

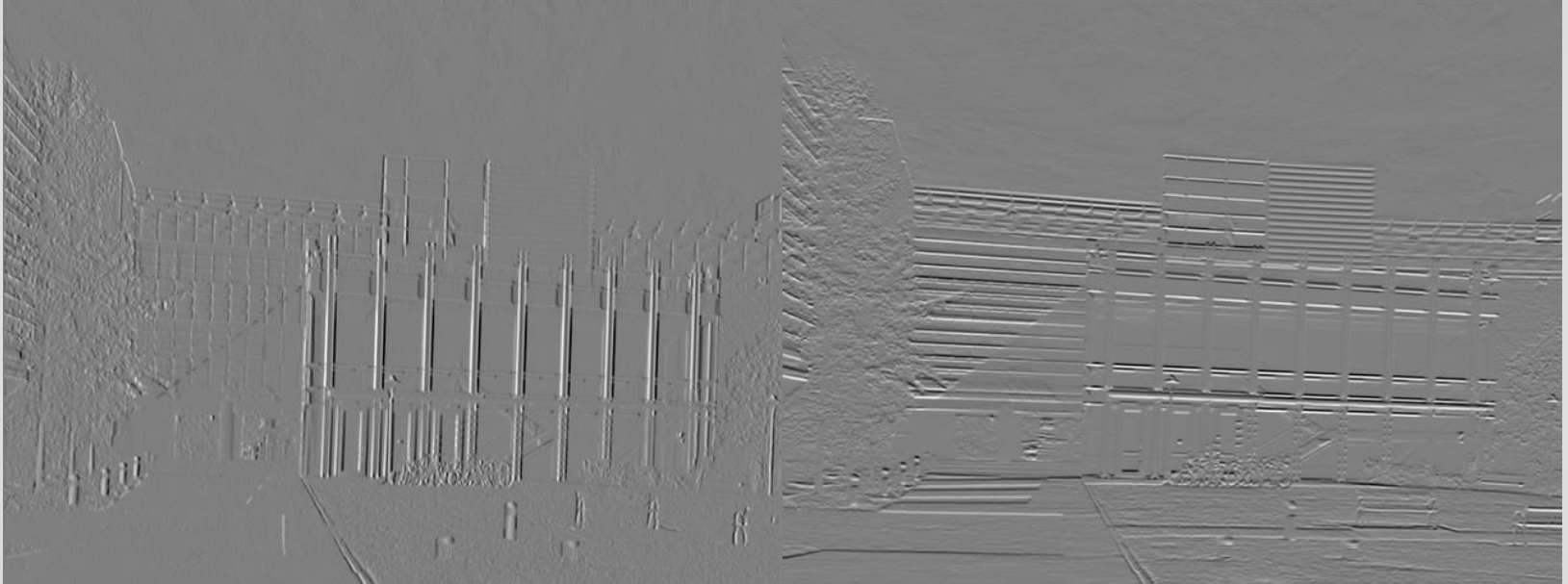
Computer Vision

Fall 2016

Problem Set #5

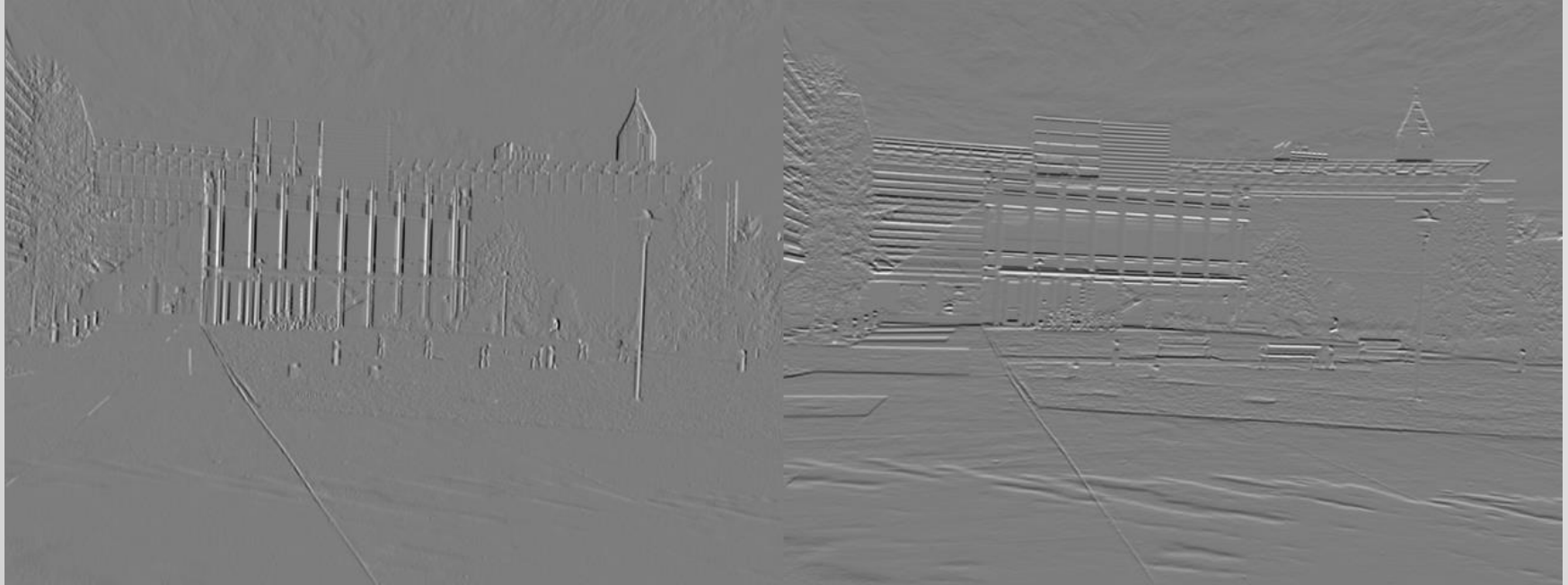
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1a: Gradient Pair of transA



