Intel OpenVINO 使用教學

Youtube 教學視頻:

English:

https://www.youtube.com/playlist?list=PLDKCjIU5YH6jMzcTV5_cxX9aPHsborbXQ

Chinese:

https://www.youtube.com/playlist?list=PLDKCjIU5YH6jF8_Za7vEflrUKJ5hj6qy3

安裝:

- Windows:

  預設裝在 C:\Program Files (x86)\IntelSWTools

  https://docs.openvinotoolkit.org/latest/_docs_install_guides_installing_openvino_windows.html
- Linux:

  預設裝在 /opt

  https://docs.openvinotoolkit.org/latest/_docs_install_guides_installing_openvino_linux.html>
- MacOS:

  預設裝在 /opt

  https://docs.openvinotoolkit.org/latest/_docs_install_guides_installing_openvino_macos.html

常用啟動指令:

在每一次新開 terminal 之後，都需要重設環境變數才能使用 openVINO 功能 !!

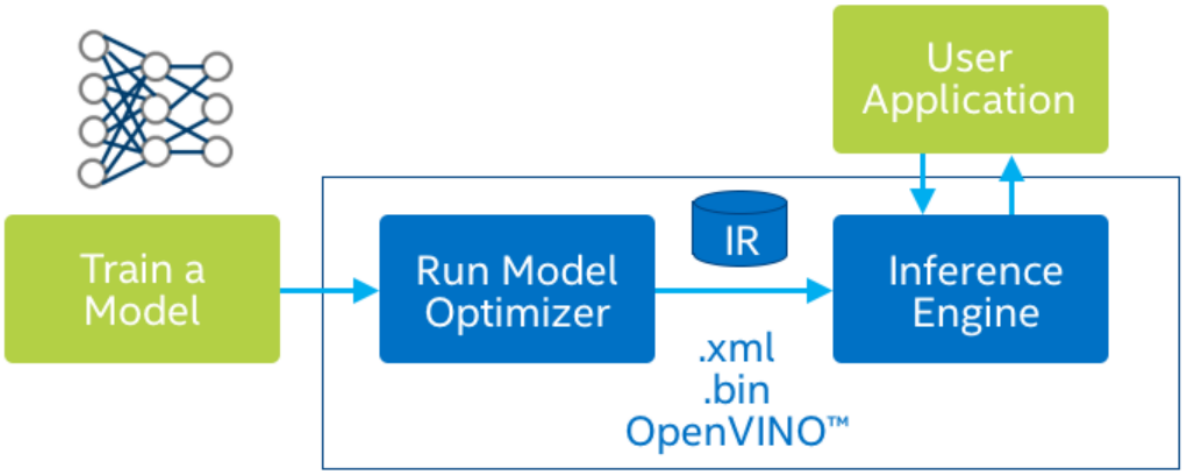
Windows:

```
"C:\Program Files (x86)\IntelSWTools\openvino\bin\setupvars.bat"
```

Linux/MacOS:

```
source /opt/intel/openvino/bin/setupvars.sh
```

openVINO 主要概念:



提升執行預測端的效能，並輕易部署在 intel 環境 (CPU,GPU,FPGA,NCS2)

Model Optimizer (Python)

- 概念: 把訓練好的深度學習 AI CNN-based 模型+權重檔，如: tensorflow (.pb) , pytorch (.onnx) , caffe , MXNet 經由官方寫好的 mo.py 轉換成 IR 格式 (.xml , .bin)，把模型架構(數學上運算)給優化

```
# 執行以下程式會有 mo.py 的用法 ,(Linux可能要用 python3)
python mo.py -h
```

- mo.py 位置:

Windows:

```
"C:\Program Files (x86)\IntelSWTools\openvino\deployment_tools\model_optimizer\"
```

Linux/Mac:

```
"/opt/intel/openvino/deployment_tools/model_optimizer"
```

- 支援深度學習模型列表:

  https://docs.openvinotoolkit.org/latest/_docs_MO_DG_prepare_model_Supported_Frameworks_Layers.html

- 施工區~~ tensorflow(keras) 轉 .pb , pytorch 轉 .onnx 需要寫教學 !!

  pytorch : torch.onnx https://pytorch.org/docs/stable/onnx.html

Inference Engine (C++/Python)

- 概念: 底層為 C++ 函式庫，也有 Python API，提供許多物件類別 class ，為實際需要程式實作部分!!
- API reference C++ 連結:
  https://docs.openvinotoolkit.org/latest/annotated.html
- API reference Python 連結:
  https://docs.openvinotoolkit.org/latest/_inference_engine_ie_bridges_python_docs_api_overview.html
- 施工區~~ 官方範例教學不多，研究中 ....

