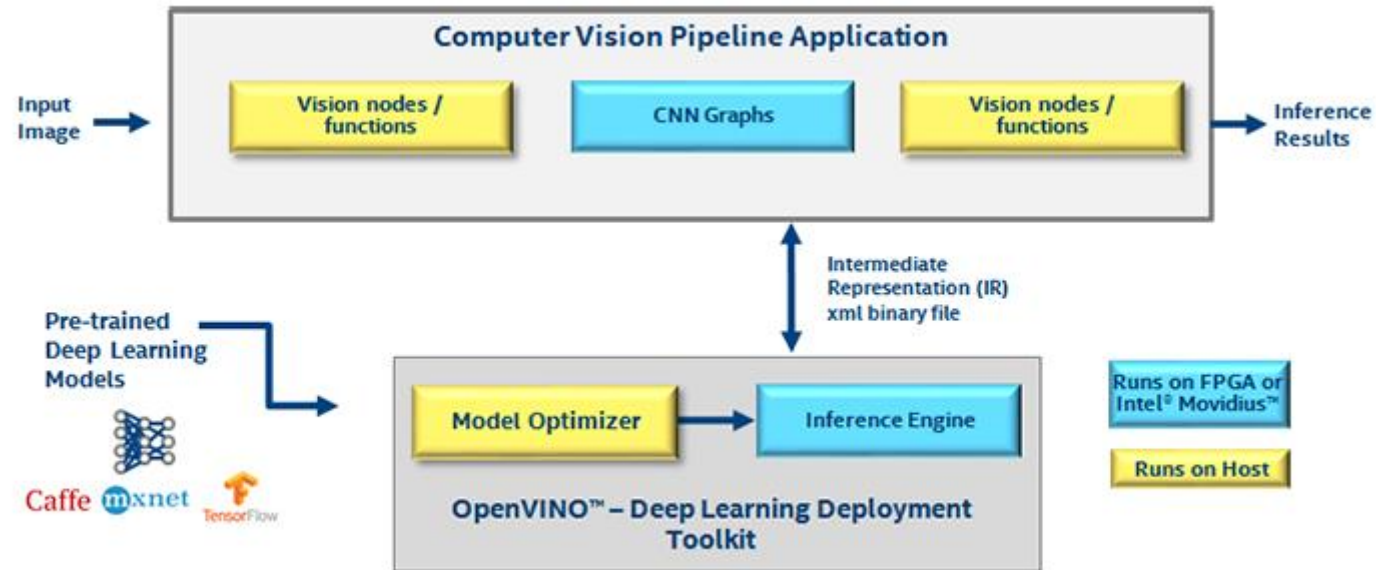
圖片來源: <https://software.intel.com/en-us/openvino-toolkit/hardware>

OpenVino支援的框架

- 可以與Intel自家的深度學習工具nGraph結合使用，且相容於市面上多數主流的深度學習框架
- 支援的框架有：
 - Caffe
 - TensorFlow
 - MXNet
 - Kaldi
 - ONNX

OpenVino的運作架構

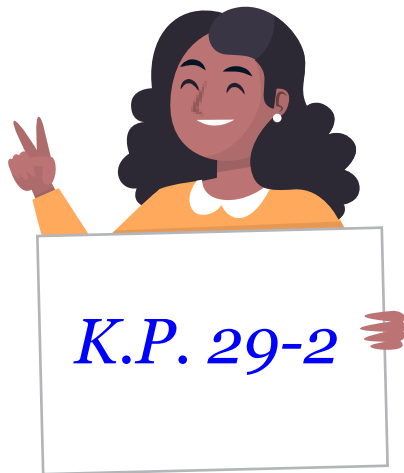
- 運作架構圖



圖片來源: <https://software.intel.com/en-us/openvino-toolkit/deep-learning-inference>

29-2: OpenVino 安裝

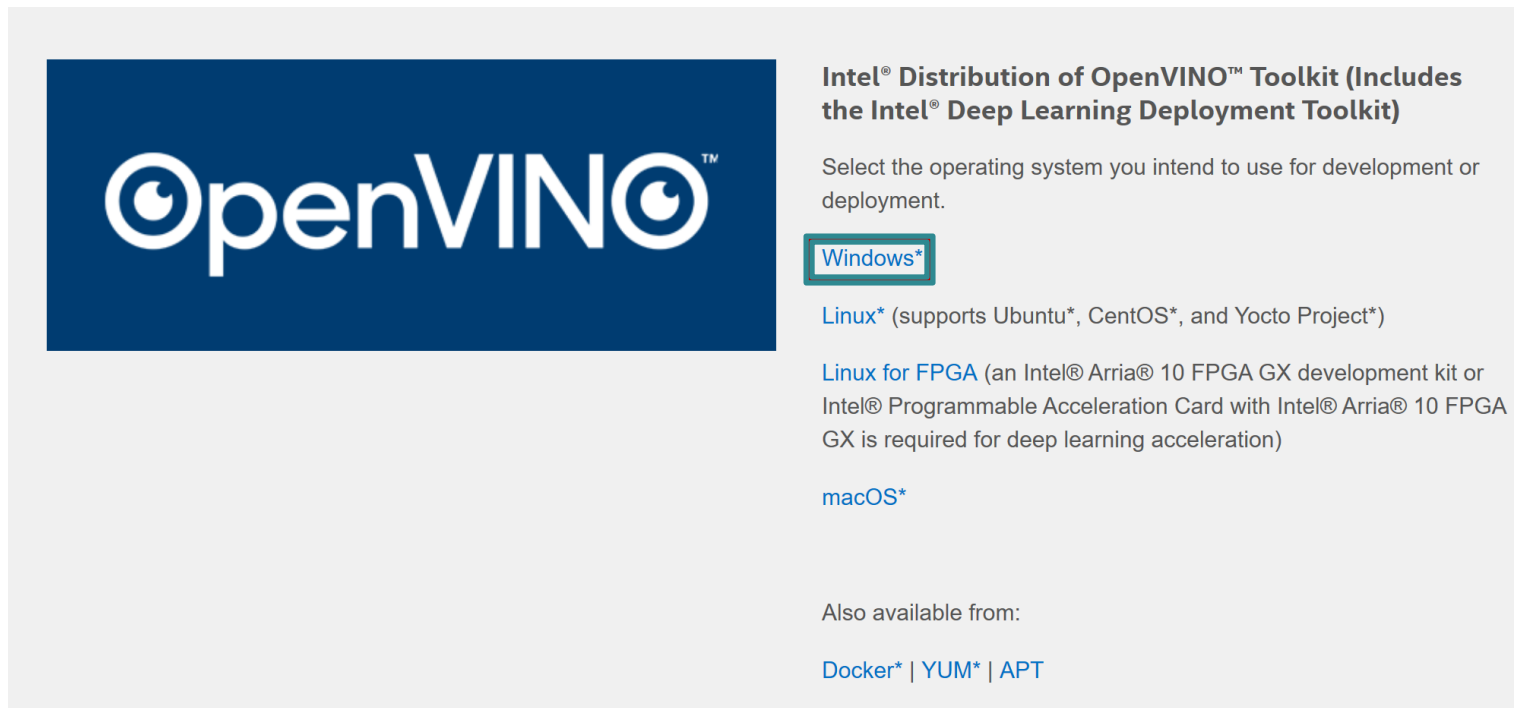
- 安裝包下載
- 執行安裝
- 驗證安裝與編譯範例
- 對Intel GPU的支援設定



designed by freepik

安裝包下載

- 連線至
 - <https://software.intel.com/en-us/openvino-toolkit/choose-download/>
- 請選擇安裝的系統(本範例以Windows為例)



