

## ECE-5554 Computer Vision: Problem Set 3

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## Answer Sheet

### 1 Programming Problem (Image Mosaicking)

#### 1.1 Pair 1: Crops

- Inputs:



Figure 1: Input Image: Crops

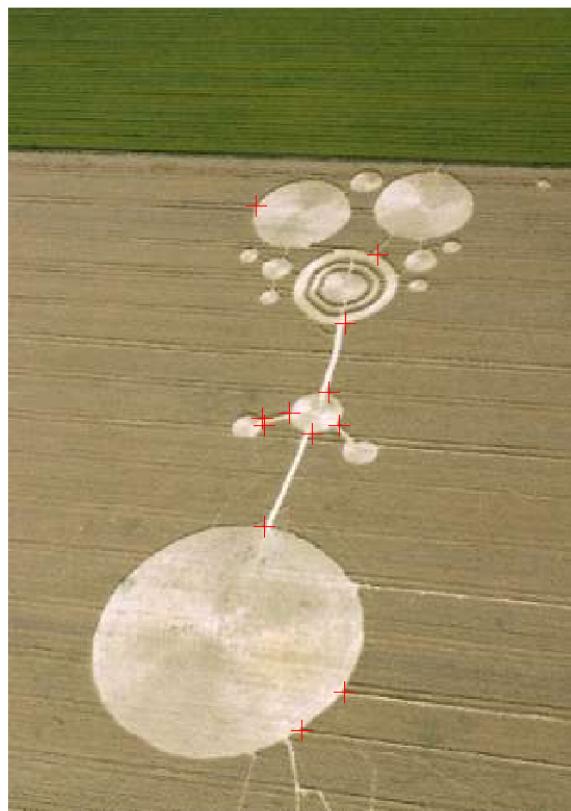


Figure 2: Base Image: Crops

- Outputs:

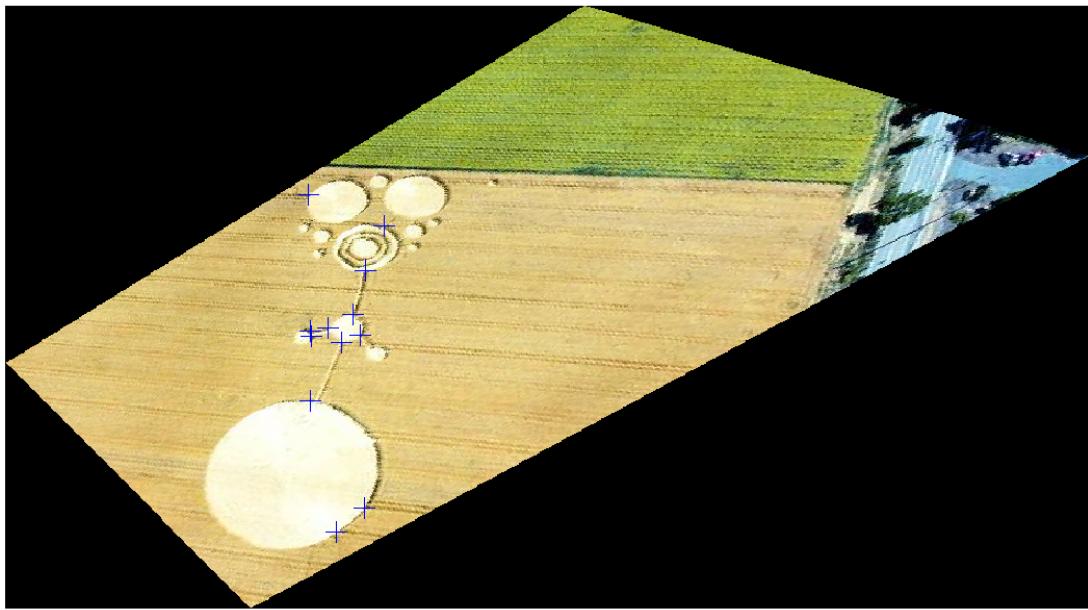


Figure 3: Warped Image Crops



Figure 4: Merged Image Crops

- Homography Matrix (obtained with the given input points):

$$\mathcal{H} : \begin{bmatrix} 0.0012 & -0.0042 & 0.9896 \\ 0.0006 & 0.0028 & -0.1434 \\ -0.0000 & 0.0000 & 0.0026 \end{bmatrix}$$

## 1.2 Pair 2: Washington D.C.

- Inputs:



Figure 5: Input Image: Washington D.C.