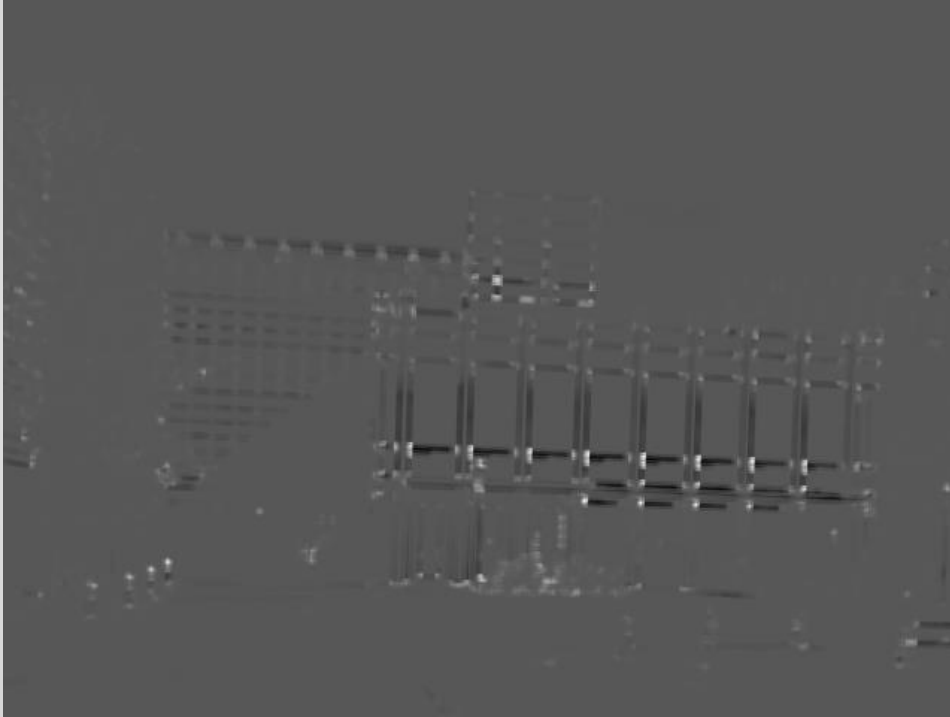
transA gradient-pair image - **ps5-1-a-1.png**