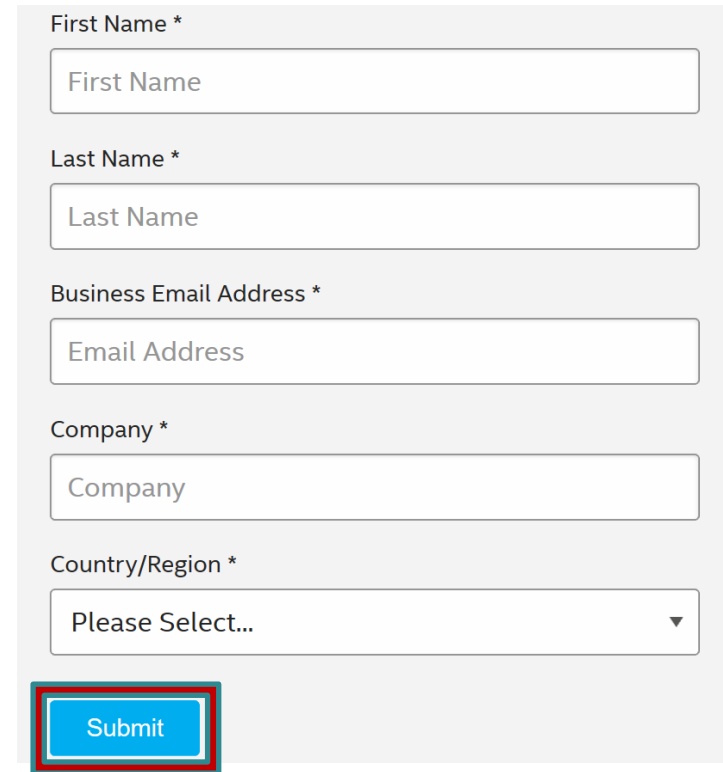
安裝包下載

- 點選藍色的“ Register & Download”按鈕



安裝包下載

- 於表單填入姓名、信箱等資等資訊
- 資料輸入完畢後按下”Submit”



First Name *

Last Name *

Business Email Address *

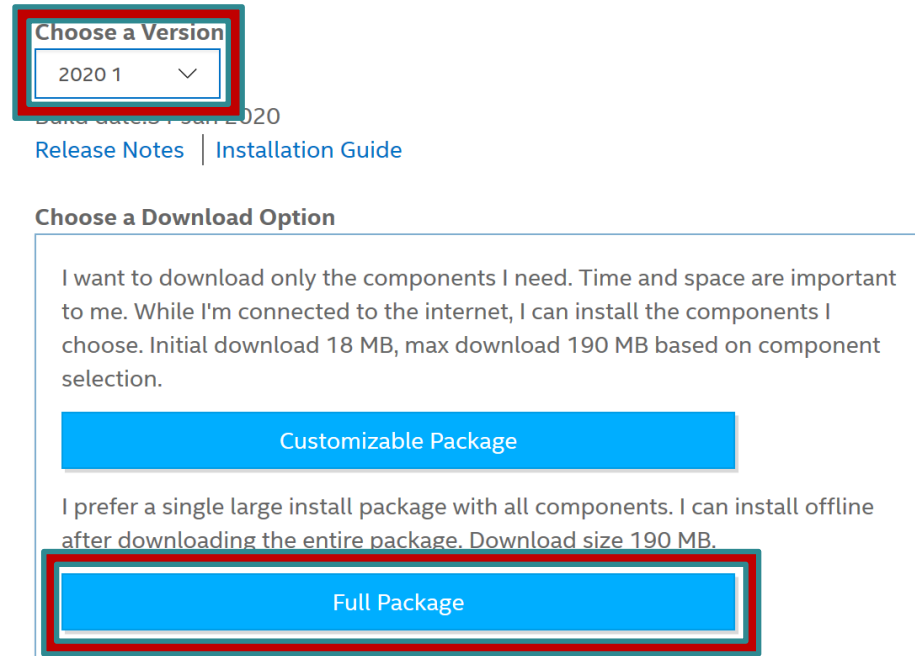
Company *

Country/Region *

Submit

安裝包下載

- 選擇版本(建議與本範例相同)
- 下載選項請選擇”Full Package”



The screenshot displays a web interface for downloading software. At the top, a section titled "Choose a Version" contains a dropdown menu with "2020 1" selected. Below this, there are links for "Release Notes" and "Installation Guide". The main section is titled "Choose a Download Option" and contains two choices. The first choice, "Customizable Package", is described as being for users who want to download only the components they need, with an initial download of 18 MB and a maximum of 190 MB. The second choice, "Full Package", is described as being for users who prefer a single large install package with all components, with a download size of 190 MB. The "Full Package" button is highlighted with a red border.

Choose a Version

2020 1 ▾

[Release Notes](#) | [Installation Guide](#)

Choose a Download Option

I want to download only the components I need. Time and space are important to me. While I'm connected to the internet, I can install the components I choose. Initial download 18 MB, max download 190 MB based on component selection.

Customizable Package

I prefer a single large install package with all components. I can install offline after downloading the entire package. Download size 190 MB.

