Computer Vision
Fall 2016
Problem Set #5

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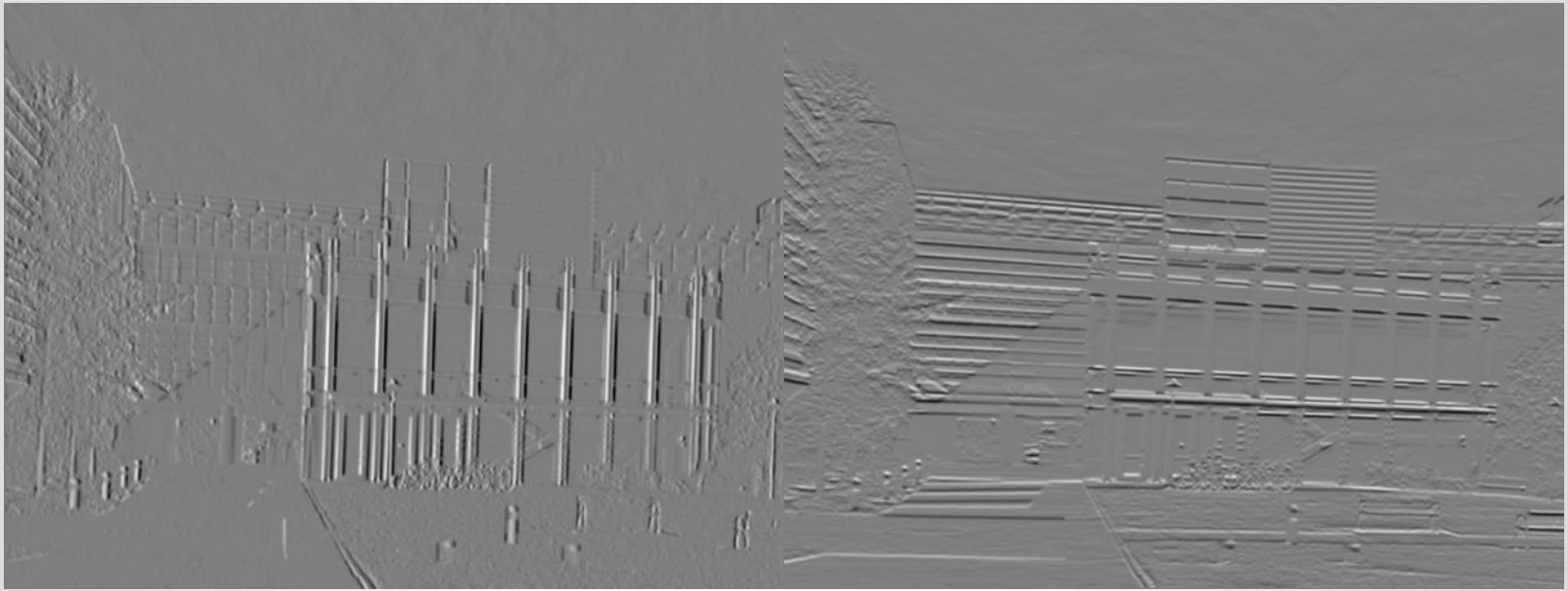
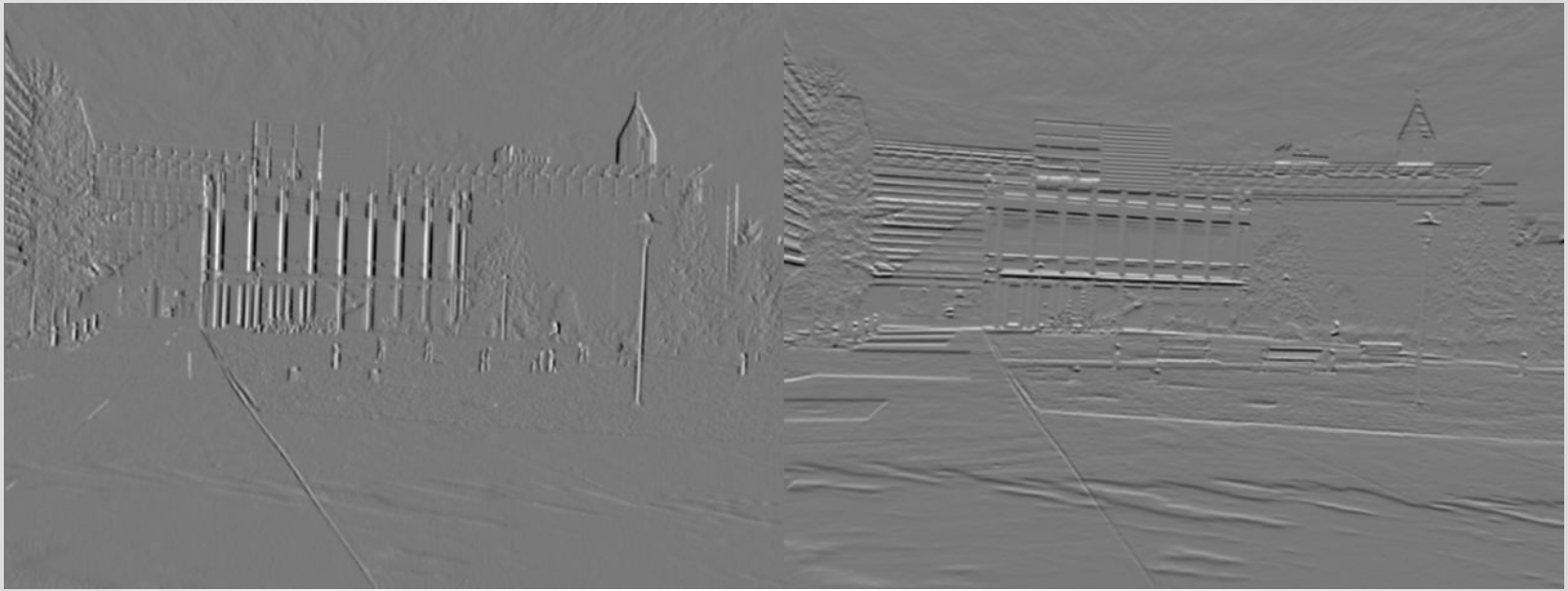
1a: Gradient Pair of transA