1a: Gradient Pair of simA



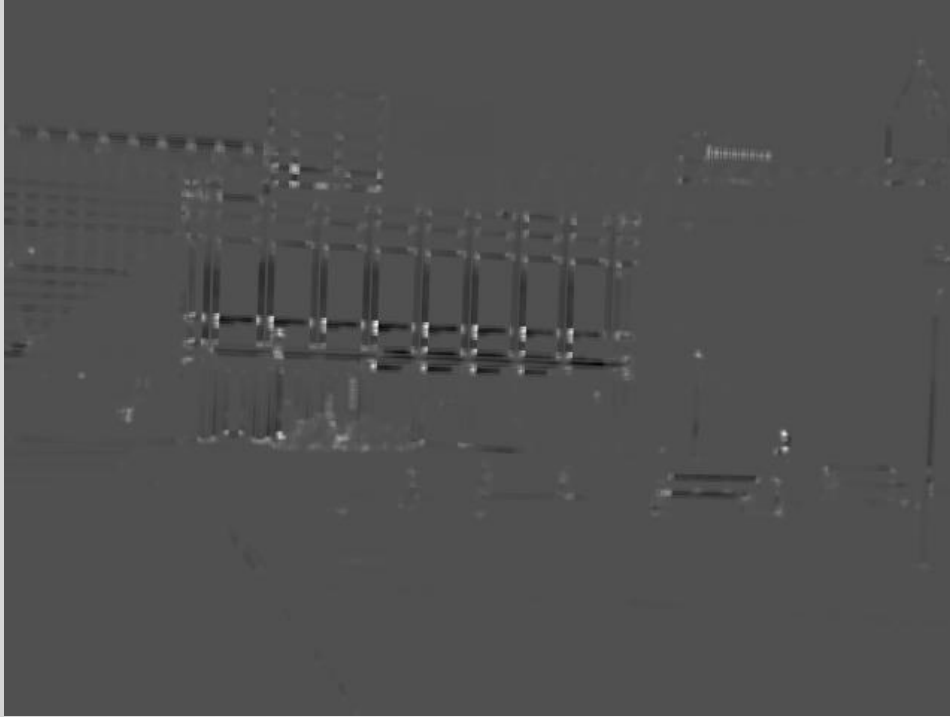
simA gradient-pair image - **ps5-1-a-2.png**

1b: Harris Response Image (transA)



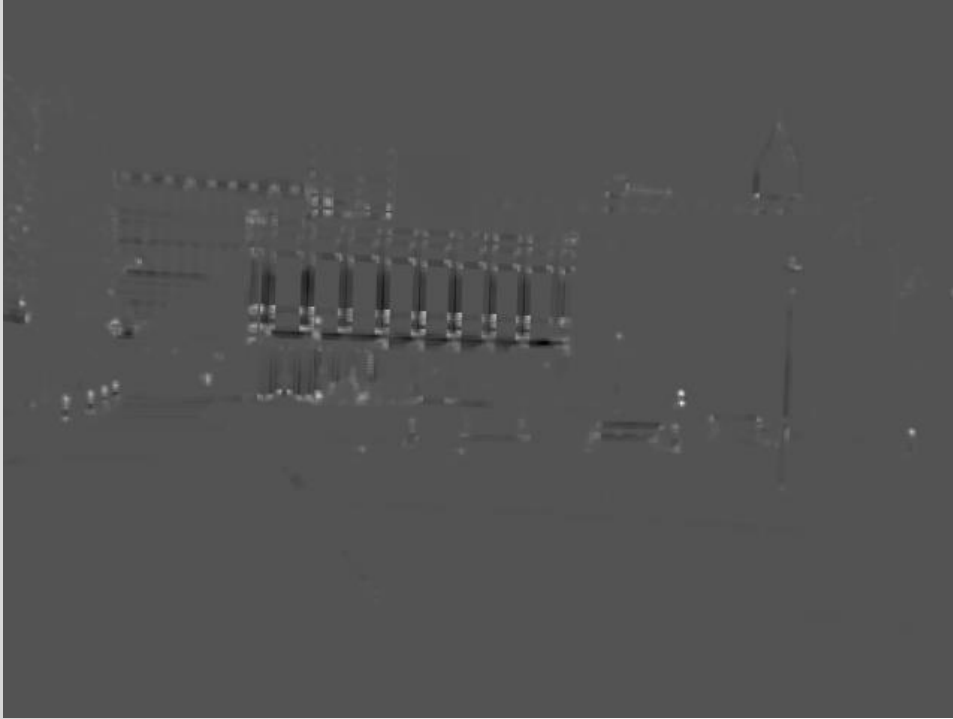
transA image - **ps5-1-b-1.png**

1b: Harris Response Image (transB)



