在 Windows OS 下安裝環境

1. 預先下載課程資料集與 code
   https://github.com/chihfanhsu/hand-on-dl/tree/master/code/
   https://mmnet.iis.sinica.edu.tw/~chihfan/hand-on-dl/cifar_10.zip
2. 如有 NVIDIA GPU 請下列網址首頁設定並安裝 GPU 加速函式庫 CUDA，若無請直接跳過此步驟，並安裝步驟 9 之 openBLAS (Visual Studio 建議安裝 2013)
   Windows
   http://ankivil.com/installing-keras-theano-and-dependencies-on-windows-10/
   Linux
   https://www.youtube.com/watch?v=wjByPfSFkBo
3. 安裝 Theano 及相依套件
   使用管理者權限打開 Anaconda Prompt 並鍵入
   `conda install theano numpy scipy mingw libpython`
4. 安裝 keras
   使用管理者權限打開 Anaconda Prompt 並鍵入 `pip install keras`
5. 設定 Theano configuration (路徑 C:\Users\[USER NAME]\.theanorc.txt)
   A. BLAS 設定方式

```
[global]
openmp=False
device=cpu

[blas]
ldflags=-LC:\openblas -lopenblas
blas.ldflags=-LC:\openblas -lopenblas
```

   B. GPU 設定方式

```
[global]
floatX = float32
device = gpu

[nvcc]
fastmath = True
compiler_bindir=C:\Program Files (x86)\Microsoft Visual Studio 12.0\VC\bin
```

6. 設定 Keras configuration (路徑 C:\Users\[USER NAME]\.keras\keras.json)

```
{
    "image_dim_ordering": "tf",
    "epsilon": 1e-07,
    "floatx": "float32",
    "backend": "theano"
}
```

7. 請先試跑看看 checkblas.py 如果成功會如同以下輸出

```
We executed 10 calls to gemm with a and b matrices of shapes (5000, 5000) and (5000, 5000).

Total execution time: 20.22s on CPU (with direct Theano binding to blas).

Try to run this script a few times. Experience shows that the first time is not as fast as followings calls. The differe
nce is not big, but consistent.

(C:\Program Files\Anaconda2) C:\>
```

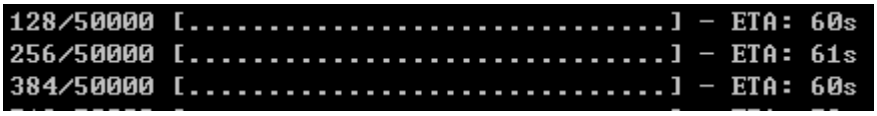
8. 請先試跑下列網址的 CNN 測試程式，如有下列 Error message 請安裝第 9 步驟的 OpenBLAS，如可以成功執行則不需要安裝(不用執行到結束，可以成功看到 Training verbose 即可)。

   A. CNN 測試程式
   https://github.com/fchollet/keras/blob/master/examples/mnist_cnn.py

   B. Error message

   > AssertionError: AbstractConv2d Theano optimization failed: there is no implementation available supporting the requested options. Did you exclude both "conv_dnn" and "conv_gemm" from the optimizer? If on GPU, is cuDNN available and does the GPU support it? If on CPU, do you have a BLAS library installed Theano can link against?

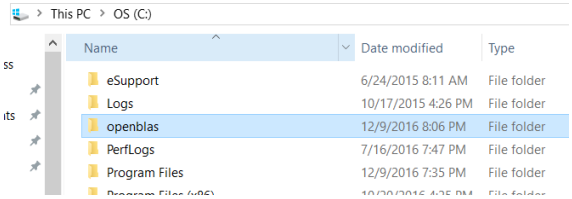
   C. Training verbose



9. 在 Windows Anaconda2 上安裝 OpenBLAS (加速 CPU 運算速度)

A. 下載 OpenBLAS
https://mmnet.iis.sinica.edu.tw/~chihfan/openblas.zip

B. 將解壓縮後的資料夾放在 C:



C. 將 C:\openblas\include 內的檔案全部複製放進以下 Anaconda 的資料夾
C:\Program Files\Anaconda2\include
C:\Program Files\Anaconda2\MinGW\x86_64-w64-mingw32\include

D. 將 C:\openblas\lib 內的檔案全部複製放進
C:\Program Files\Anaconda2\MinGW\x86_64-w64-mingw32\lib

E. 將 C:\Users\[user name]\AppData\Local\Theano 資料夾內的檔案全都刪除

F. 重新開啓 Anaconda Prompt

G. 如果還是有問題請來信 chihfan@iis.sinica.edu.tw 並請您附上錯誤訊息