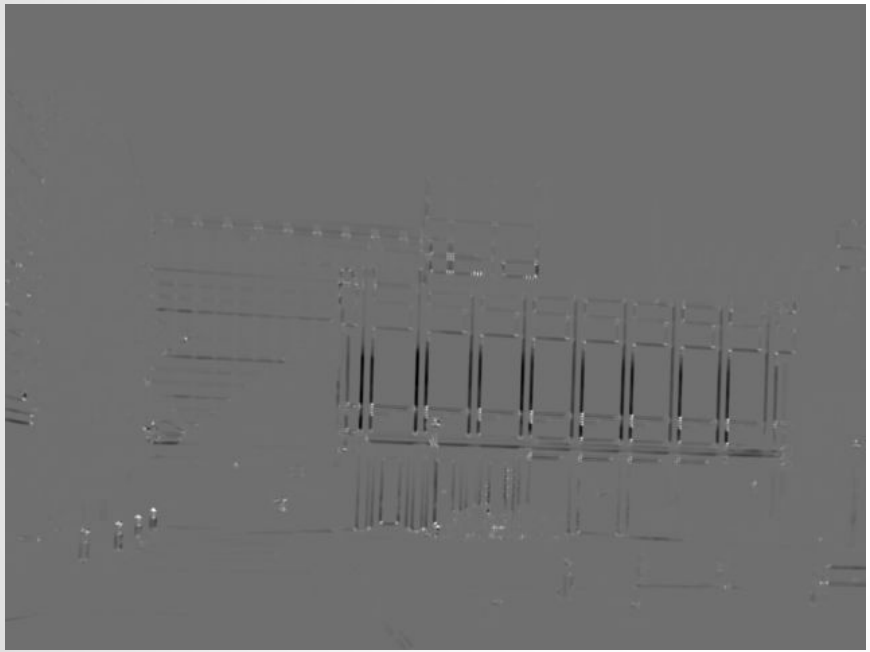
transA gradient-pair image - **ps5-1-a-1.png**

1a: Gradient Pair of simA



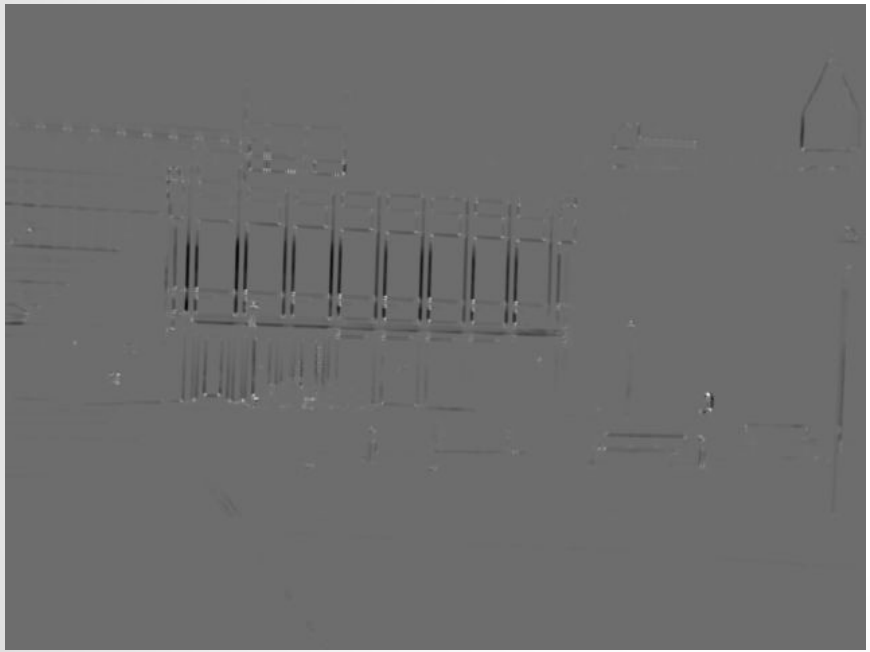
simA gradient-pair image - **ps5-1-a-2.png**

1b: Harris Response Image (transA)