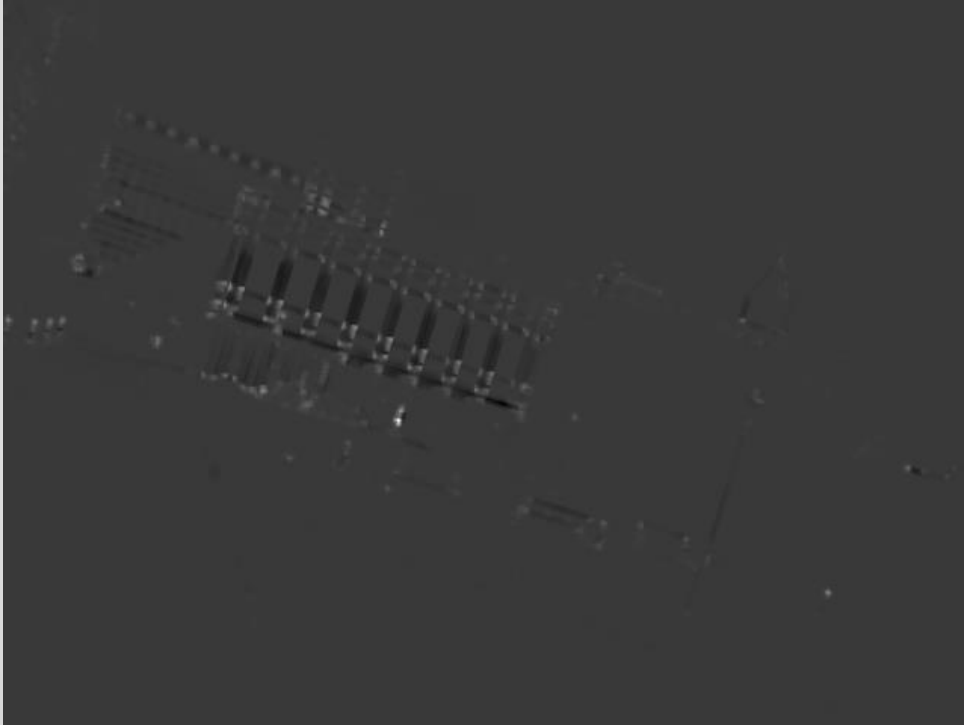
transB image - **ps5-1-b-2.png**

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)



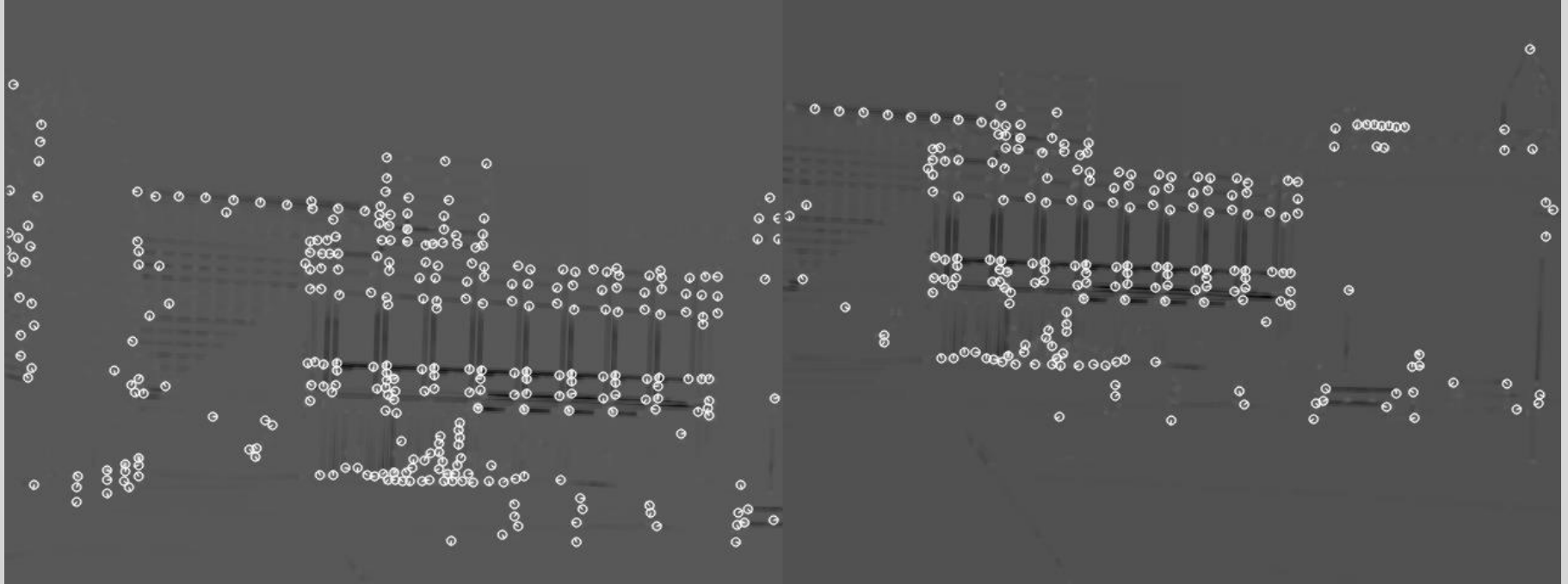
simA image - ps5-1-c-3.png

1c: Harris Corners Image (simB)



