

CS543/ECE549 Assignment 1

Name: <name>

NetId: <netid>

Parts 1 and 2: Implementation Description

Briefly describe your implemented approaches, focusing on any non-trivial implementation choices you had to make. Be sure to specify which metric (SSD or NCC) you used for determining channel offsets.

- **Part 1A (Basic Alignment) Description:**
- **Part 1B (Multiscale Alignment) Description:**
- **Part 2 (Fourier Alignment) Description:**

Parts 1 and 2: Channel Offsets

In this section, please provide channel offsets for each of the six low-resolution and three high-resolution images.

Feel free to try out different color channels as base channels for alignment and select the one that gives the best quality, but remember to report the final offsets from each channel to the <Blue> channel.

Offsets of each channel to the <Blue> channel:

Low-res Image	Basic Alignment (1A)		Fourier-based Alignment (2)	
	<Green> (h,w) offset	<Red> (h,w) offset	<Green> (h,w) offset	<Red> (h,w) offset
00125v.jpg				
00149v.jpg				

00153v.jpg				
00351v.jpg				
00398v.jpg				
01112v.jpg				
High-res Image	Multiscale Alignment (1B)		Fourier-based Alignment (2)	
	<Green> (h,w) offset	<Red> (h,w) offset	<Green> (h,w) offset	<Red> (h,w) offset
01047u.tif				
01657u.tif				
01861a.tif				

Parts 1 and 2: Runtime Comparison and Discussion

In this section, please provide the running time for each of the six low-resolution and three high-resolution images. For timing, you can use the python `time` module, as described in the assignment instructions. ***Feel free to use an estimate if the single-scale solution takes too long to run on high-resolution images.***

Report the running time in terms of seconds (s).

Image	Basic (1A)	Multiscale (1B)	Fourier-based (2)
00125v.jpg			
00149v.jpg			
00153v.jpg			
00351v.jpg			
00398v.jpg			
01112v.jpg			
01047u.tif			
01657u.tif			

01861a.tif			
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Also, please discuss how the runtime improves for the multiscale solution compared to basic one, and for Fourier-based solution compared to both basic and multiscale solution?

Parts 1 and 2: Output Visualizations

In this section, you will provide the aligned colorized outputs as follows:

- **Basic Alignment** for low-resolution images
- **Multiscale Alignment** for high-resolution images
- **Fourier-based Alignment** for both high-resolution and low-resolution images
- **Inverse Fourier transform visualizations** for two images (**00153v.jpg** and **01861a.tif**)
 - Visualization for **both** channel alignments **without** preprocessing
 - Visualization for **both** channel alignments **with** any sharpening or filter-based preprocessing you applied to color channels
 - **Please note that you still need to include visualization outputs of all images in the .zip file.**

Please upload the images in compressed .jpeg format.

1A: Basic Alignment

00125v.jpg

00149v.jpg

00153v.jpg

00351v.jpg

00398v.jpg

01112v.jpg

1B: Multiscale Alignment

01047u.tif

01657u.tif

01861a.tif

2: Fourier-based Alignment

00125v.jpg

00149v.jpg

00153v.jpg

00351v.jpg

00398v.jpg

01112v.jpg

01047u.tif

01657u.tif

01861a.tif

2: Inverse Fourier Transform Visualizations

00153v.jpg

B to G without processing

B to R without processing

B to G with processing

B to R with processing

01861a.tif

B to G without processing

B to R without processing

B to G with processing

B to R with processing

Parts 1 and 2: Any additional discussion, bonus Improvements

Put any additional discussion (failure cases, limitations, other observations) here.

Put any bonus results and discussion here.

Part 3: Hybrid images implementation discussion

Discuss your approach here.

Part 3: Hybrid images results

Provide each of the following for **3 different examples** (1 provided pair, 2 pairs of your own):

Two input images

Two *filtered* input images

Two generated hybrid image (at different resolutions, similar to images C and D above)

Two σ values (one for each filter) – or alternative filter specification

Example 1:

Example 2:

Example 3:

Part 3: Results discussion, bonus improvements

Include discussion of how successful your examples are + any interesting observations

Include any bonus results and discussion here