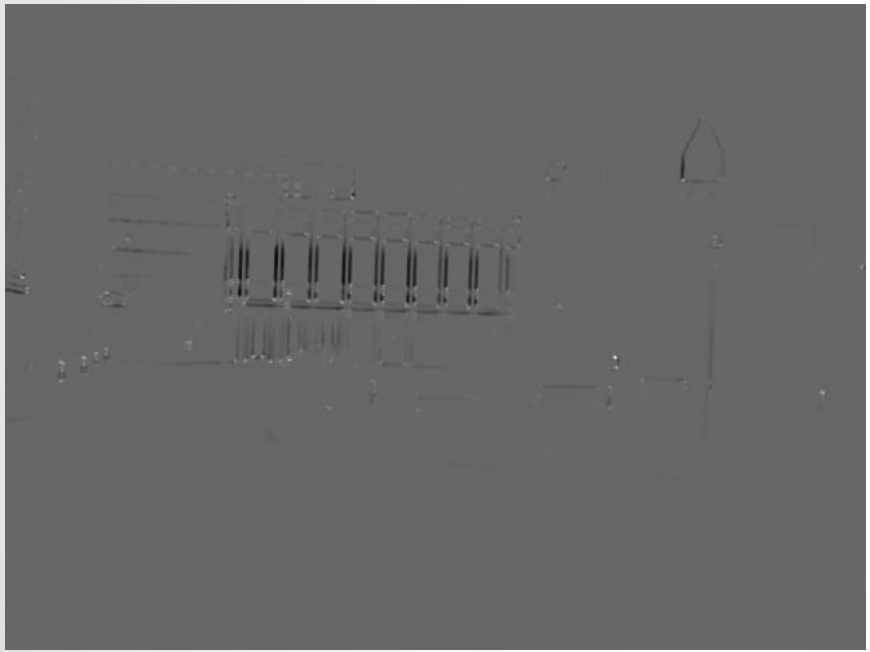
transA image - **ps5-1-b-1.png**

1b: Harris Response Image (transB)



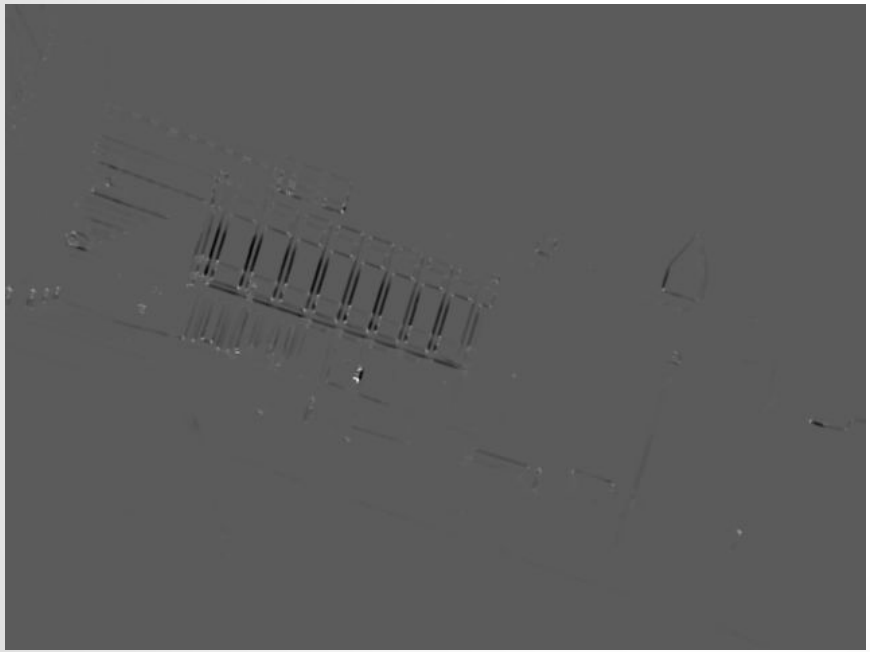
transB image - **ps5-1-b-2.png**

1b: Harris Response Image (simA)



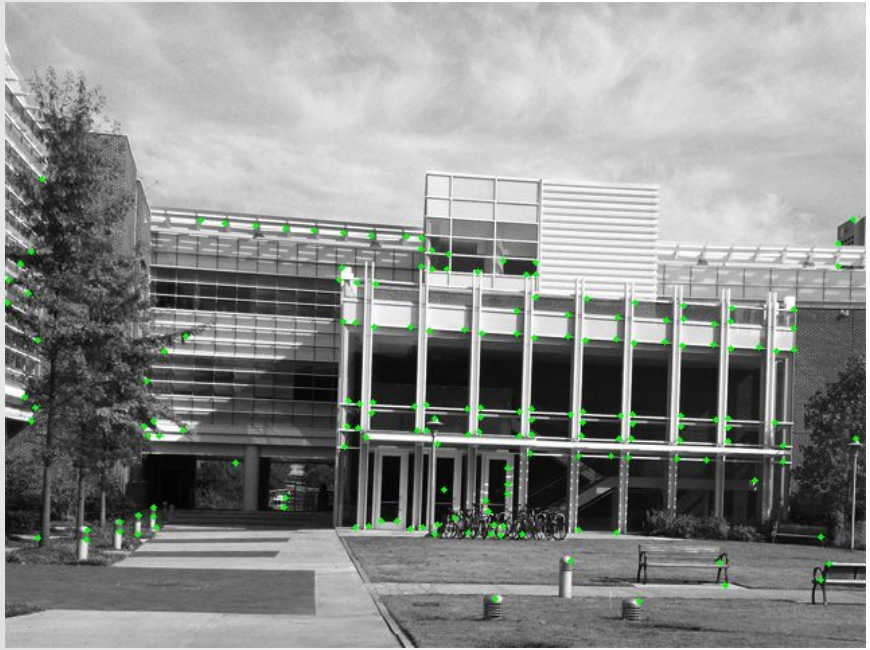
simA image - **ps5-1-b-3.png**

1b: Harris Response Image (simB)