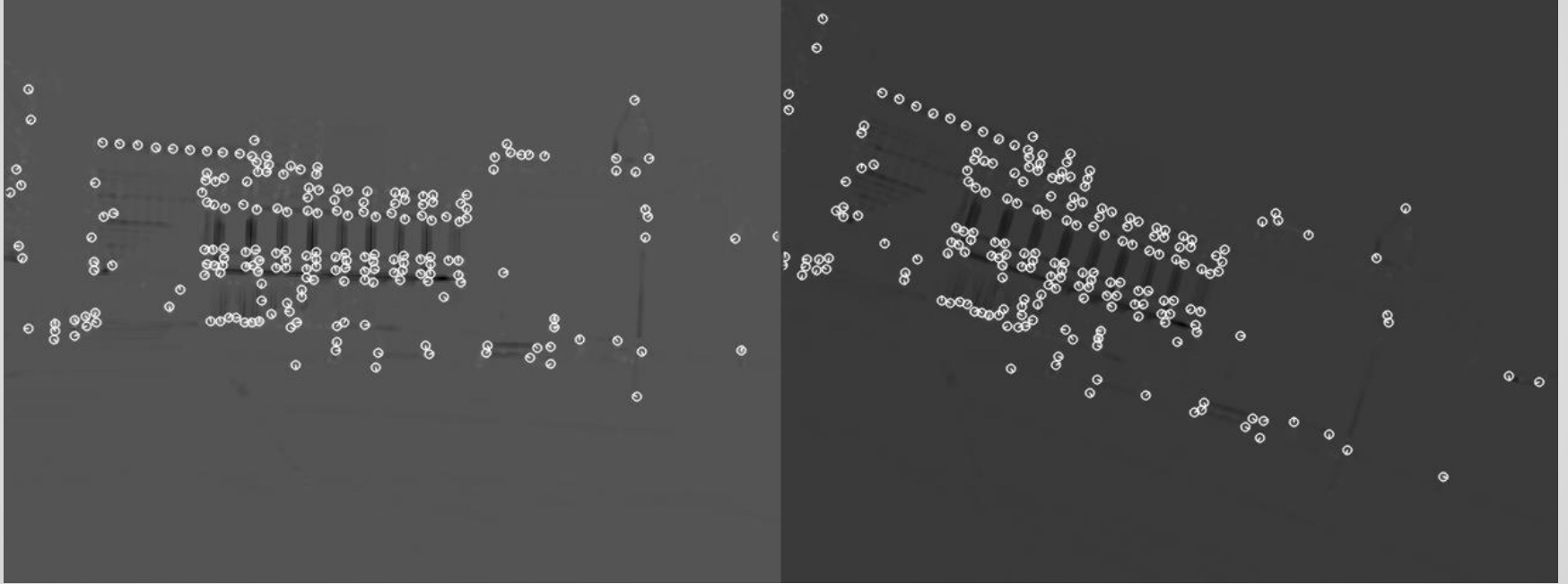
simB image - ps5-1-c-4.png

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)



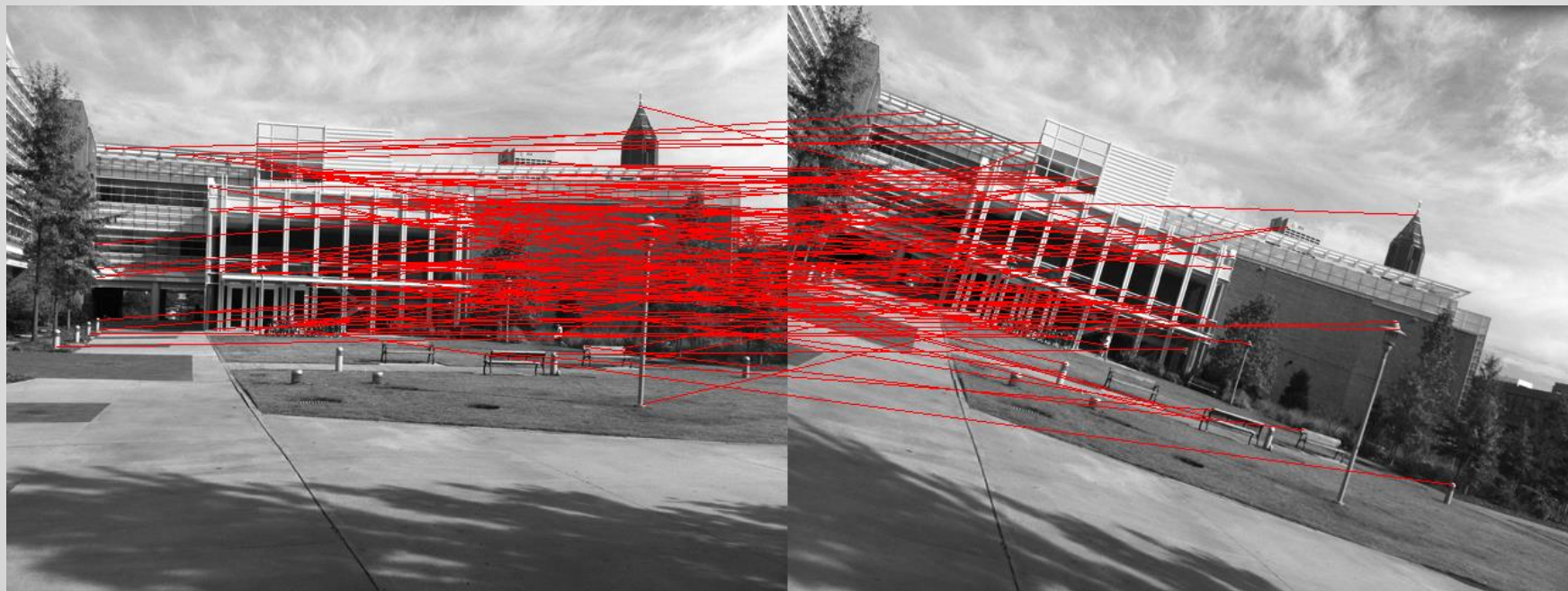
Interest points with angles show on simA/B-pair image - **ps5-2-a-2.png**