Full Package

執行安裝

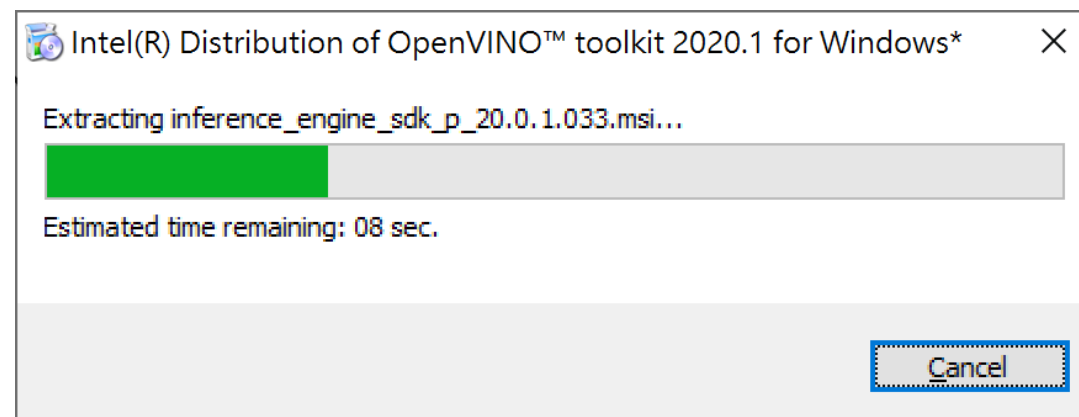
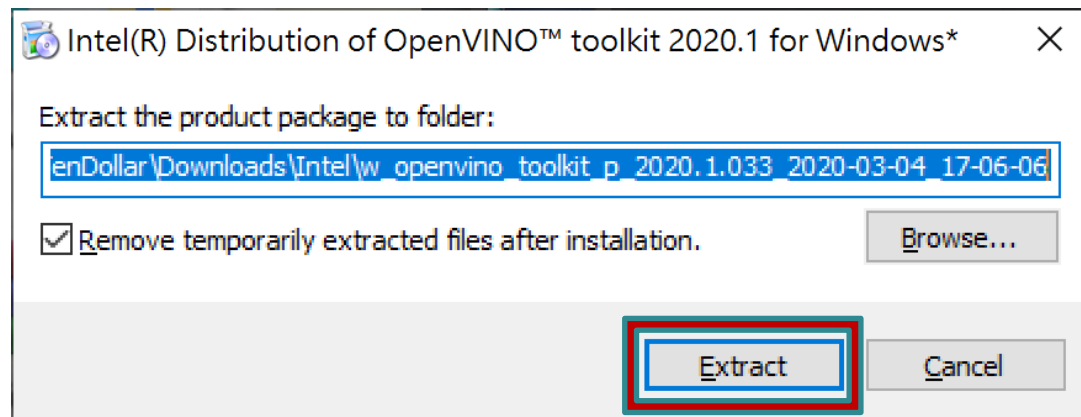
- 請到下載目錄執行剛下載好的安裝包



w_openvino_toolkit_p
_2020.1.033.exe

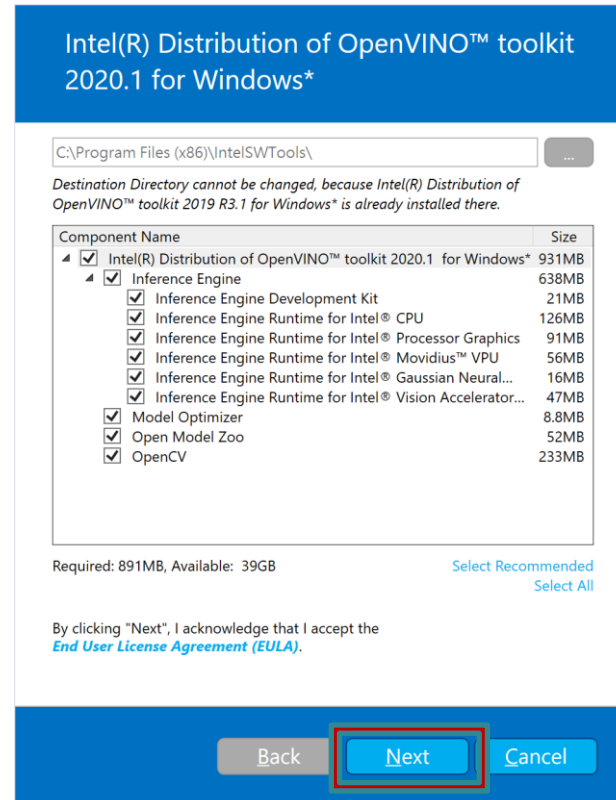
執行安裝

- 點選“ **Extract**”按鈕啟動安裝程式
- 等待解壓縮完，安裝程式就會啟動



執行安裝

- 這邊請維持全選狀態直接下一步



執行安裝

- 選擇同意條款後點選下一步

Intel(R) Distribution of OpenVINO™ toolkit
2020.1 for Windows*

Intel® Software Improvement Program (Windows) [Learn more](#)

To improve our software and customer experience, Intel would like to collect technical information about your software installation and runtime status (such as installation metrics, license/support types, software SKU/serial, counters, flags, and timestamps) and development environment (such as operating system, CPU architecture, last 4-digits of the MAC address and other Intel products installed). ("Information").

Intel may collect this Information directly or optionally through the use of Google Analytics. If Google Analytics is used to collect the Information, Google will aggregate the Information with that of other users and present the aggregated results to Intel without any personal identifiers. Information collected by Google will be retained by Google under its own data collection policies (<https://www.google.com/policies/privacy/partners/>).

The Information collected under this notice directly by Intel through its Intel® Software Improvement Program may be retained indefinitely but it will not be shared outside of Intel or its wholly-owned subsidiaries.

The aggregated Information provided to Intel by Google through its Software Improvement Program may be retained by Intel indefinitely but it will not be shared outside of Intel or its wholly-owned subsidiaries.

You can revoke your consent at any time by choosing "Improvement Program Options" in the "Settings" tab of the Intel® Software Manager and selecting the "I do NOT consent to the collection of my Information" option.

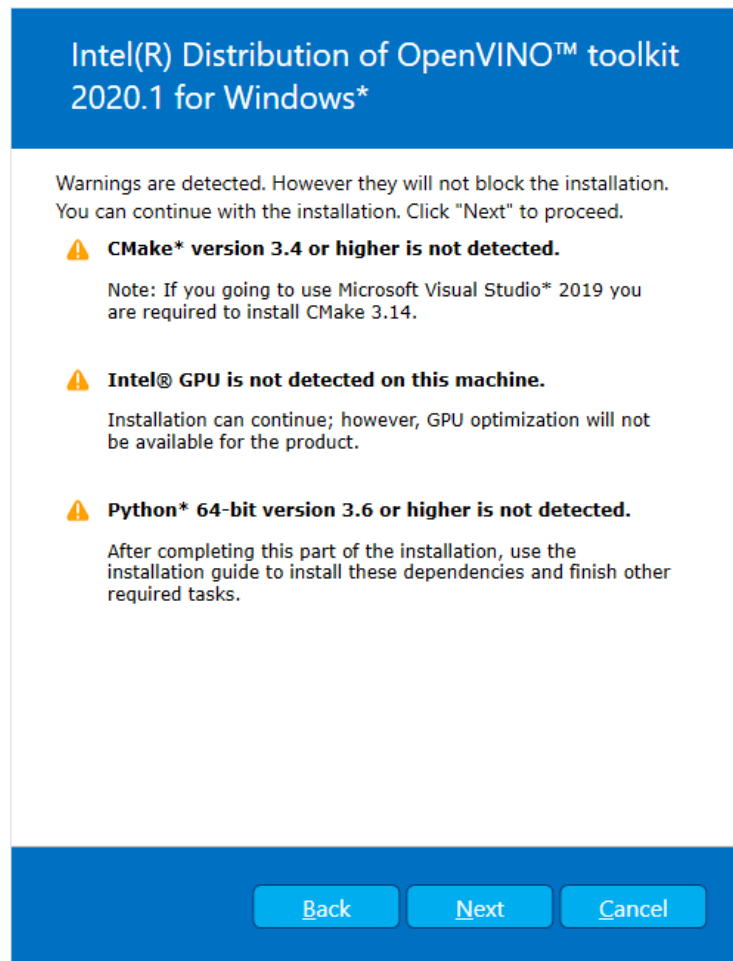
For more details, please refer to this article: (<https://software.intel.com/en-us/articles/software-improvement-program>)