官方 **demos/samples:**

build 建構指令

- Windows:

  官方教學

  https://docs.openvinotoolkit.org/latest/_docs_IE_DG_Samples_Overview.html#build_samples_windows

  或執行以下指令 !!

  ```
  "C:\Program Files
  (x86)\IntelSWTools\openvino\deployment_tools\inference_engine\demos\build_demos_msv
  c.bat"

  "C:\Program Files
  (x86)\IntelSWTools\openvino\deployment_tools\inference_engine\samples\build_samples
  _msvc.bat"
  ```

- Linux/MacOS:

  官方教學

  https://docs.openvinotoolkit.org/latest/_docs_IE_DG_Samples_Overview.html#build_samples_linux

  或執行以下指令 !!

  ```
  "/opt/intel/openvino/deployment_tools/inference_engine/demos/build_demos.sh"

  "/opt/intel/openvino/deployment_tools/inference_engine/samples/build_samples.sh"
  ```

build 預設執行檔，輸出位置:

註: [username] 請取代為使用者名字

- Windows:

  samples

  ```
  cd "C:\Users\
  [username]\Documents\Intel\OpenVINO\inference_engine_samples_build\intel64\Release"
  ```

  demos

  ```
  cd "C:\Users\[username]\Documents\Intel\OpenVINO\omz_demos_build\intel64\Release"
  ```

- Linux/MacOS:

  samples

  ```
  cd "/Users/[username]/inference_engine_samples_build/intel64/Release"
  ```

demos

```
cd "/Users/[username]/omz_demos_build/intel64/Release"
```

demos / samples 表

終端機指令：

```
[runfile] -i[inputfile] -m [XMLfile]  -d [device]
```

- [demofile] 為 demos/samples 執行檔名 (Linux 執行需使用 ./[runfile] 語法)
- [inputfile] 為輸入圖片/影片名，
- [XMLfile] 為經過 Mo 預訓練模型
- [device] 為配置 CPU or GPU

demos

檔案名	概述	**Input**	**Output**	**github** 說明
crossroad_camera_demo	框住馬路上的人	.mp4	即時 render	https://github.com/opencv/open_model_zoo/tree/master/demos/crossroad_camera_demo
gaze_estimation_demo	偵測臉輪廓	.mp4	即時 render	https://github.com/opencv/open_model_zoo/tree/master/demos/gaze_estimation_demo
human_pose_estimation_demo	偵測骨架	.mp4	即時 render	https://github.com/opencv/open_model_zoo/tree/master/demos/human_pose_estimation_demo
interative_face_detection_demo	臉部表情	.mp4	即時 render	https://github.com/opencv/open_model_zoo/tree/master/demos/interactive_face_detection_demo
mask_rcnn_demo	圖像分割	.bmp	.bmp	https://github.com/opencv/open_model_zoo/tree/master/demos/mask_rcnn_demo
multi-channel-face-detection-demo		.mp4	即時 render	https://github.com/opencv/open_model_zoo/tree/master/demos/multichannel_demo/fd
multi-channel-human-pose-estimation-demo		.mp4	即時 render	https://github.com/opencv/open_model_zoo/tree/master/demos/multichannel_demo/hpe
object_detection_demo_faster_rcnn	物件偵測	.bmp	.bmp	https://github.com/opencv/open_model_zoo/tree/master/demos/object_detection_demo_faster_rcnn
object_detection_demo_ssd_async	物件偵測	.mp4	即時 render	https://github.com/opencv/open_model_zoo/tree/master/demos/object_detection_demo_ssd_async
object_detection_demo_yolov3_async	物件偵測	.mp4	即時 render	https://github.com/opencv/open_model_zoo/tree/master/demos/object_detection_demo_yolov3_async
pedestrian_tracker_demo	行人追蹤	.mp4	即時 render	https://github.com/opencv/open_model_zoo/tree/master/demos/pedestrian_tracker_demo

檔案名	概述	**Input**	**Output**	**github** 說明
security_barrier_camera_demo	行車紀錄器	.mp4	即時 render	https://github.com/opencv/open_model_zoo/tree/master/demos/security_barrier_camera_demo
segmentation_demo	圖像分割	.bmp	.bmp	https://github.com/opencv/open_model_zoo/tree/master/demos/segmentation_demo
smart_classroom_demo	教室監視	.mp4	即時 render	https://github.com/opencv/open_model_zoo/tree/master/demos/smart_classroom_demo
super_resolution_demo	圖片還原高解析度	.bmp	.bmp	https://github.com/opencv/open_model_zoo/tree/master/demos/super_resolution_demo
text_detection_demo	文字辨識	.bmp	.bmp	https://github.com/opencv/open_model_zoo/tree/master/demos/text_detection_demo

samples

檔案名	官網說明
benchmark_app	https://docs.openvinotoolkit.org/latest/_inference_engine_samples_benchmark_app_README.html
classification_samples_async	https://docs.openvinotoolkit.org/latest/_inference_engine_samples_classification_sample_async_README.html
hello_classfication	https://docs.openvinotoolkit.org/latest/_inference_engine_samples_hello_classification_README.html
hello_nv12_input_classification	https://docs.openvinotoolkit.org/latest/_inference_engine_samples_hello_nv12_input_classification_README.html
hello_query_device	https://docs.openvinotoolkit.org/latest/_inference_engine_samples_hello_query_device_README.html
hello_reshape_ssd	https://docs.openvinotoolkit.org/latest/_inference_engine_samples_hello_reshape_ssd_README.html
object_detection_sample_ssd	https://docs.openvinotoolkit.org/latest/_inference_engine_samples_object_detection_sample_ssd_README.html
speech_sample	https://docs.openvinotoolkit.org/latest/_inference_engine_samples_speech_sample_README.html
style_transfer_sample	https://docs.openvinotoolkit.org/latest/_inference_engine_samples_style_transfer_sample_README.html

下載所有 demo 會用到的預訓練模型 [YOUR_DIR] = 代表你要存的地方

```
cd "C:\Program Files
(x86)\IntelSWTools\openvino\deployment_tools\open_model_zoo\tools\downloader"

python downloader.py --all -o [YOUR_DIR]
```

下載範例影片，到達 [YOUR_DIR]

```
git clone https://github.com/intel-iot-devkit/sample-videos.git
```