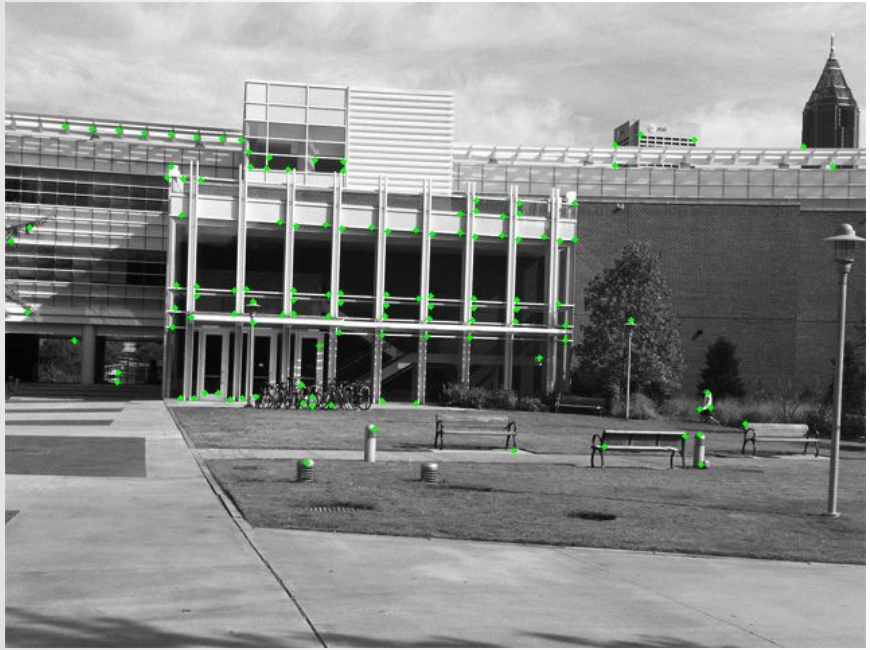
simB image - **ps5-1-b-4.png**

1c: Harris Corners Image (transA)



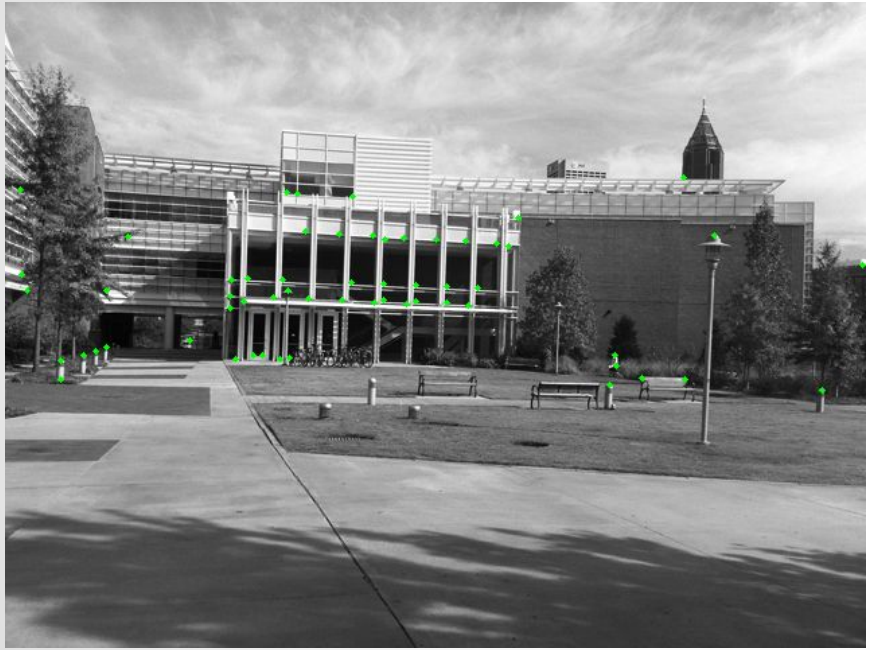
transA image - **ps5-1-c-1.png**

1c: Harris Corners Image (transB)



transB image - **ps5-1-c-2.png**

1c: Harris Corners Image (simA)