☒ I consent to the collection of my Information
☐ I do NOT consent to the collection of my Information

Back Next Cancel

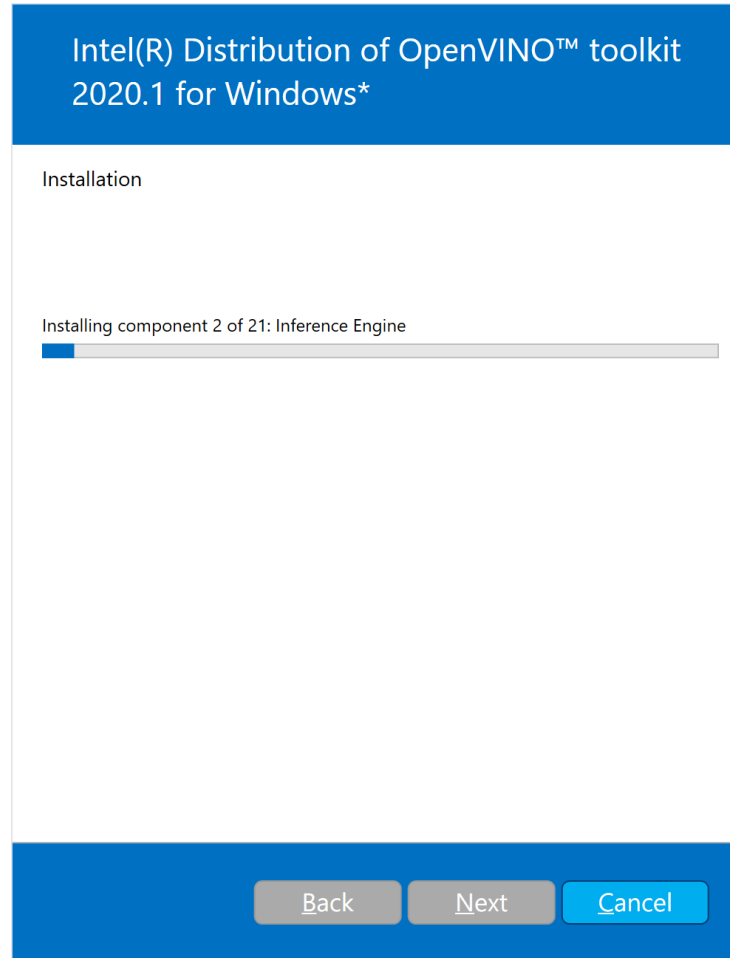
執行安裝

- 記下缺少的套件，於安裝結束後再補安裝



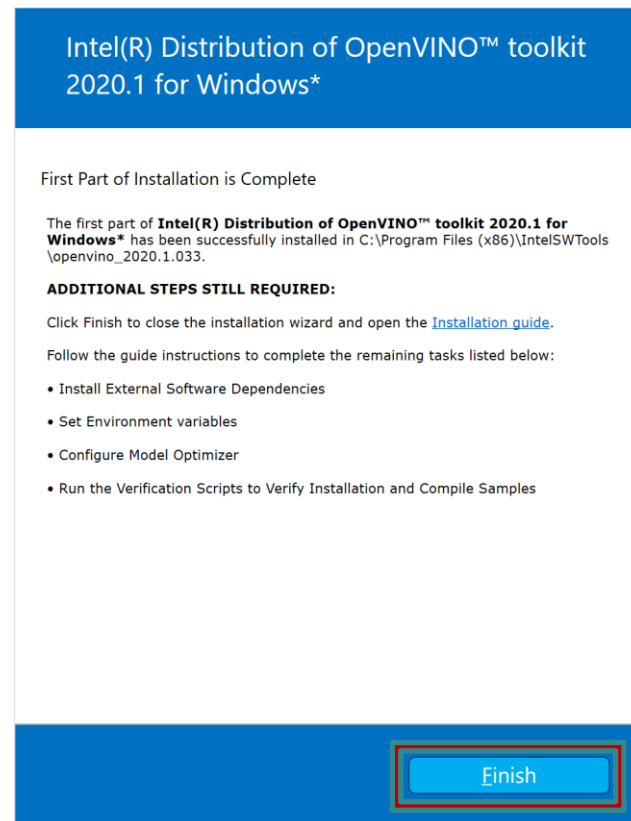
執行安裝

- 等候安裝完畢



執行安裝

- 安裝完畢後按下”Finish”結束安裝程式
- 若有要求重新開機，請重新開機後再進行缺少套件的安裝

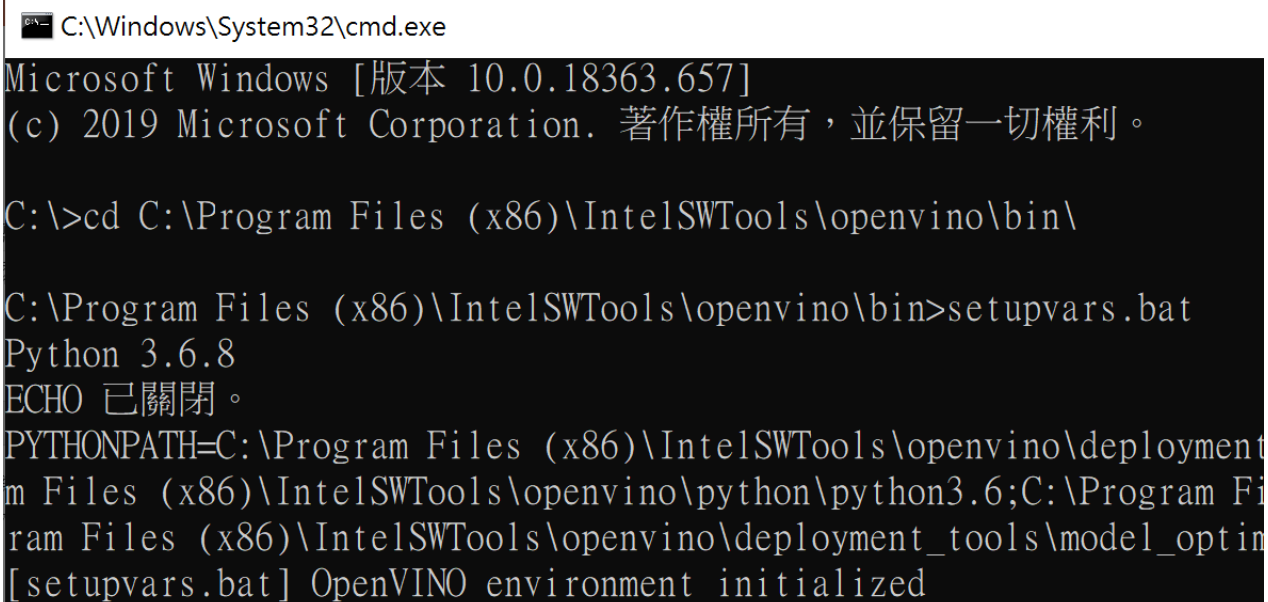


執行安裝

- 根據剛剛的提示安裝以下缺少的套件
 - Microsoft Visual Studio with C++ 2019, 2017, or 2015 with MSBuild(<http://visualstudio.microsoft.com/downloads/>)
 - CMake 3.4 or higher 64-bit(<https://cmake.org/download/>)
 - 註: 若使用Visual Studio 2019版本, Cmake版本請選用3.14以上
 - Python 3.6.5 64-bit(<https://www.python.org/downloads/release/python-365/>)

驗證安裝與編譯範例

- 請開啟**CMD**輸入以下指令切換到安裝目錄
 - **cd C:\Program Files (x86)\IntelSWTools\openvino\bin**
 - (如果你有更改安裝目錄，請自行修正位置)
- 執行環境設定
 - **setupvars.bat**



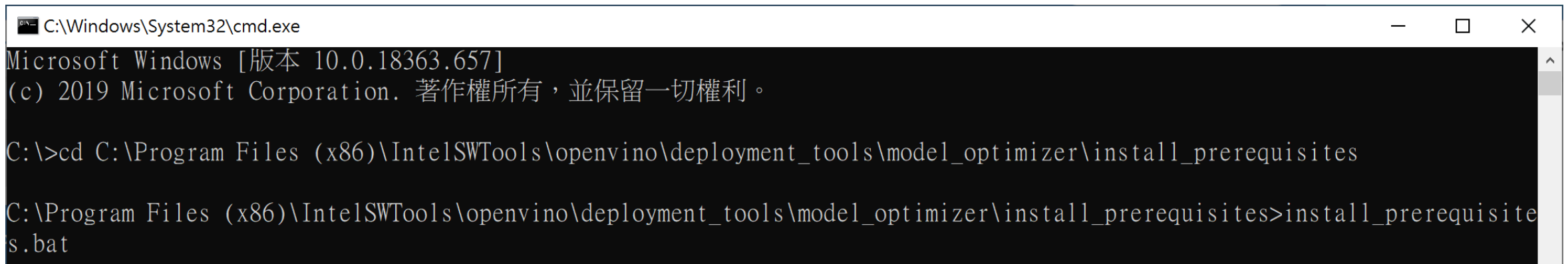
```
C:\Windows\System32\cmd.exe
Microsoft Windows [版本 10.0.18363.657]
(c) 2019 Microsoft Corporation. 著作權所有，並保留一切權利。

C:\>cd C:\Program Files (x86)\IntelSWTools\openvino\bin\

C:\Program Files (x86)\IntelSWTools\openvino\bin>setupvars.bat
Python 3.6.8
ECHO 已關閉。
PYTHONPATH=C:\Program Files (x86)\IntelSWTools\openvino\deployment_tools\python\python3.6;C:\Program Files (x86)\IntelSWTools\openvino\deployment_tools\model_optimization\python\python3.6
[setupvars.bat] OpenVINO environment initialized
```

驗證安裝與編譯範例

- 切換到以下目錄
 - `cd C:\Program Files (x86)\IntelSWTools\openvino\deployment_tools\model_optimizer\install_prerequisites`
- 安裝優化器套件
 - `install_prerequisites.bat`



```
C:\Windows\System32\cmd.exe
Microsoft Windows [版本 10.0.18363.657]
(c) 2019 Microsoft Corporation. 著作權所有，並保留一切權利。

C:\>cd C:\Program Files (x86)\IntelSWTools\openvino\deployment_tools\model_optimizer\install_prerequisites

C:\Program Files (x86)\IntelSWTools\openvino\deployment_tools\model_optimizer\install_prerequisites>install_prerequisites.bat
```

驗證安裝與編譯範例

- 看到類似以下畫面的輸出即為安裝成功

```
C:\Windows\System32\cmd.exe
Requirement already satisfied: decorator>=4.3.0 in c:\users\tendollar\appdata\roaming\python\python36\site-packages (from
m networkx>=1.11->-r ..\requirements.txt (line 3)) (4.4.1)
Requirement already satisfied: setuptools in c:\users\tendollar\appdata\local\programs\python\python36\lib\site-packages
(from protobuf==3.6.1->-r ..\requirements.txt (line 5)) (40.6.2)
Requirement already satisfied: typing-extensions>=3.6.2.1 in c:\users\tendollar\appdata\roaming\python\python36\site-pac
kages (from onnx>=1.1.2->-r ..\requirements.txt (line 6)) (3.7.4.1)
Requirement already satisfied: markdown>=2.6.8 in c:\users\tendollar\appdata\roaming\python\python36\site-packages (from
tensorboard<1.16.0,>=1.15.0->tensorflow<2.0.0,>=1.2.0->-r ..\requirements.txt (line 1)) (3.1.1)
Requirement already satisfied: werkzeug>=0.11.15 in c:\users\tendollar\appdata\roaming\python\python36\site-packages (fr
om tensorboard<1.16.0,>=1.15.0->tensorflow<2.0.0,>=1.2.0->-r ..\requirements.txt (line 1)) (0.16.0)
Requirement already satisfied: h5py in c:\users\tendollar\appdata\roaming\python\python36\site-packages (from keras-appl
ications>=1.0.8->tensorflow<2.0.0,>=1.2.0->-r ..\requirements.txt (line 1)) (2.10.0)
Requirement already satisfied: urllib3<1.23,>=1.21.1 in c:\users\tendollar\appdata\roaming\python\python36\site-packages
(from requests<2.19.0,>=2.18.4->mxnet<=1.5.1,>=1.0.0->-r ..\requirements.txt (line 2)) (1.22)
Requirement already satisfied: idna<2.7,>=2.5 in c:\users\tendollar\appdata\roaming\python\python36\site-packages (from
requests<2.19.0,>=2.18.4->mxnet<=1.5.1,>=1.0.0->-r ..\requirements.txt (line 2)) (2.6)
Requirement already satisfied: certifi>=2017.4.17 in c:\users\tendollar\appdata\roaming\python\python36\site-packages (f
rom requests<2.19.0,>=2.18.4->mxnet<=1.5.1,>=1.0.0->-r ..\requirements.txt (line 2)) (2019.11.28)
Requirement already satisfied: chardet<3.1.0,>=3.0.2 in c:\users\tendollar\appdata\roaming\python\python36\site-packages
(from requests<2.19.0,>=2.18.4->mxnet<=1.5.1,>=1.0.0->-r ..\requirements.txt (line 2)) (3.0.4)
You are using pip version 18.1, however version 20.0.2 is available.
You should consider upgrading via the 'python -m pip install --upgrade pip' command.
*****
Warning: please expect that Model Optimizer conversion might be slow.
You can boost conversion speed by installing protobuf-*.egg located in the
"model-optimizer\install_prerequisites" folder or building protobuf library from sources.
For more information please refer to Model Optimizer FAQ, question #80.

C:\Program Files (x86)\IntelSWTools\openvino\deployment_tools\model_optimizer\install_prerequisites>
微軟注音 半 :
```


驗證安裝與編譯範例

- 切換到以下目錄
 - `cd C:\Program Files (x86)\IntelSWTools\openvino\deployment_tools\demo\`
- 執行範例程式
 - `demo_squeezenet_download_convert_run.bat`

```
[ INFO ] Completed to begin request execution
[ INFO ] Processing output blobs

Top 10 results:

Image C:\Program Files (x86)\IntelSWTools\openvino\deployment_tools\demo\car.png

classid probability label
-----
817 0.6853030 sports car, sport car
479 0.1835197 car wheel
511 0.0917197 convertible
436 0.0200694 beach wagon, station wagon, wagon, estate car, beach waggon, station waggon, waggon
751 0.0069604 racer, race car, racing car
656 0.0044177 minivan
717 0.0024739 pickup, pickup truck
581 0.0017788 grille, radiator grille
468 0.0013083 cab, hack, taxi, taxicab
661 0.0007443 Model T

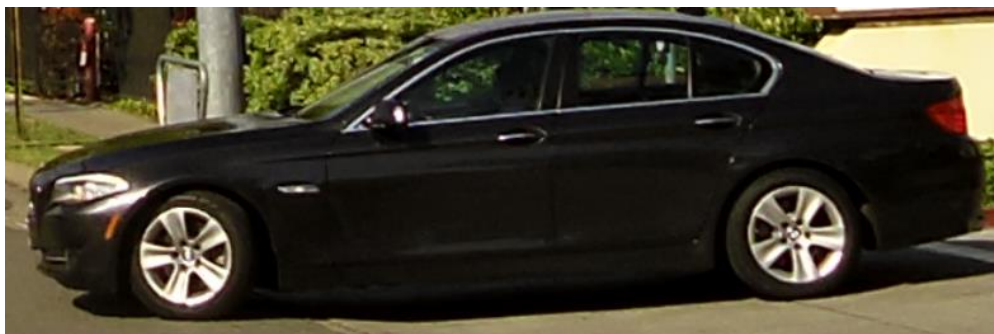
[ INFO ] Execution successful

[ INFO ] This sample is an API example, for any performance measurements please use the dedicated benchmark

#####|| Classification demo completed successfully ||#####
```

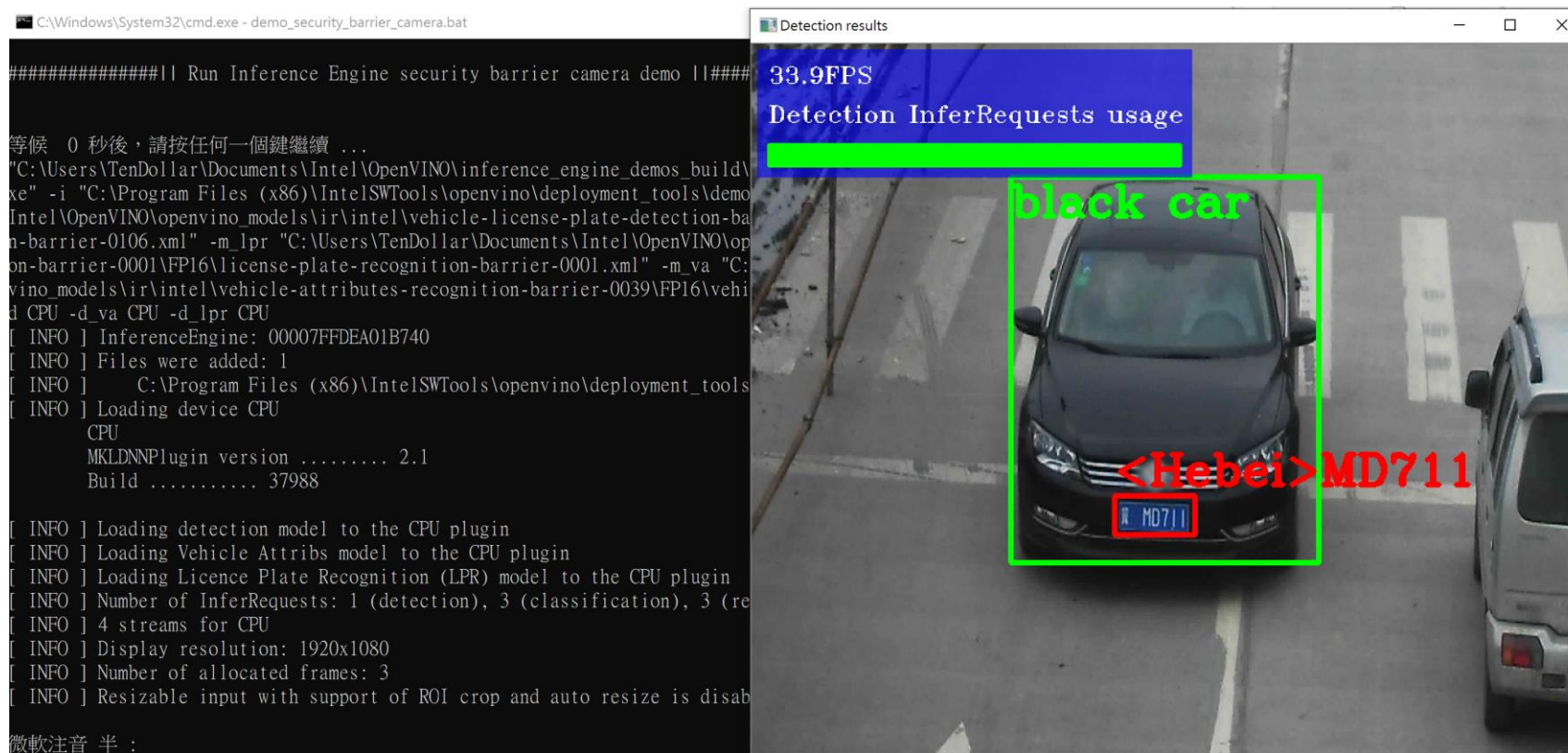
驗證安裝與編譯範例

- 剛剛的範例預測的是以下這張圖
 - 圖片位置預設為:C:\Program Files (x86)\IntelSWTools\openvino\deployment_tools\demo\car.png