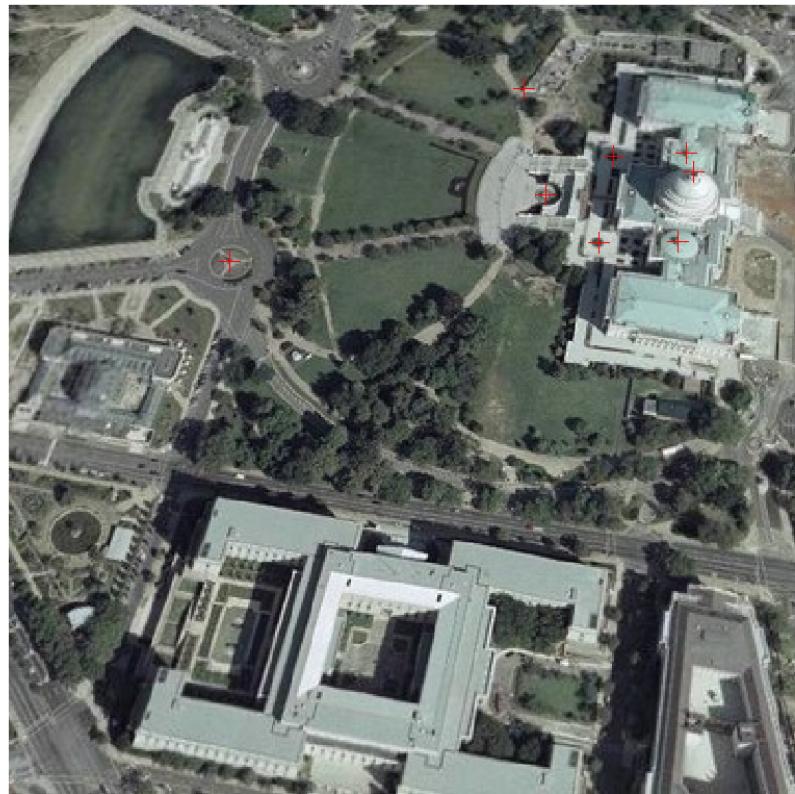


Figure 6: Base Image: Washington D.C.

- Outputs:

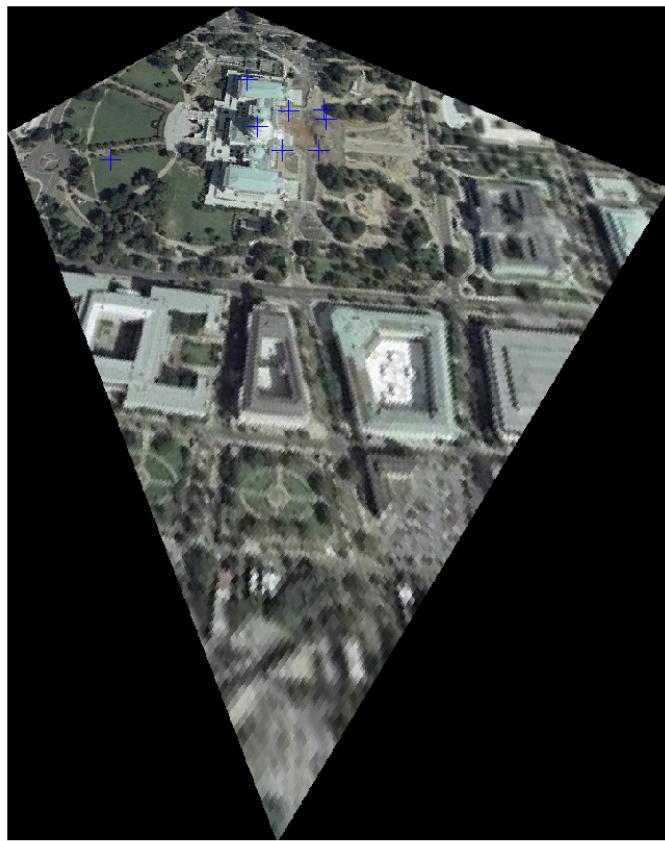


Figure 7: Warped Image: Washington D.C.