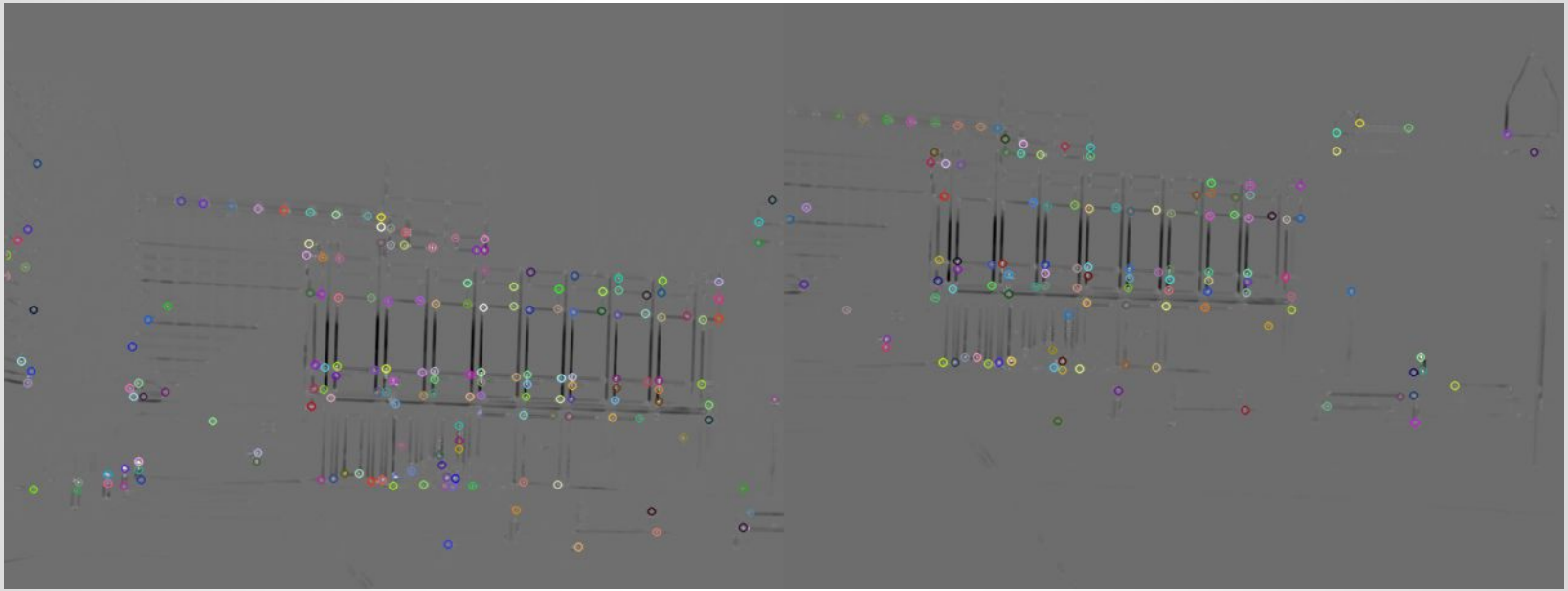


simA image - **ps5-1-c-3.png**

1c: Harris Corners Image (simB)

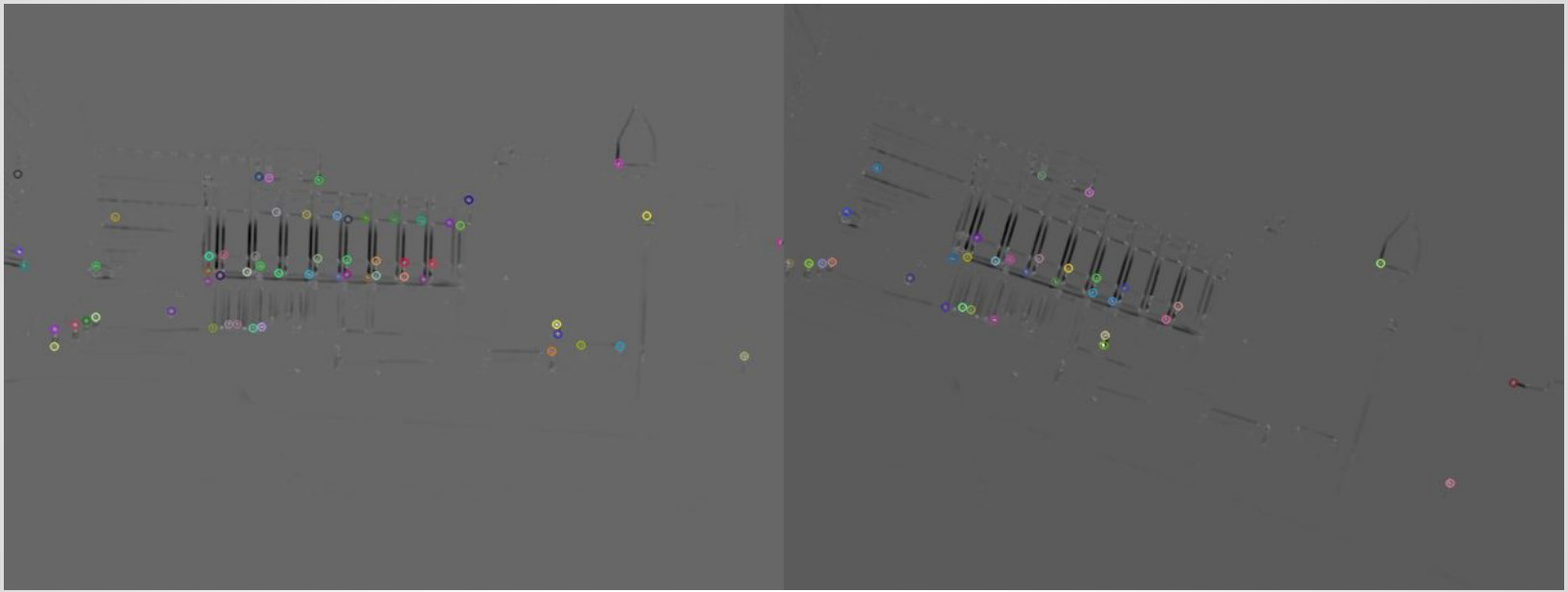
simB image - **ps5-1-c-4.png**

2a: Interest Points Pair (transA-B)



