Parallel Image Processing

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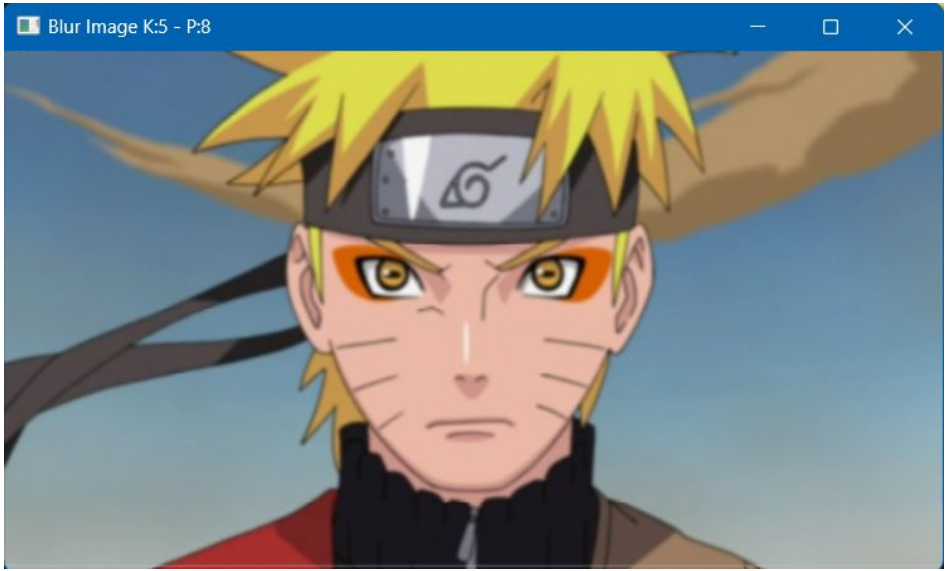
1- Image Blurring (Gaussian Blur)

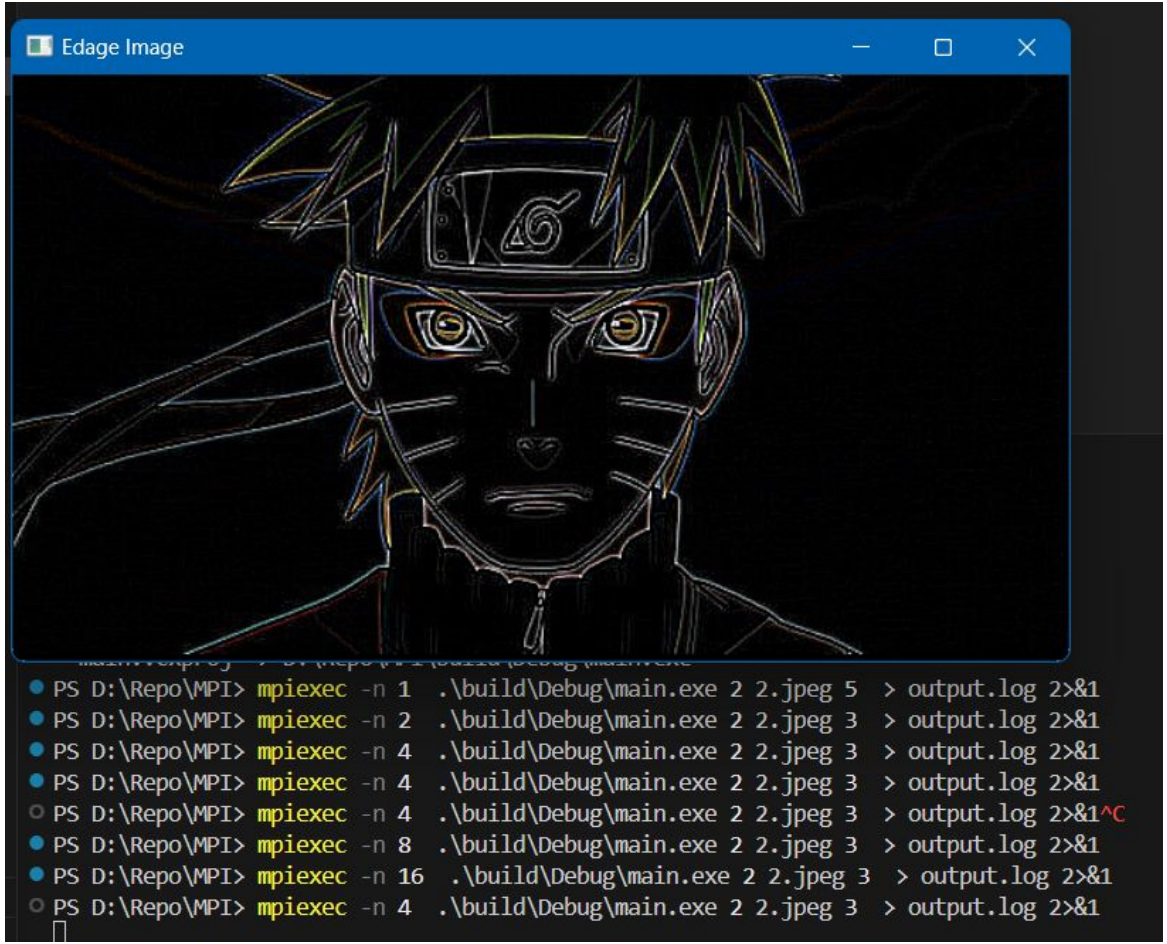
- Time Performance Versus the number of processors:
  - Number of process: 1 Total execution time: 0.107839 seconds.
  - Number of process: 2 Total execution time: 0.062786 seconds.
  - Number of process: 3 Total execution time: 0.0482468 seconds
  - Number of process: 4 Total execution time: 0.0437717 seconds.
  - Number of process: 8 Total execution time: 0.0276743 seconds.
  - Number of process: 16 Total execution time: 0.0336868 seconds.
  - Number of process: 32 Total execution time: 0.037552 seconds (Over Head effect).
- Notes:
  - kernel Size (3,3)
  - Padding
  - Image Size (648 x 660)


Blur Image K:3 - P:2


Blur Image K:5 - P:8

2- Image Edge Detection

- Time Performance Versus the number of processors:
  - Number of process: 1 Total execution time: 0.0551483 seconds.
  - Number of process: 2 Total execution time: 0.0277755 seconds.
  - Number of process: 4 Total execution time: 0.0208439 seconds
  - Number of process: 8 Total execution time: 0.0146136 seconds.
  - Number of process: 16 Total execution time: 0.0177112 seconds (Over Head effect).
- Notes:
  - kernel Size (3,3)
  - Padding
  - Image Size (331x 597)


Edage Image
PS D:\Repo\MPI> mpiexec -n 1 .\build\Debug\main.exe 2 2.jpeg 5 > output.log 2>&1
PS D:\Repo\MPI> mpiexec -n 2 .\build\Debug\main.exe 2 2.jpeg 3 > output.log 2>&1
PS D:\Repo\MPI> mpiexec -n 4 .\build\Debug\main.exe 2 2.jpeg 3 > output.log 2>&1
PS D:\Repo\MPI> mpiexec -n 4 .\build\Debug\main.exe 2 2.jpeg 3 > output.log 2>&1
PS D:\Repo\MPI> mpiexec -n 4 .\build\Debug\main.exe 2 2.jpeg 3 > output.log 2>&1^C
PS D:\Repo\MPI> mpiexec -n 8 .\build\Debug\main.exe 2 2.jpeg 3 > output.log 2>&1
PS D:\Repo\MPI> mpiexec -n 16 .\build\Debug\main.exe 2 2.jpeg 3 > output.log 2>&1
PS D:\Repo\MPI> mpiexec -n 4 .\build\Debug\main.exe 2 2.jpeg 3 > output.log 2>&1

3- Image Sharpening

- Time Performance Versus the number of processors:
  - Number of process: 1 Total execution time: 0.0310361 seconds.
  - Number of process: 2 Total execution time: 0.0179153 seconds.
  - Number of process: 3 Total execution time: 0.0138519 seconds.
  - Number of process: 8 Total execution time: 0.0104141 seconds.
  - Number of process: 16 Total execution time: 0.0127504 seconds(Overhead effect).
- Notes:
  - kernel Size (3,3)
  - Padding
  - Image Size (331x 597)


Sharp Image

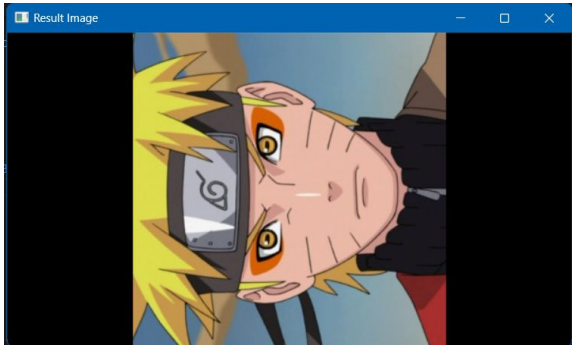
Pros & Cons:

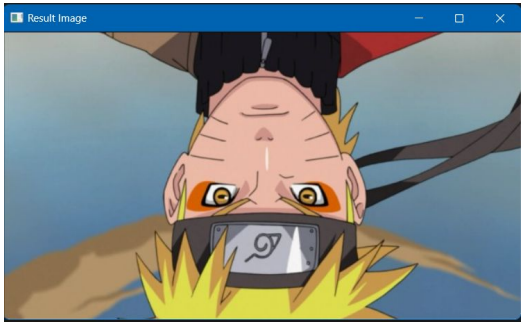
- We gain some time using parallel image processing filters algorithm using Process round (2 - 8).
- When using more process we have Over Head Problem.
- Also filters is Neighborhood operation so Splitting image bear more processors gives less Accurate output .
- Can do Effect a black a border in the bottom because a different border Issue.

When Using 64 Proceser:

4- Image Rotation (Color Space way)

- Time Performance Versus the number of processors:
  - Number of processes: 3 Total execution time: 0.0347912 seconds.





- Advantage of this approach can work with any angle

- The disadvantage of this approach always need 3 processes .

4- Image Rotation (Transformation way)

- Time Performance Versus the number of processors:

  - Number of process: 1 Total execution time: 0.410361 seconds.
  - Number of process: 2 Total execution time: 0.3179153 seconds.
  - Number of process: 3 Total execution time: 0.2138519 seconds.
  - Number of process: 8 Total execution time: 0.4104141 seconds.
  - Number of process: 16 Total execution time: 0.0127504 seconds(Overhead effect).

- The advantage of this approach:
  - Can use any number of processors.
- The disadvantage of this approach:
  - Only work if angle % 90 == 0


ResultImage Image After Ad...


ResultImage Image After Adding P:0
ResultImage Image After Adding P:0

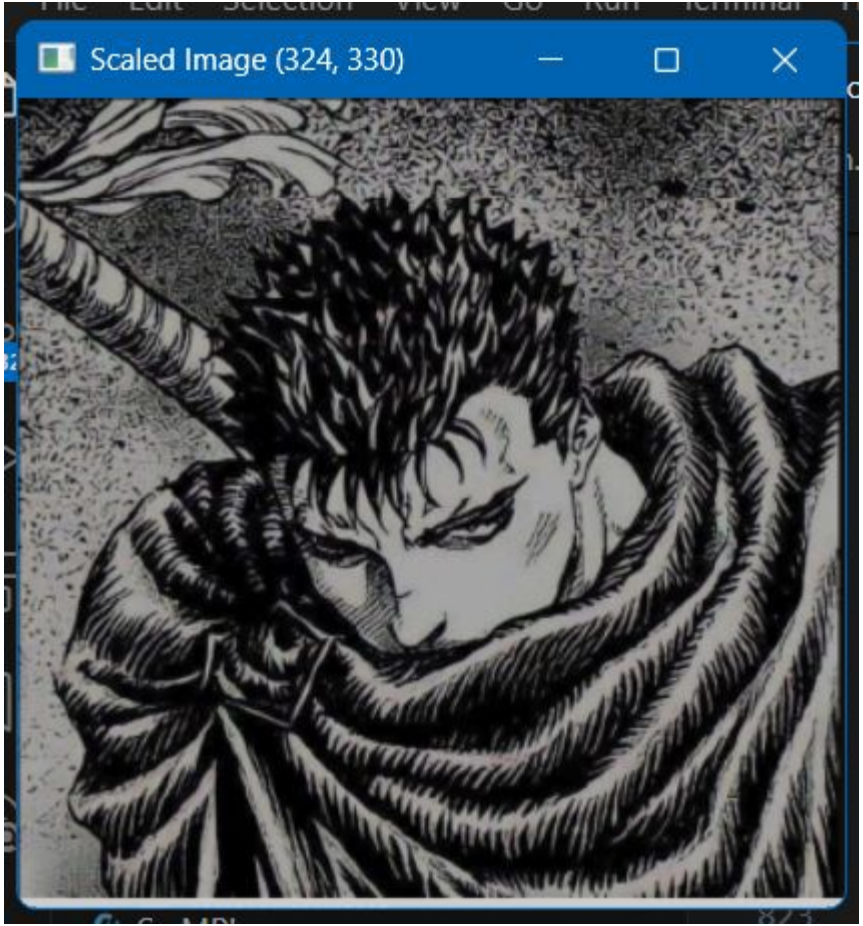

ResultImage Image After Adding P:0

5- Image Scaling:

- Time Performance Versus the number of processors:
  - Number of processes: 1 Total execution time: 0.1551109 seconds
  - Number of processes: 2 Total execution time: 0.133638 seconds.
  - Number of processes: 3 Total execution time: 0.0863796 seconds.
  - Number of processes: 4 Total execution time: 0.0868169 seconds.
  - Number of processes: 8 Total execution time: 0.0900788 seconds.

- Notes:
  - Scale Size 2
  - Image Size (648 x 660)


Scaled Image (1296, 1320)


Scaled Image (324, 330)

6- Histogram Equalization :

- Time Performance Versus the number of processors:
  - Number of processes: 2 Total execution time: 0.0069806 seconds.
  - Number of processes: 3 Total execution time: 0.0072396 seconds.
  - Number of processes: 4 Total execution time: 0.0068656 seconds.
  - Number of processes: 8 Total execution time: 0.0058524 seconds.

7- Color Space Conversion:

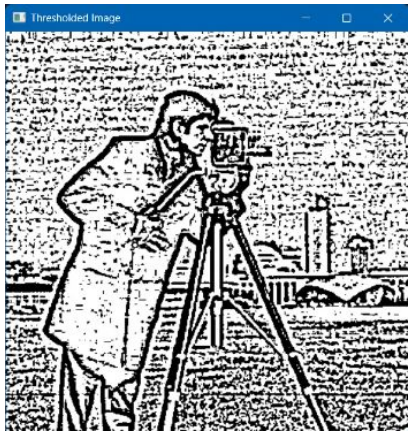
- Time Performance Versus the number of processors:
  - Number of processes: 1 Total execution time: 0.0149367 seconds.
  - Number of processes: 2 Total execution time: 0.0134758 seconds.
  - Number of processes: 3 Total execution time: 0.009791 seconds.
  - Number of processes: 4 Total execution time: 0.010545 seconds.
  - Number of processes: 6 Total execution time: 0.0092691 seconds.
  - Number of processes: 8 Total execution time: 0.0099956 seconds.

8- Global Thresholding:

- Time Performance Versus the number of processors:
  - Number of process: 1 Total execution time: 0.0182638 seconds
  - Number of process: 2 Total execution time: 0.0132336 seconds
  - Number of process: 4 Total execution time: 0.0109604 seconds
  - Number of process: 8 Total execution time: 0.0099482 seconds
  - Number of process: 16 Total execution time: 0.0110909 seconds

9- Local Thresholding:

- Time Performance Versus the number of processors:
  - Number of process: 1 Total execution time: 0.0075723 seconds.
  - Number of process: 2 Total execution time: 0.0059322 seconds
  - Number of process: 4 Total execution time: 0.004856 seconds
  - Number of process: 6 Total execution time: 0.0052009 seconds
  - Number of process: 8 Total execution time: 0.0049671 seconds

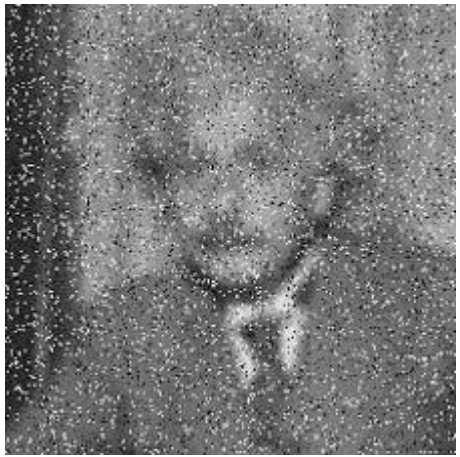


10- Image Compression

- Time Performance Versus the number of processors:
  - Number of process: 1 Total execution time: 0.0152638 seconds
  - Number of process: 2 Total execution time: 0.0102336 seconds
  - Number of processes: 4 Total execution time: 0.0002966 seconds.
  - Number of process: 8 Total execution time: 0.0099482 seconds
  - Number of process: 16 Total execution time: 0.0110909 seconds

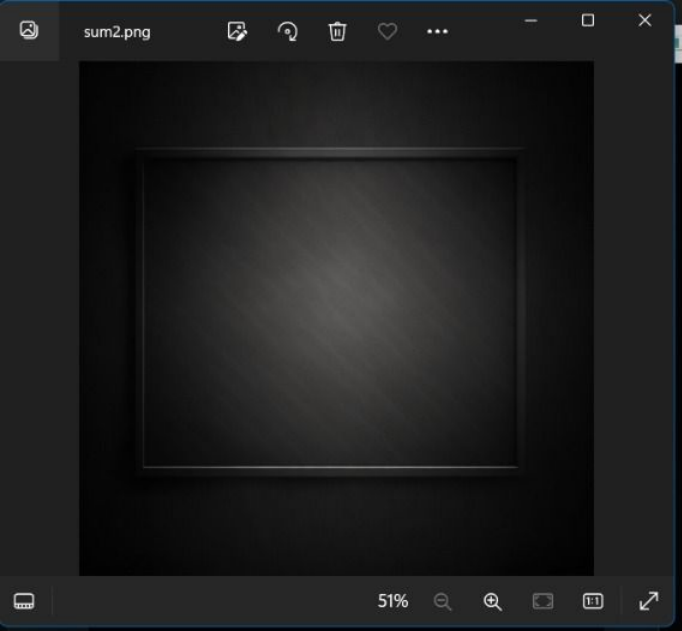
11- Median

- Time Performance Versus the number of processors:
  - Number of processes: 1 Total execution time: 0.0087755 seconds.
  - Number of processes: 2 Total execution time: 0.0069944 seconds.
  - Number of processes: 4 Total execution time: 0.0039494 seconds.

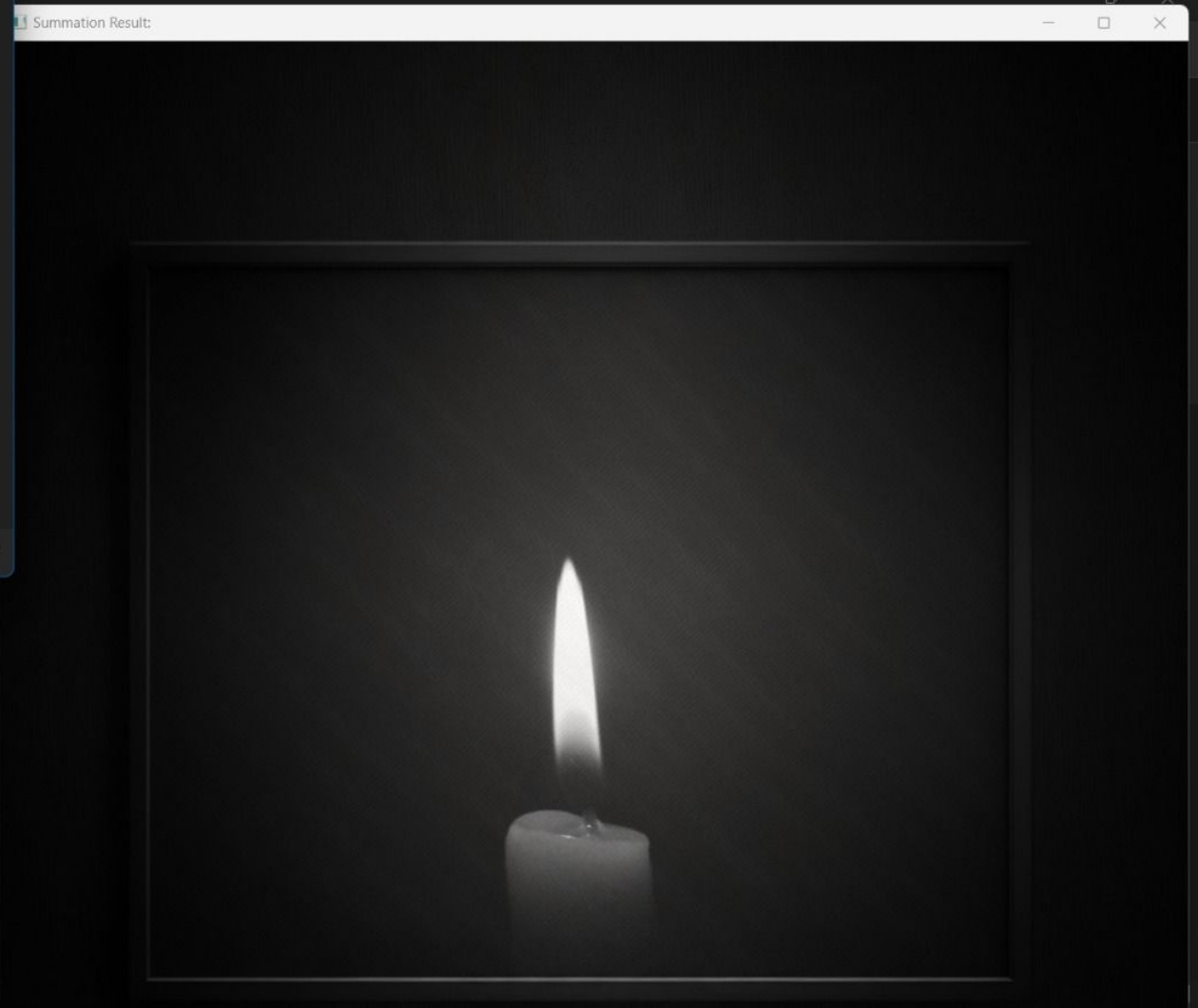


12- Image Summation

- Time Performance Versus the number of processors:
  - Number of processes: 1 Total execution time: 0.316408 seconds
  - Number of processes: 2 Total execution time: 0.288973 seconds.
  - Number of processes: 4 Total execution time: 0.004679 seconds
  - Number of process: 6 Total execution time: 0.0052009 seconds.

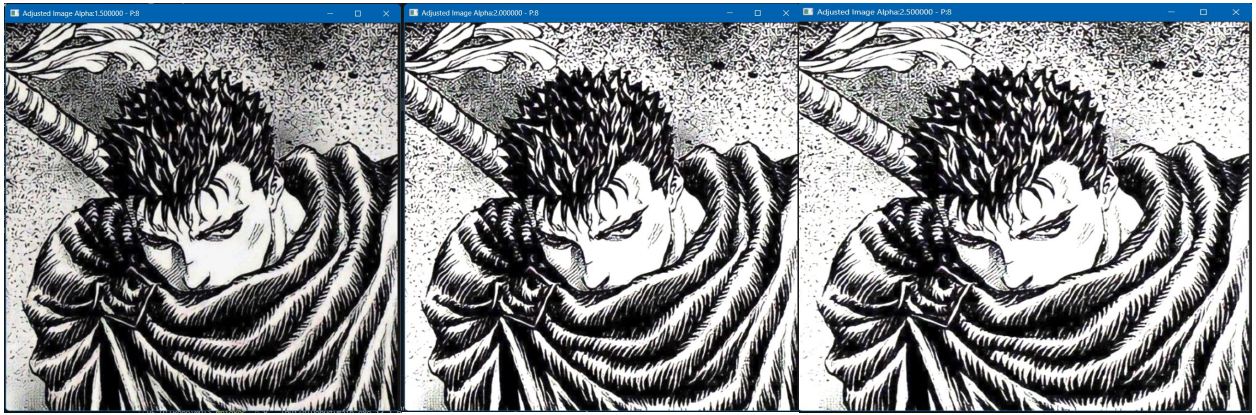

sum2.png
51%


51%


Summation Result:

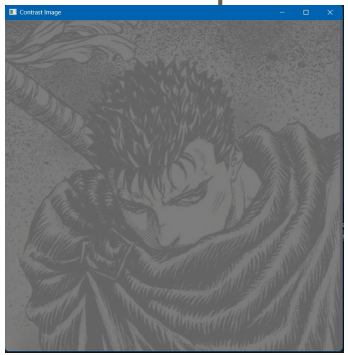
13-Adjust Image Brightness

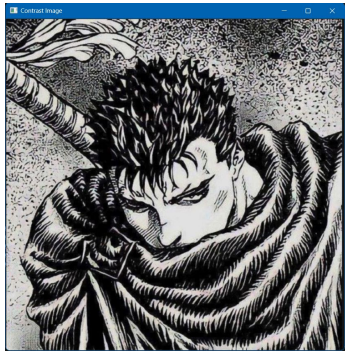
- Time Performance Versus the number of processors:
  - Number of processes: 1 Total execution time: 0.0246335 seconds.
  - Number of processes: 2 Total execution time: 0.0208388 seconds.
  - Number of processes: 4 Total execution time: 0.0619482 seconds
  - Number of processes: 8 Total execution time: 0.0102103 seconds.