2b: Putative Pair Image (transA-B)



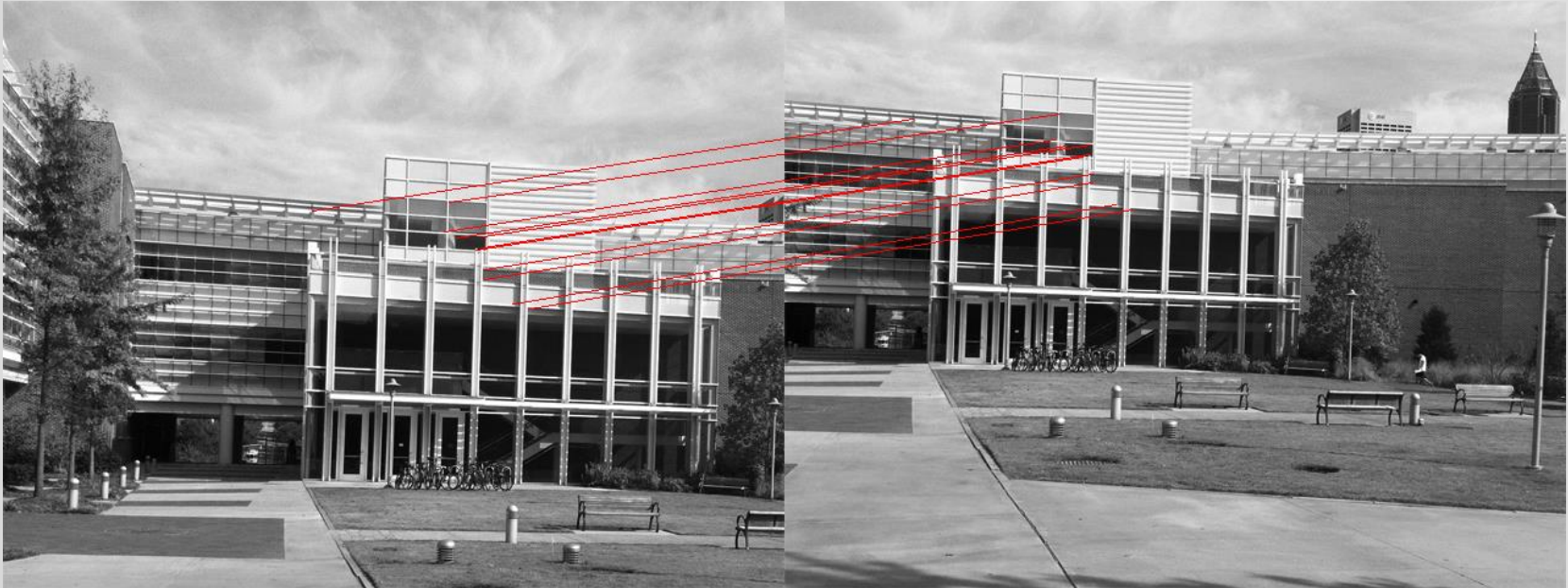
Putative transA/B-pair image - **ps5-2-b-1.png**

2b: Putative Pair Image (simA-B)