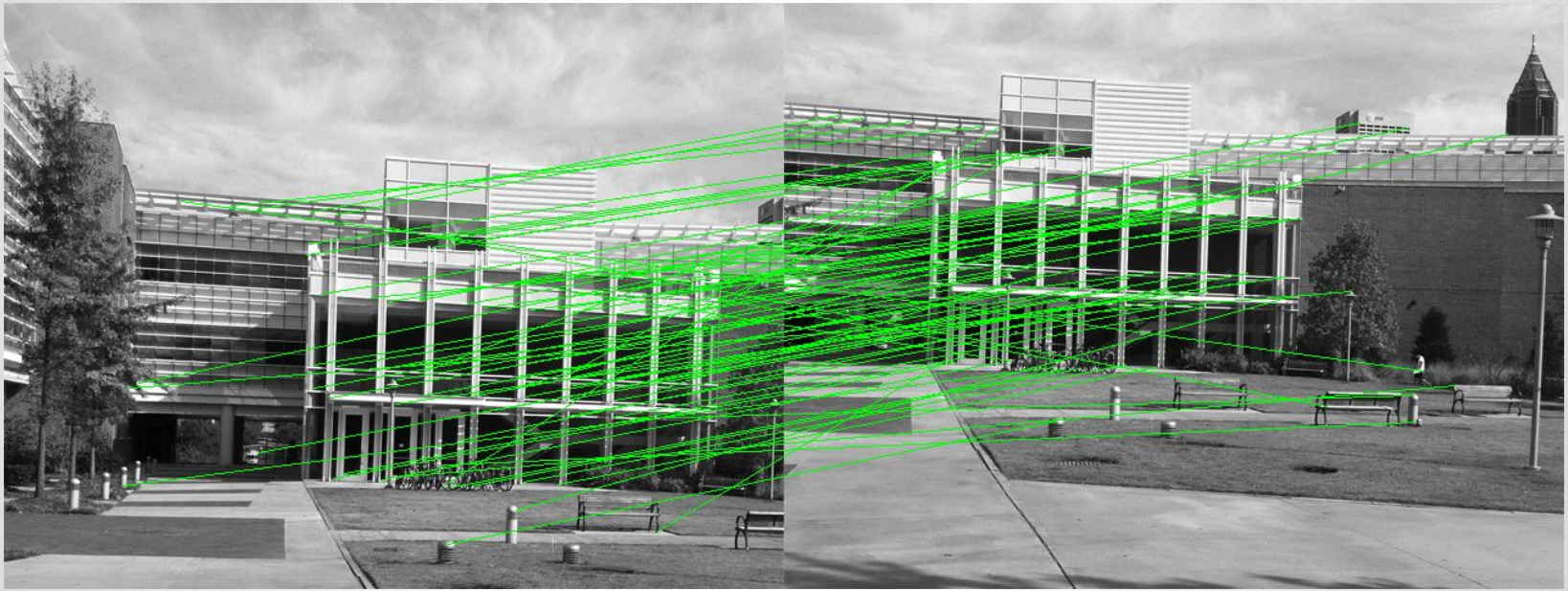
Interest points with angles show on transA/B-pair image - **ps5-2-a-1.png**

2a: Interest Points Pair (simA-B)



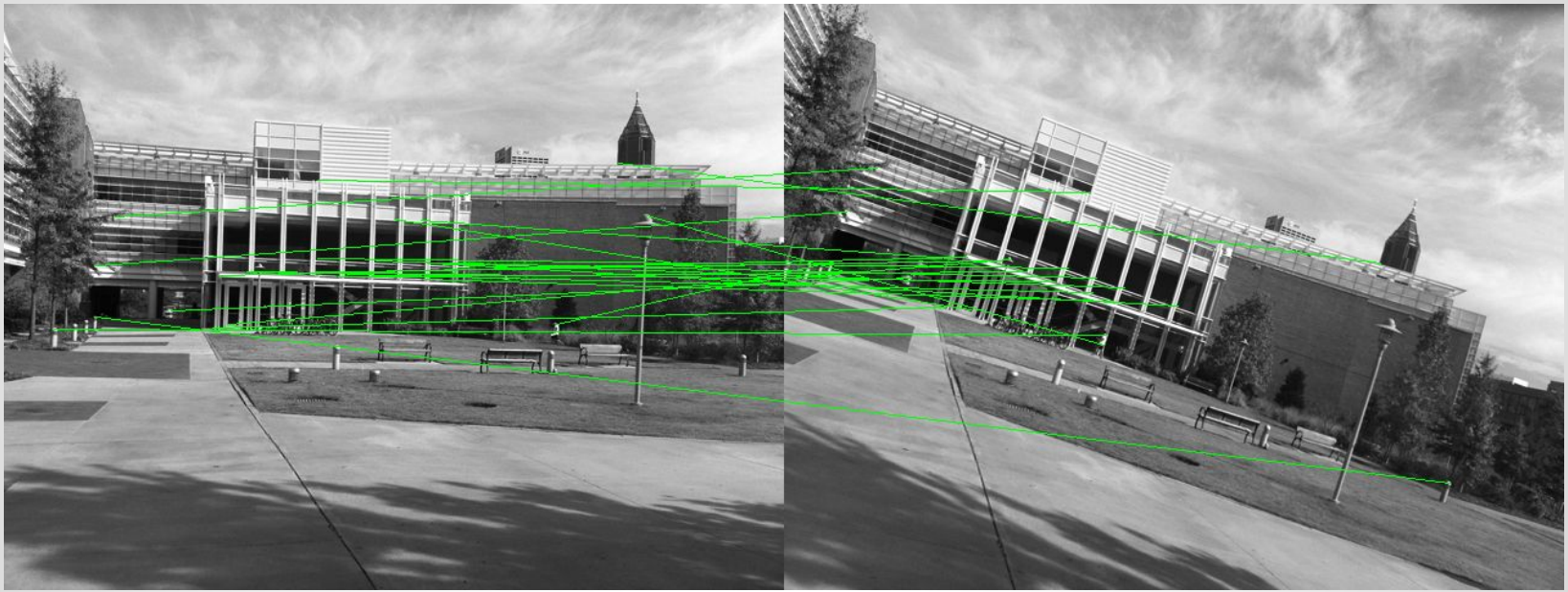
Interest points with angles show on simA/B-pair image - **ps5-2-a-2.png**

2b: Putative Pair Image (transA-B)



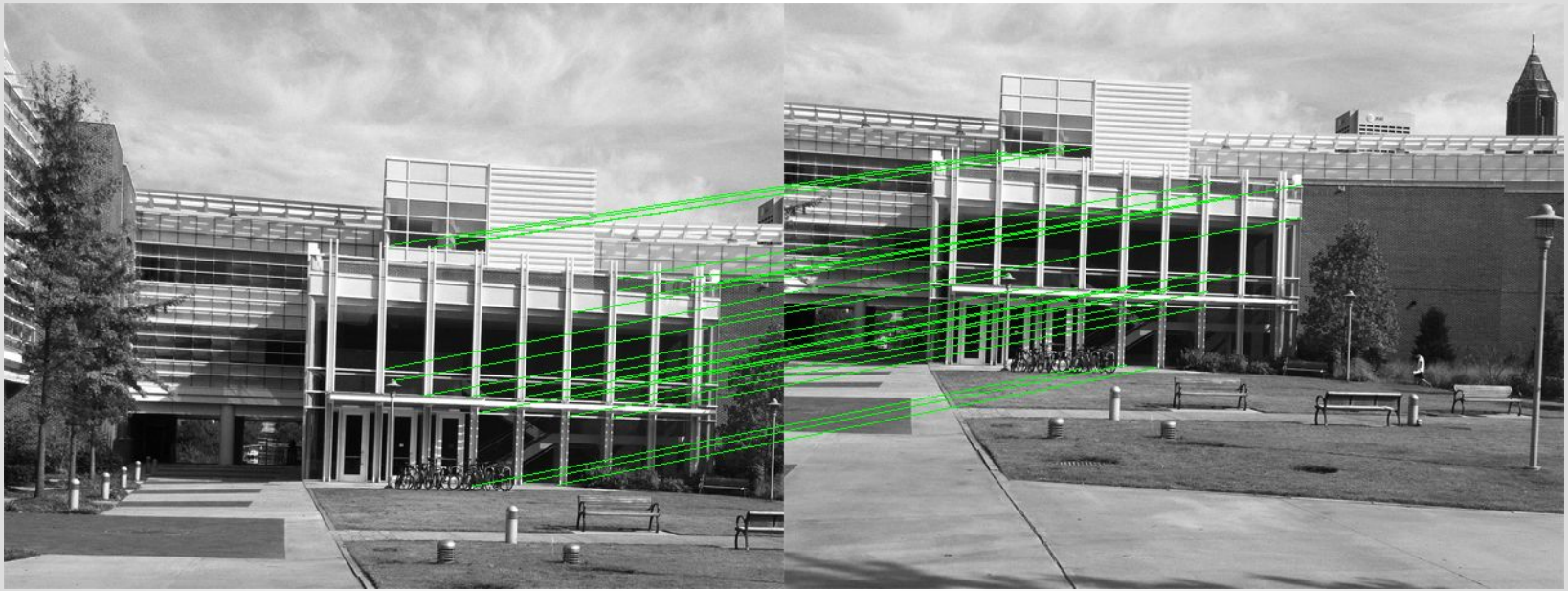
Putative transA/B-pair image - **ps5-2-b-1.png**

2b: Putative Pair Image (simA-B)



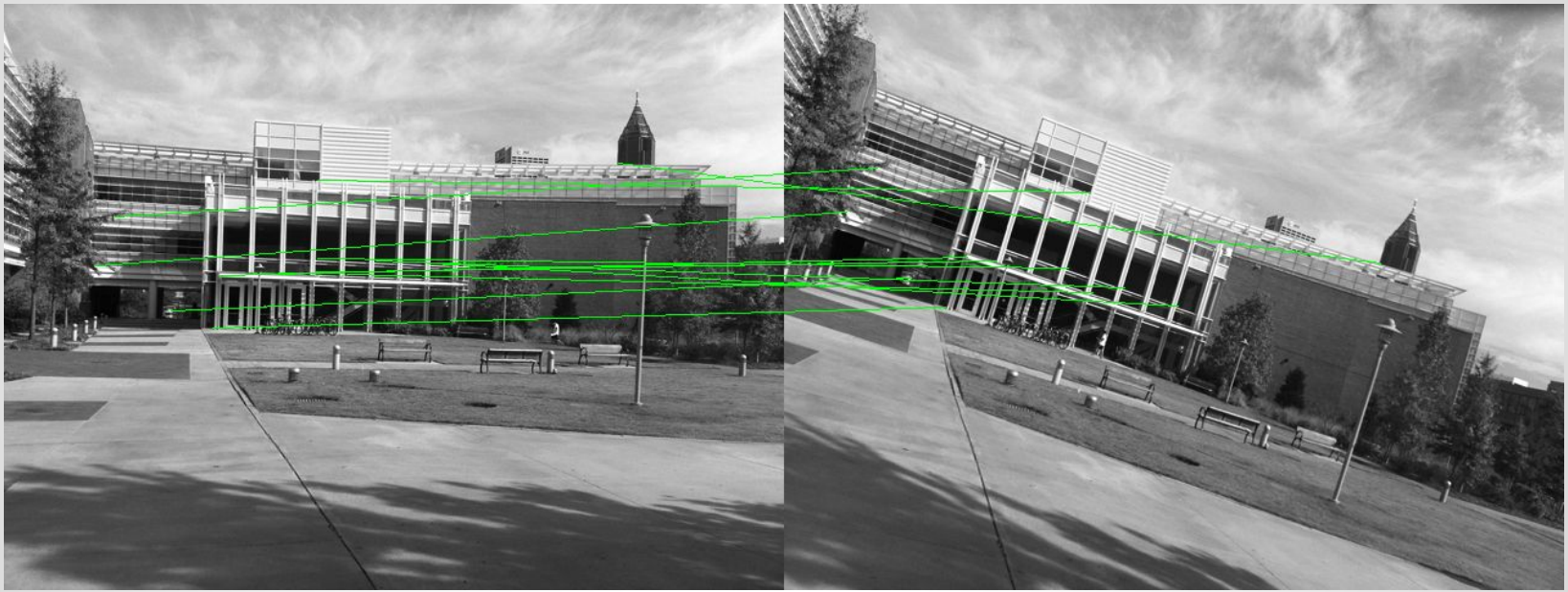
Putative simA/B-pair image - **ps5-2-b-2.png**

3a: Consensus Set Image (transA-B)



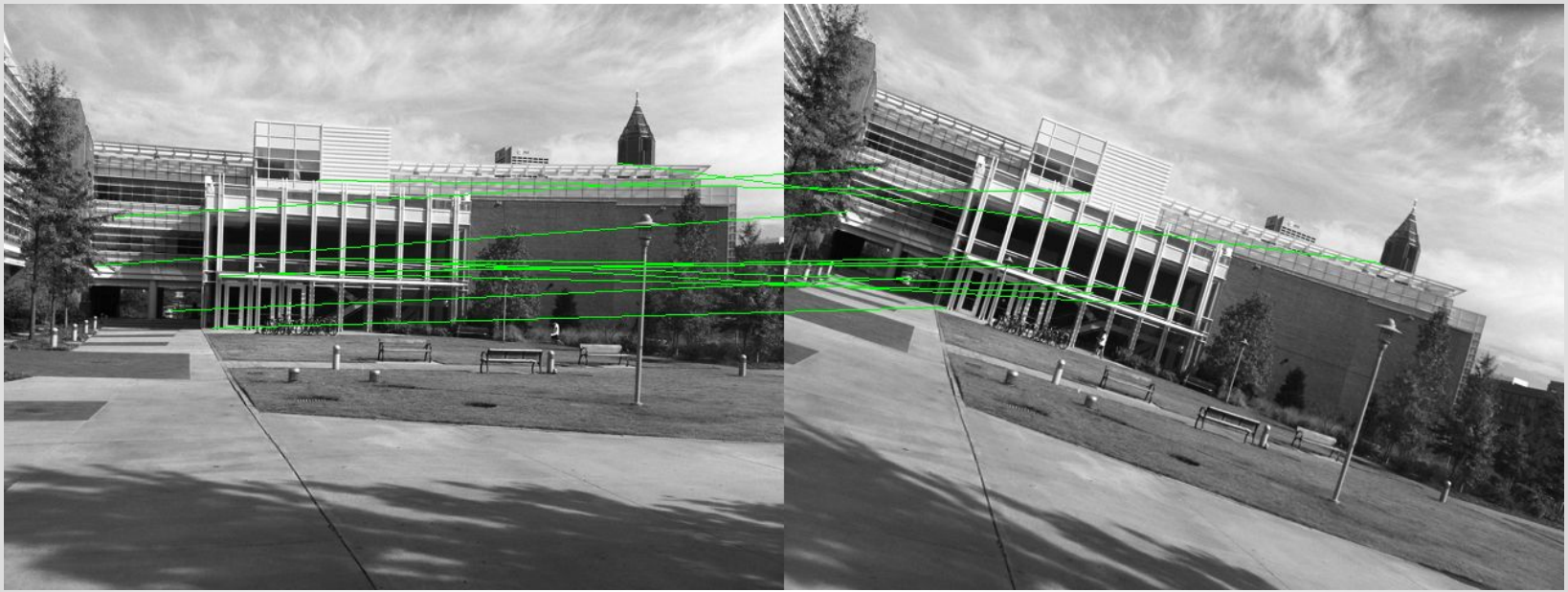
Biggest consensus set lines drawn on pair - **ps5-3-a-1.png**

3b: Consensus Set Image (simA-B)



Biggest consensus set lines drawn on pair - **ps5-3-b-1.png**

3c: Consensus Set Image II (simA-B)



Biggest consensus set lines drawn on pair - **ps5-3-c-1.png**

3d: Warped Image

warpedB image- **ps5-3-d-1.png**

overlay image - **ps5-3-d-2.png**

4a: Warped Image (CHALLENGE)

warpedB image- **ps5-3-e-1.png**

overlay image - **ps5-3-e-2.png**

5: Discussion

- For question 1, describe the behavior of your corner detector including anything surprising, such as points not found in both images of a pair.
  - For the corner detector, I have to set the kernel size to be small (3, 3). If the kernel is too big, the harris response will be unfocused. Some corners are only found on one image but not the others. This is due to distance of the object affecting the size of the corner. In addition, even though harris detector is rotation invariant, there are many corners that are not detected.

5: Discussion

- For questions 2 and 3, ORB and RANSAC:
  - What translation vector was used?
    - [[-149.2]
      [-85.4]]
  - What percentage of your matches was the biggest consensus set?
    - Approximately 50% for translate, similarity, or affine.

5: Discussion

- Regardless of whether you implemented the challenge problem, comment as to whether using the similarity transform or the affine one would give better results, and why or why not.
  - Using the affine transform would give better result. It appears to align better compare to similarity transform. The affine transformation preserves points and straight lines but does not preserve angles between lines or distance between points.