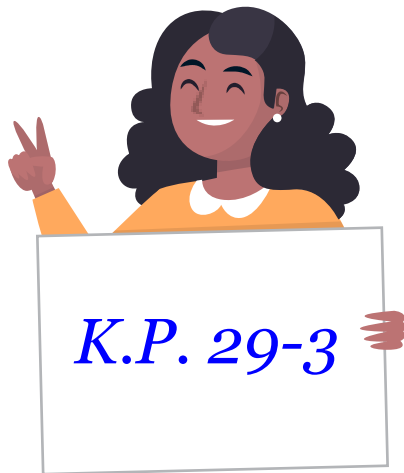
驗證安裝與編譯範例

- 接著於同一個目錄中執行以下指令開啟另一個範例
 - demo_security_barrier_camera.bat



29-3: OpenVino對Intel GPU的支援

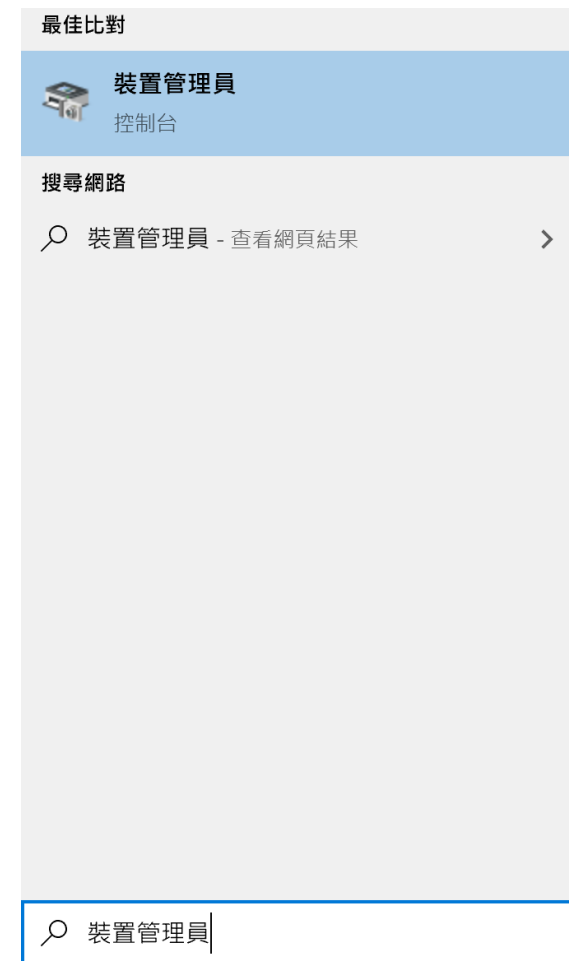
- 確認**GPU**的設定
- 測試**GPU**加速



designed by freepik

確認GPU的設定

- 若使用的是Intel第6代以上的CPU，則可以使用內建的GPU進行加速，若要開啟GPU加速功能請依照以下流程
- 請開啟裝置管理員
 - 可透開始旁的過搜尋功能快速開啟



確認GPU的設定

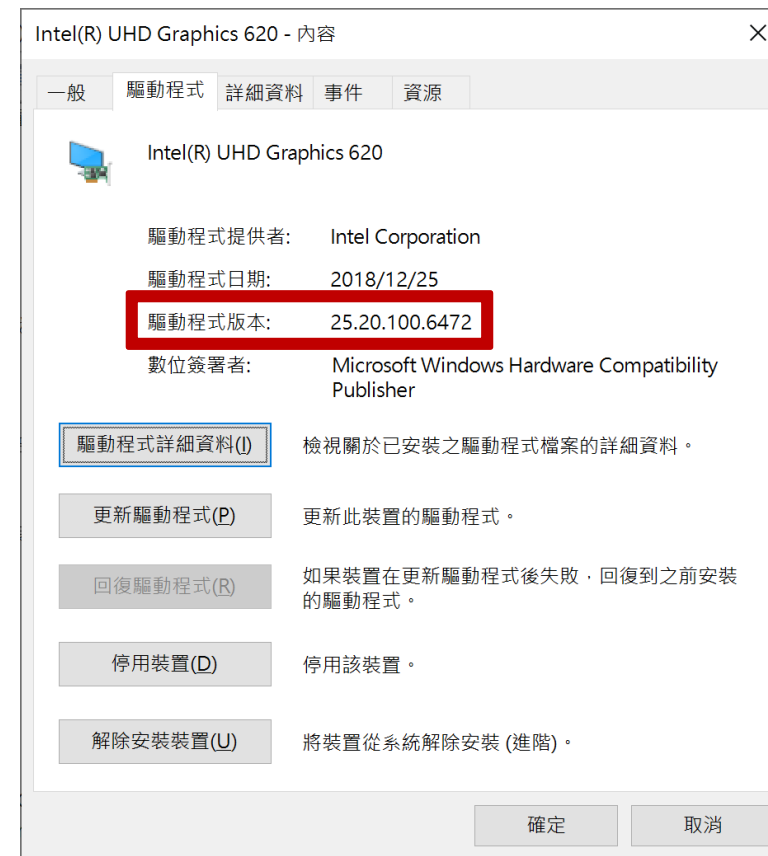
- 在裝置管理員中找到顯示卡
- 對Intel的顯卡按右鍵>內容開啟資訊視窗



確認 GPU 的設定

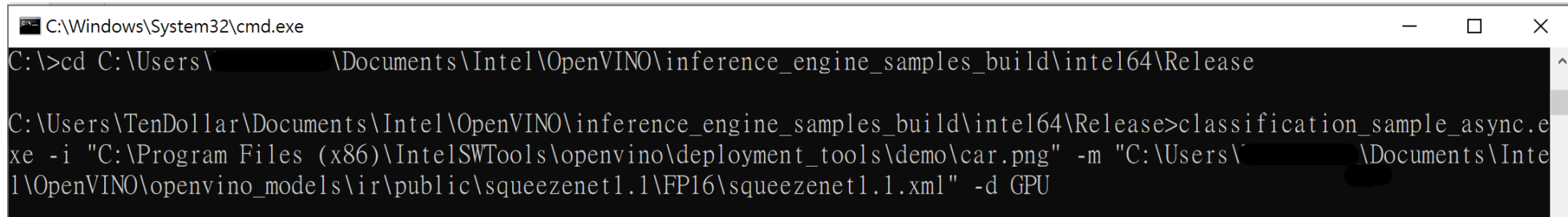
- 在資訊視窗中切換到驅動程式的分頁
- 檢查驅動程式版本是否大於「15.65」
- 若小於15.65可從以下網址取得最新的驅動程式，下載後安裝即可使用OpenVino的GPU加速功能

— https://downloadcenter.intel.com/product/80939/Graphics-Drivers?elq_cid=6000005&erpm_id=9076962



