TUGAS PEMROSESAN PARALEL

“IMAGE STITCHING”

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Kali ini, kami akan menjelaskan langkah-langkah melakukan image stitching dengan menggunakan MPI pada single node.

1. Unduh dataset gambar yang difoto lewat drone untuk wilayah fasilkom dari google drive: https://drive.google.com/drive/folders/18ANYLm6ub7dIyEtRt-IPouc4oylAGWgI. Disini, kami menyimpan gambar tersebut di direktori "Stiching"

```
mpiuser@master:~/Stiching$ ls
A.JPG          DJI_0952.JPG  DJI_0959.JPG  DJI_0966.JPG  DJI_0980.JPG  DJI_0987.JPG  DJI_0994.JPG
B.JPG          DJI_0953.JPG  DJI_0960.JPG  DJI_0974.JPG  DJI_0981.JPG  DJI_0988.JPG  DJI_0995.JPG
bubblesort.py  DJI_0954.JPG  DJI_0961.JPG  DJI_0975.JPG  DJI_0982.JPG  DJI_0989.JPG  DJI_0996.JPG
C.JPG          DJI_0955.JPG  DJI_0962.JPG  DJI_0976.JPG  DJI_0983.JPG  DJI_0990.JPG  DJI_0997.JPG
coba3.py       DJI_0956.JPG  DJI_0963.JPG  DJI_0977.JPG  DJI_0984.JPG  DJI_0991.JPG  DJI_0998.JPG
DJI_0950.JPG   DJI_0957.JPG  DJI_0964.JPG  DJI_0978.JPG  DJI_0985.JPG  DJI_0992.JPG  DJI_0999.JPG
DJI_0951.JPG   DJI_0958.JPG  DJI_0965.JPG  DJI_0979.JPG  DJI_0986.JPG  DJI_0993.JPG  D.JPG
mpiuser@master:~/Stiching$
```

2. Setelah itu dataset tersedia, maka user harus menginstall tiap library yang dibutuhkan untuk melakukan image stitching. Tools yang diinstall pertama ialah program python:

```
mpiuser@master:~$ python3
Python 3.10.12 (main, Nov 20 2023, 15:14:05) [GCC 11.4.0] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>>
```

3. install opencv:

```
mpiuser@master:~$ pip install opencv-python
Defaulting to user installation because normal site-packages is not writeable
Requirement already satisfied: opencv-python in ./.local/lib/python3.10/site-packages (4.8.1.78)
Requirement already satisfied: numpy>=1.21.2 in ./.local/lib/python3.10/site-packages (from opencv-python) (1.26.2)
mpiuser@master:~$
```

4. Lalu diikuti dengan installasi library matplotlib:

```
mpiuser@master:~$ pip install matplotlib
Defaulting to user installation because normal site-packages is not writeable
Requirement already satisfied: matplotlib in ./.local/lib/python3.10/site-packages (3.8.2)
Requirement already satisfied: numpy<2,>=1.21 in ./.local/lib/python3.10/site-packages (from matplotlib) (1.26.2)
Requirement already satisfied: kiwisolver>=1.3.1 in ./.local/lib/python3.10/site-packages (from matplotlib) (1.4.5)
Requirement already satisfied: contourpy>=1.0.1 in ./.local/lib/python3.10/site-packages (from matplotlib) (1.2.0)
Requirement already satisfied: pyparsing>=2.3.1 in /usr/lib/python3/dist-packages (from matplotlib) (2.4.7)
Requirement already satisfied: python-dateutil>=2.7 in /usr/lib/python3/dist-packages (from matplotlib) (2.8.1)
Requirement already satisfied: fonttools>=4.22.0 in ./.local/lib/python3.10/site-packages (from matplotlib) (4.45.1)
Requirement already satisfied: packaging>=20.0 in ./.local/lib/python3.10/site-packages (from matplotlib) (23.2)
Requirement already satisfied: pillow>=8 in /usr/lib/python3/dist-packages (from matplotlib) (9.0.1)
Requirement already satisfied: cycler>=0.10 in ./.local/lib/python3.10/site-packages (from matplotlib) (0.12.1)
```

5. Lalu diikuti dengan instalasi MPI

```
mpiuser@master:~$ pip install mpi4py
Defaulting to user installation because normal site-packages is not writeable
Requirement already satisfied: mpi4py in ./.local/lib/python3.10/site-packages (3.1.5)
```

6. Setelah itu, lakukan instalasi python untuk melakukan pemrograman python. Disini kamu menggunakan command “sudo nano gambar.py”. Untuk programnya ialah sebagai berikut:

```
import cv2
import glob
import matplotlib.pyplot as plt
import math
from mpi4py import MPI

gambar = glob.glob("/home/mpiuser/Stiching/*JPG")
gambar.sort()

images = []
for filename in gambar:
    img = cv2.imread(filename)
    img = cv2.cvtColor(img, cv2.COLOR_BGR2RGB)
    images.append(img)

num_images = len(images)

plt.figure(figsize=[30, 10])
num_cols = 3
num_rows = math.ceil(num_images / num_cols)

# Menampilkan gambar sebelum stitching
for i in range(1, num_images + 1):
    plt.subplot(num_rows, num_cols, i)
    plt.axis('off')
    plt.imshow(images[i-1])

stitcher = cv2.Stitcher_create()
status, result = stitcher.stitch(images)

# Periksa status hasil stitching
if status == cv2.Stitcher_OK:
    plt.figure(figsize=[30, 10])
    plt.imshow(result)
    plt.axis('off')
    cv2.imwrite('panorama1.png', result)
    plt.show()
else:
    print("Error during stitching")
```

```
 GNU nano 6.2                                        gambar.py
import cv2
import glob
import matplotlib.pyplot as plt
import math
from mpi4py import MPI

gambar = glob.glob("/home/mpiuser/Stiching/*JPG")
gambar.sort()

images = []
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    plt.axis('off')
    cv2.imwrite('panorama1.png', result)
                                                [ Read 39 lines ]
```

7. Selanjutnya run kodingan tersebut. Karena program ini dijalankan pada single node. Maka command yang diberikan adalah “mpirun -np 1 -host master python3 gambar.py”

```
mpiuser@master:~/Stiching$ mpirun -np 1 -host master python3 gambar.py
Authorization required, but no authorization protocol specified
Authorization required, but no authorization protocol specified
Authorization required, but no authorization protocol specified
Authorization required, but no authorization protocol specified
```

8. Setelah menunggu program run, maka hasilnya akan muncul seperti di bawah ini: