BIGR LAB
big data research laboratory

期末project

蘇育生

Source by 董孝倫 and 鄭鈞輿

期末分組與期程

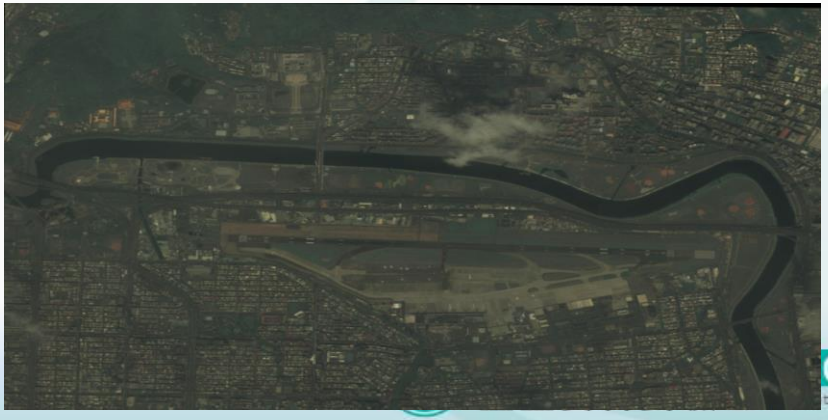
- 分組
  - 兩人為一組
- 執行時間
  - 6/11~6/25
  - 報告順序6/25天宣佈
  - 最晚6/28 11:59前上傳至LMS作業區繳交報告
- 討論時間
  - 6/18課堂上1到3節課討論時間

期末專題

- 主題：透過OpenCL來加速影像處理
- 影像處理參考文獻與最後demo成果
  - Tu, T.; Hsu, C.; Tu, P.; Lee, C. An adjustable pan-sharpening approach for IKONOS/QuickBird/GeoEye-1/WorldView-2 imagery. IEEE J. Sel. Top. Appl. Earth Obs. Remote Sens. 2012, 5, 125–134, doi:10.1109/JSTARS.2011.2181827.

來源圖片

- 高解析度灰階圖:taipei_pan.jpg
  -尺寸: 16384*8192
- 低解析度全彩圖:Taipei_mul.jpg
  -尺寸: 16384*8192



上台報告(簡報格式)

- 基本安裝環境說明
- 顯卡資訊(跑完benckmark.py)
- 用流程圖說明程式流程，如何加速影像處理，特別使用OpenCL進行平行計算
- DEMO最佳參數結果
- 效率結果表
- 遭遇問題如何解決
- 參考資料來源

Experimental platform- benchmark.py

```
Platform name: NVIDIA CUDA
Platform profile: FULL_PROFILE
Platform vendor: NVIDIA Corporation
Platform version: OpenCL 1.2 CUDA 7.5.8
---------------------------------------------------------------
Device name: GeForce GTX 860M
Device type: GPU
Device memory:  2048 MB
Device max clock speed: 1019 MHz
Device compute units: 5
Device max work group size: 1024
Device max work item sizes: [1024, 1024, 64]
Data points: 8388608
Workers: 256
Preferred work group size multiple: 32
Execution time of test: 0.00225507 s
Results OK
```

效率結果表格

Host→Device (s), GPU (s), Device → Host (s)
Experimental OS: windows 7 64bit
Experimental platform: GPU

Work Item	Work Item	Host→Device	GPU	Device→Host

繳交資料

- 壓縮檔案須包含:
  - 完整簡報
  - OpenCL程式碼(需要註解)

- 助教說明影像處理參考文獻
  - Tu, T.; Hsu, C.; Tu, P.; Lee, C. An adjustable pan-sharpening approach for IKONOS/QuickBird/GeoEye-1/WorldView-2 imagery. IEEE J. Sel. Top. Appl. Earth Obs. Remote Sens. 2012, 5, 125–134, doi:10.1109/JSTARS.2011.2181827.

Demo 程式套件

- Numpy
- Scipy
- pyopencl

原始程式

```
import numpy as np
import scipy.misc as scm import time
def main():
    k = 0.5
    pan = scm.imread('taipei_pan.jpg')
    mul = scm.imread('taipei_mul.jpg')
    r = mul[:, :, 0]
    g = mul[:, :, 1]
    b = mul[:, :, 2]
    time_start = time.time()
    i = (r*0.171 +g*0.2+b*0.171)/0.632
    kx__pan_minus_iii = k*(pan-i)
    coe = pan/(i+kx__pan_minus_iii)
    nr = coe * (r+kx__pan_minus_iii)
    ng = coe * (g+kx__pan_minus_iii)
    nb = coe * (b+kx__pan_minus_iii)
    finish_time = time.time() - time_start
    print "finish time:", finish_time
    output_img = np.empty_like(mul)
    output_img[:, :, 0] = nr
    output_img[:, :, 1] = ng
    output_img[:, :, 2] = nb
    scm.imsave("output.jpg", output_img)
if __name__ == '__main__':
    main()
```

We help you to understand new technologies and trends!