測試GPU加速

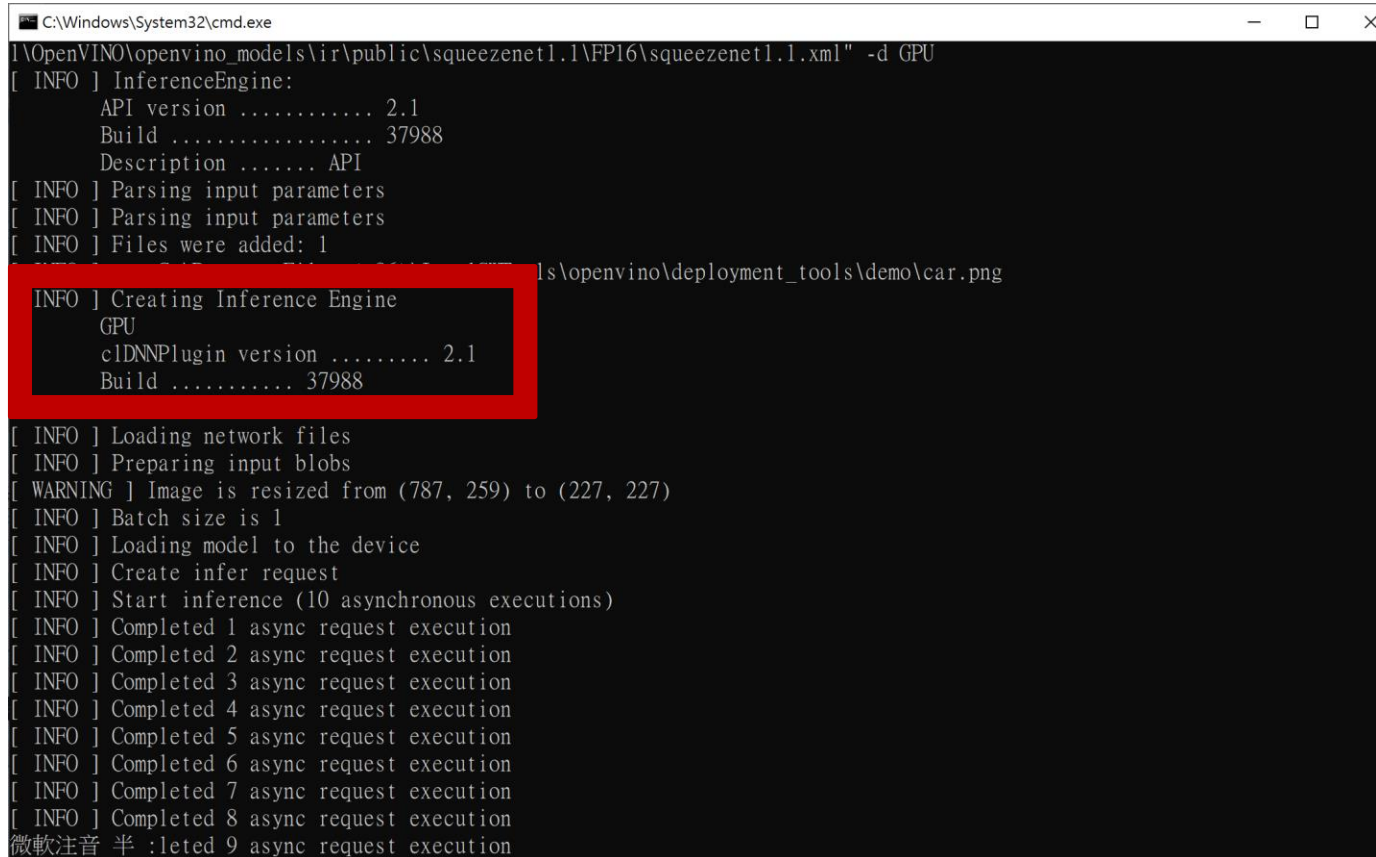
- 執行以下的指令進行GPU加速測試
 - **cd**
C:\Users\<username>\Documents\Intel\OpenVINO\inference_engine_samples_build\intel64\Release
 - **classification_sample_async.exe -i "C:\Program Files (x86)\IntelSWTools\openvino\deployment_tools\demo\car.png" -m "C:\Users\<username>\Documents\Intel\OpenVINO\openvino_models\ir\public\squeezenet1.1\FP16\squeezenet1.1.xml" -d GPU**
 - 將以上的<username>代換成使用者的名稱



```
C:\Windows\System32\cmd.exe
C:\>cd C:\Users\TenDollar\Documents\Intel\OpenVINO\inference_engine_samples_build\intel64\Release
C:\Users\TenDollar\Documents\Intel\OpenVINO\inference_engine_samples_build\intel64\Release>classification_sample_async.exe -i "C:\Program Files (x86)\IntelSWTools\openvino\deployment_tools\demo\car.png" -m "C:\Users\TenDollar\Documents\Intel\OpenVINO\openvino_models\ir\public\squeezenet1.1\FP16\squeezenet1.1.xml" -d GPU
```


測試 GPU 加速

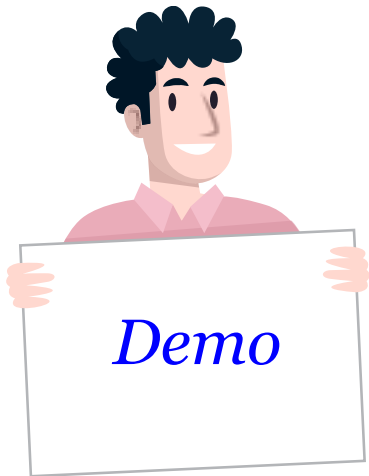
- 觀察輸出是否有GPU的字樣，若有即代表GPU有正確被啟動



```
C:\Windows\System32\cmd.exe
I:\OpenVINO\openvino_models\ir\public\squeezenet1.1\FP16\squeezenet1.1.xml" -d GPU
[ INFO ] InferenceEngine:
        API version ..... 2.1
        Build ..... 37988
        Description ..... API
[ INFO ] Parsing input parameters
[ INFO ] Parsing input parameters
[ INFO ] Files were added: 1
[ INFO ] Creating Inference Engine
        GPU
        cldnnPlugin version ..... 2.1
        Build ..... 37988
[ INFO ] Loading network files
[ INFO ] Preparing input blobs
[ WARNING ] Image is resized from (787, 259) to (227, 227)
[ INFO ] Batch size is 1
[ INFO ] Loading model to the device
[ INFO ] Create infer request
[ INFO ] Start inference (10 asynchronous executions)
[ INFO ] Completed 1 async request execution
[ INFO ] Completed 2 async request execution
[ INFO ] Completed 3 async request execution
[ INFO ] Completed 4 async request execution
[ INFO ] Completed 5 async request execution
[ INFO ] Completed 6 async request execution
[ INFO ] Completed 7 async request execution
[ INFO ] Completed 8 async request execution
[ INFO ] Completed 9 async request execution
```

Demo 29-3

- 下載OpenVino
- 安裝OpenVino
- 測試OpenVino



designed by freepik

線上Corelab

- 題目1：語意切割範例
 - 下載預訓練模型instance-segmentation-security-0050到資料夾C:\models
- 題目2：切換到instance segmentation的資料夾並列出所有檔案
- 題目3：語意切割demo
 - 開啟cmd並切換資料夾
 - 執行語意切割

本章重點精華回顧

- OpenVino入門
- OpenVino安裝
- OpenVino對Intel GPU的支援



Lab: OpenVino

- **Lab01: 下載OpenVino**
- **Lab02: 安裝OpenVino**
- **Lab03: 測試OpenVino**

Estimated time:
20 minutes