14- Image Contrast:

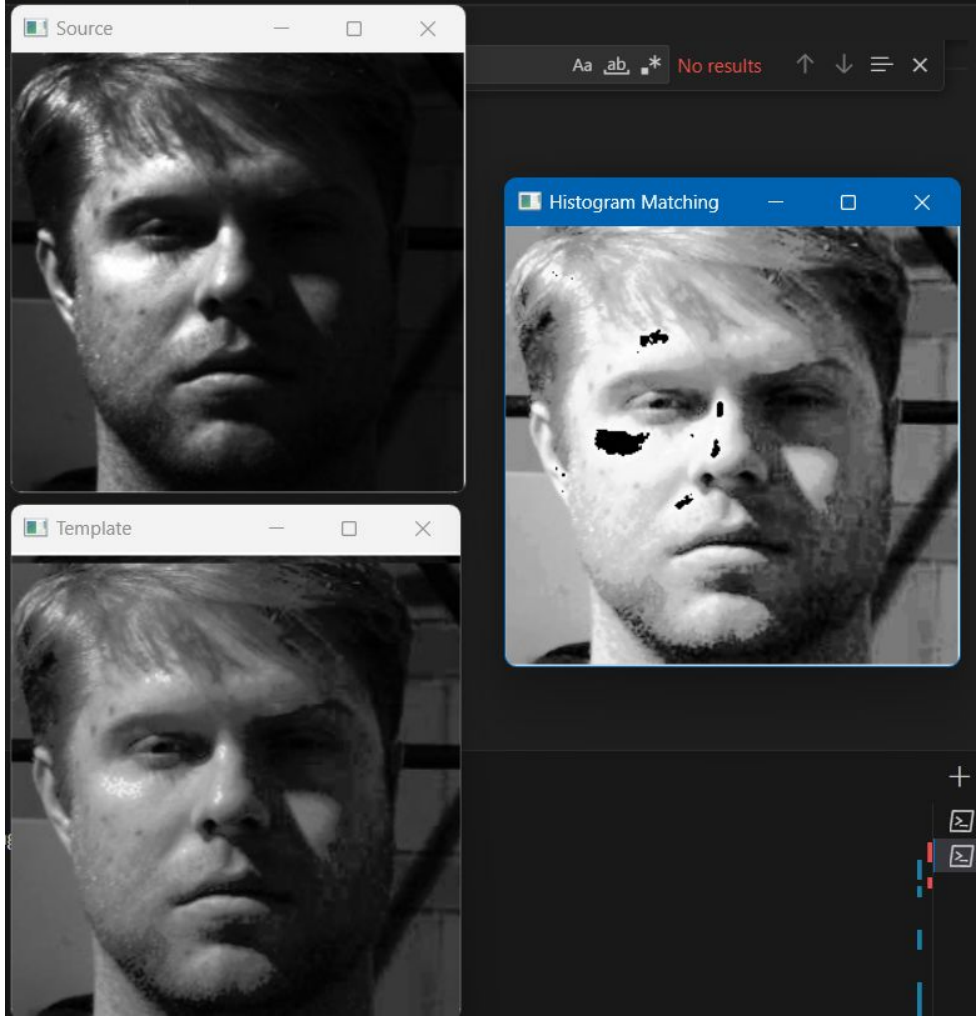
- Time Performance Versus the number of processors:
  - Number of processes: 1 Total execution time: 0.064185 seconds.
  - Number of processes: 2 Total execution time: 0.0455586 seconds.
  - Number of processes: 4 Total execution time: 0.0343933 seconds
  - Number of processes: 6 Total execution time: 0.029009 seconds.
  - Number of processes: 8 Total execution time: 0.0255811 seconds.





15- Histogram Matching:

- Time Performance Versus the number of processors:
  - Number of processes: 1 Total execution time: 0.0323114 seconds
  - Number of processes: 2 Total execution time: 0.0305581 seconds
  - Number of processes: 4 Total execution time: 0.0299272 seconds
  - Number of processes: 6 Total execution time: 0.029009 seconds.
  - Number of processes: 8 Total execution time: 0.0270478 seconds.


Source
Aa ab .* No results
Histogram Matching
Template