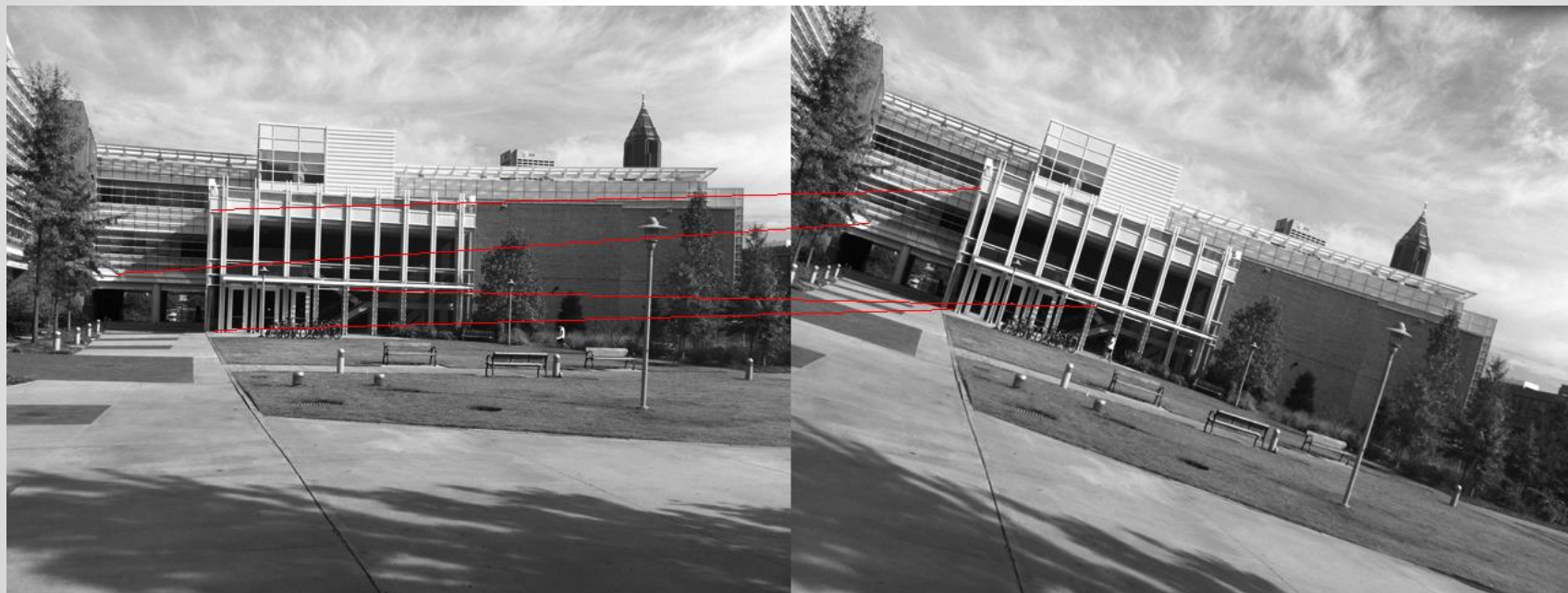
Putative simA/B-pair image - **ps5-2-b-2.png**

3a: Consensus Set Image (transA-B)



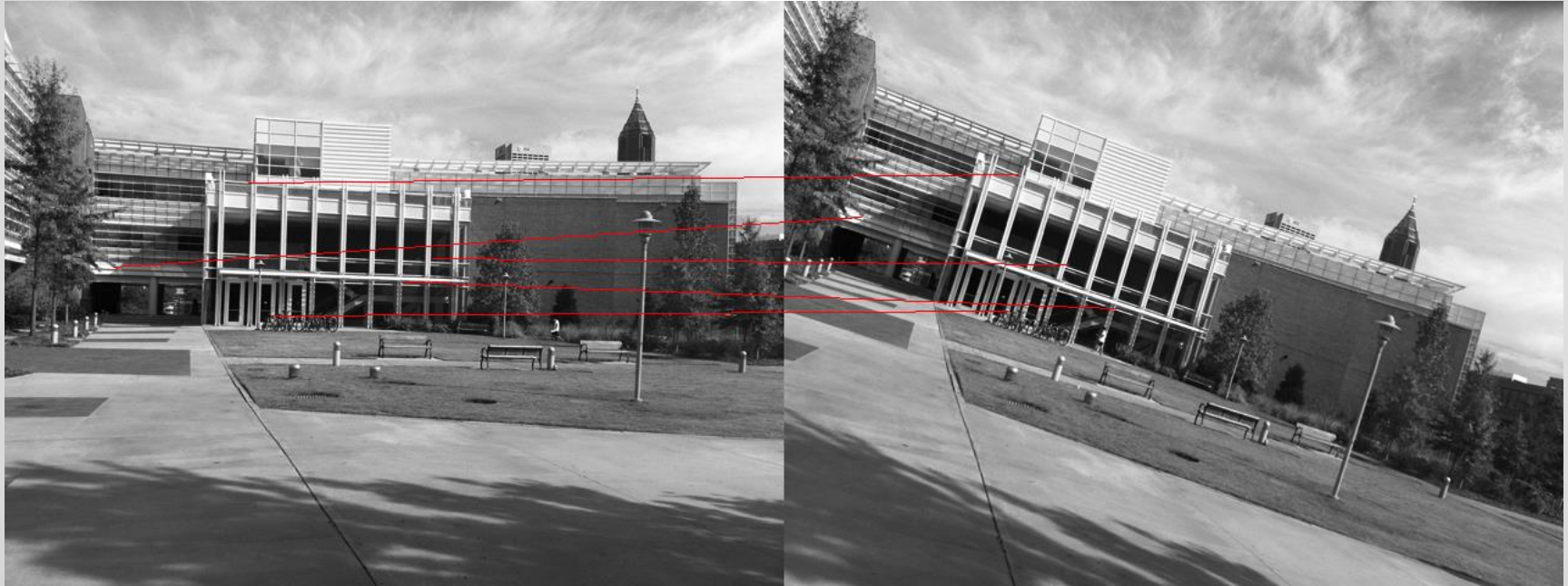
Biggest consensus set lines drawn on pair - **ps5-3-a-1.png**

