Assignment 2: Creating Panoramas

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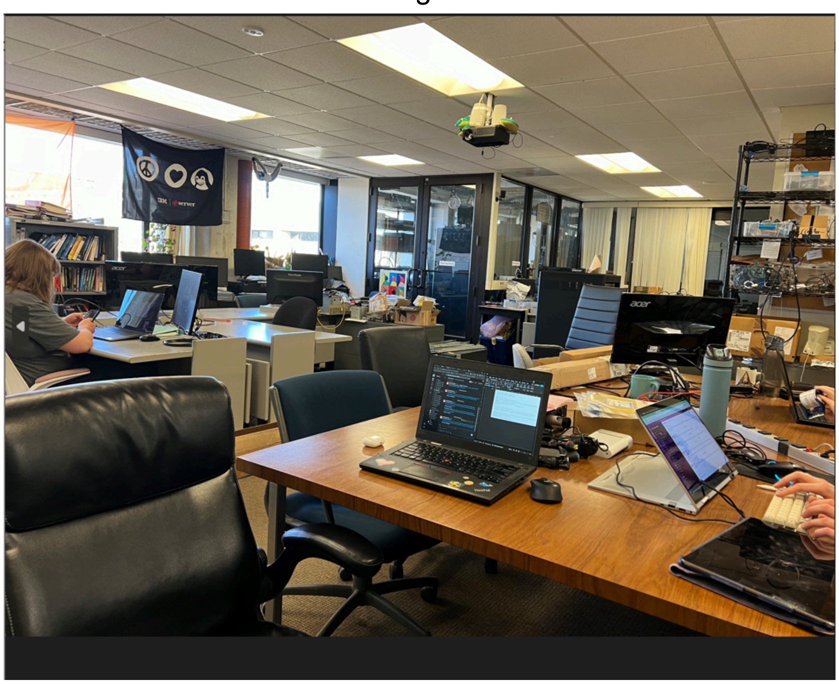
Image 1

Image 2



Transform Matrix A based on Sample Points

a

3x3 double

	1	2	3
1	-4.2722e-04	-2.5879e-04	0.8379
2	-5.7596e-05	-7.0647e-04	0.5458
3	-4.7003e-08	-3.1191e-07	1.0914e-04

Transform Matrix A1 based upon image 1 and 2 points obtained using detectSURFfeatures and ransac, used to transform Image 2

a a1

3x3 double

	1	2	3
1	-7.7747e-04	-6.8502e-06	0.9710
2	-9.5757e-05	-6.9007e-04	0.2391
3	-8.3209e-08	-2.0201e-09	-5.0290e-04

Image 2 after applying the transformation matrix using transform_image.m from assignment 1

Image 1 blend using ramp

Image 2 blend using ramp

Final Panorama

7)

$$\begin{matrix}\hat{x}' = \\ \hat{y}' = \\ \hat{w}' = \end{matrix}\begin{bmatrix} a & b & t_x \\ -b & a & t_y \\ 0 & 0 & 1 \end{bmatrix} \rightarrow \begin{matrix}\hat{x}' = ax + by + t_x \\ \hat{y}' = -bx + ay + t_y \\ \hat{w}' = 0x + 0y + 1 = 1\end{matrix} \rightarrow \begin{matrix} x' = \frac{\hat{x}'}{\hat{w}'} = ax + by + t_x \\ y' = \frac{\hat{y}'}{\hat{w}'} = -bx + ay + t_y \end{matrix}$$

At minimum, we need 2 correspondences for a full square matrix.

$$\begin{bmatrix} x_1 & y_1 & 1 & 0 \\ y_1 & -x_1 & 0 & 1 \\ & \vdots & & \\ & & & \end{bmatrix} \begin{bmatrix} a \\ b \\ t_x \\ t_y \end{bmatrix} = \begin{bmatrix} x'_1 \\ y'_1 \\ \vdots \\ \vdots \end{bmatrix}$$

$$2N \times 4 \quad 4 \times 1 \quad 2N \times 1$$