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)

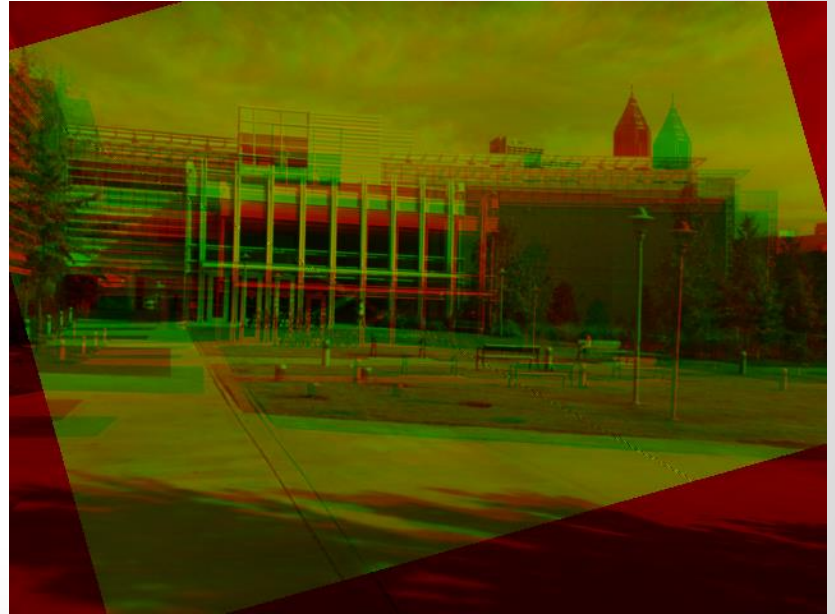


Biggest consensus set lines drawn on pair - **ps5-3-c-1.png**

3d: Warped Image



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



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

4a: Warped Image (CHALLENGE)



warpedB image- **ps5-4-a-1.png**



overlay image - **ps5-4-a-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.

Overall the results that were obtained were quite acceptable. Something to note was the sensitivity of the threshold for example going from 0.38 to 0.3 changes results drastically. The choice of kernel could also had an effect on the obtained results. Some of the corners were difficult to get on both images such as the corners of the triangle on top of the building.

5: Discussion

For questions 2 and 3, ORB and RANSAC:

- What translation vector was used?

3a: Translation vector:

$\begin{bmatrix} -142.4 \end{bmatrix}$

$\begin{bmatrix} -76.8 \end{bmatrix}$

3b: Transform Matrix for the best set:

$\begin{bmatrix} 0.98747453 & -0.28107539 & 36.22000024 \end{bmatrix}$

$\begin{bmatrix} 0.28107539 & 0.98747453 & -61.79370381 \end{bmatrix}$

3c: Transform Matrix for the best set:

$\begin{bmatrix} -4.50638187\text{e-}01 & -1.59416515\text{e-}01 & 5.61953373\text{e+}02 \end{bmatrix}$

$\begin{bmatrix} -1.14352696\text{e-}01 & 4.74081792\text{e-}02 & 2.50461579\text{e+}02 \end{bmatrix}$

5: Discussion

- What percentage of your matches was the biggest consensus set?

3a: 0.111940298507

3b: 0.0576923076923

3c: 0.0480769230769

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.

It was found that similarity gave good results but affine was expected to be better since it has 3 matches instead of 2. Due to the randomness of the algorithm each run changes a bit making the results different as well. Overall, both algorithms had close results.