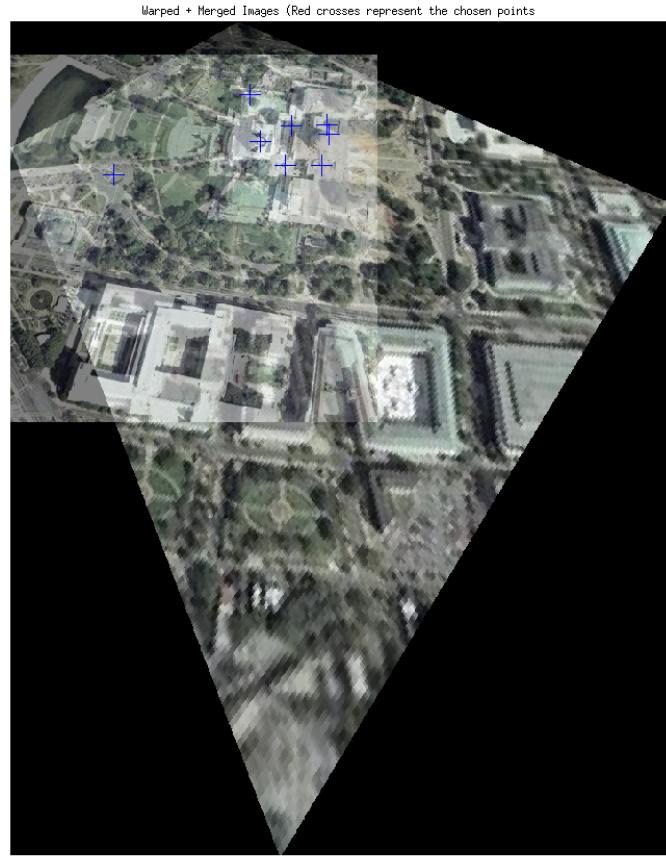


Figure 8: Merged Image: Washington D.C.

- Homography Matrix (obtained with the given input points):

$$\mathcal{H} : \begin{bmatrix} 0.0019 & 0.0002 & -0.9800 \\ -0.0008 & 0.0010 & -0.1988 \\ 0.0000 & -0.0000 & -0.0012 \end{bmatrix}$$

### 1.3 Pair 3: CMS Lab.

- Inputs:



Figure 9: Input Image: CMS Lab



Figure 10: Base Image: CMS Lab

- Outputs:



Figure 11: Warped Image: CMS Lab

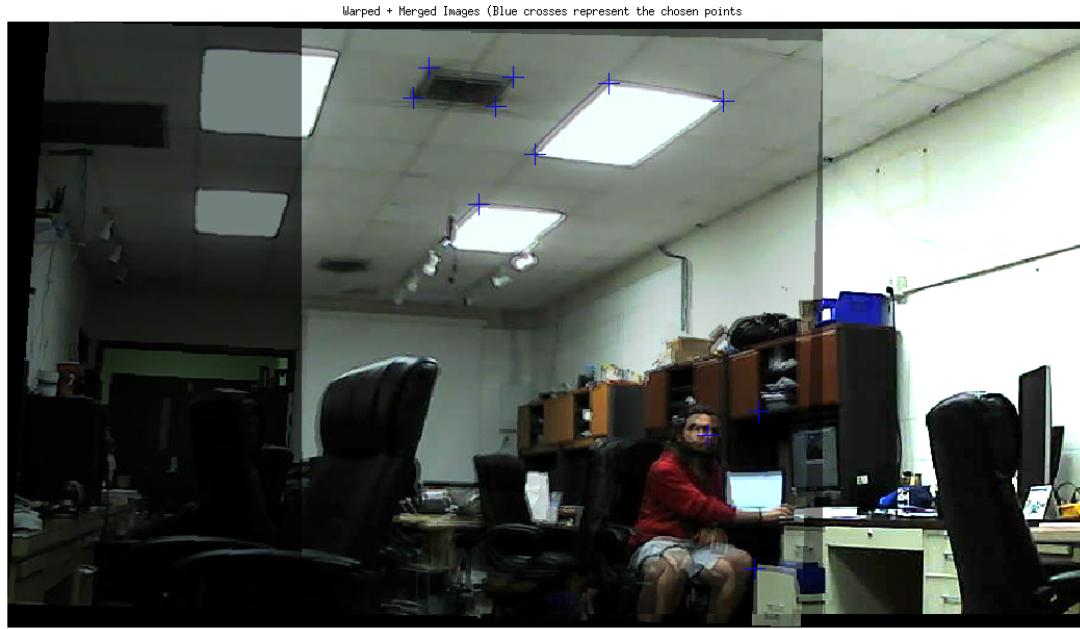


Figure 12: Merged Image: CMS Lab

- Homography Matrix (obtained with the given input points):

$$\mathcal{H} : \begin{bmatrix} -0.0047 & 0.0003 & 0.9992 \\ -0.0001 & -0.0046 & 0.0398 \\ 0.0000 & -0.0000 & -0.0048 \end{bmatrix}$$

#### 1.4 Pair 4: Warping into Frame

- Inputs:



Figure 13: Input Image: CVPR Logo for 2016



Figure 14: Base Image: Empty Billboard

- Outputs:



Figure 15: Warped Image: CVPR Logo



Figure 16: Merged Image: Virtual CVPR Billboard

- Homography Matrix (obtained with the given input points):

$$\mathcal{H} : \begin{bmatrix} -0.0045 & 0.0004 & -0.8065 \\ -0.0011 & -0.0044 & -0.5912 \\ -0.0000 & 0.0000 & -0.0075 \end{bmatrix}$$

## 2 Extra Credit

### 2.1 RANSAC

### 2.2 Rectification

- Inputs:

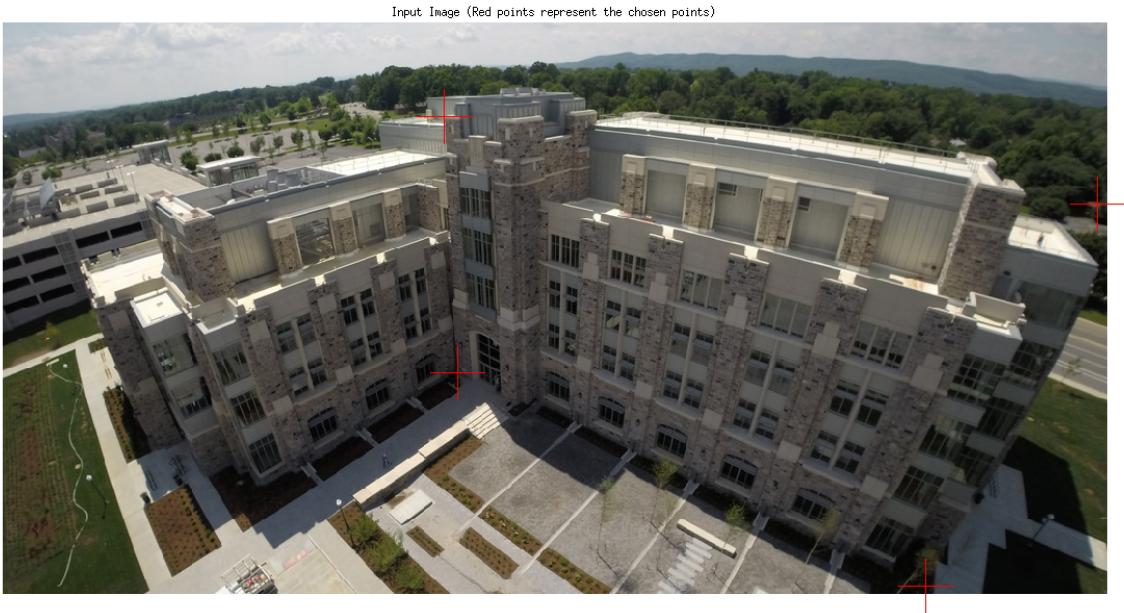


Figure 17: Input Image: Aerial Shot of Goodwin Hall

- Outputs:

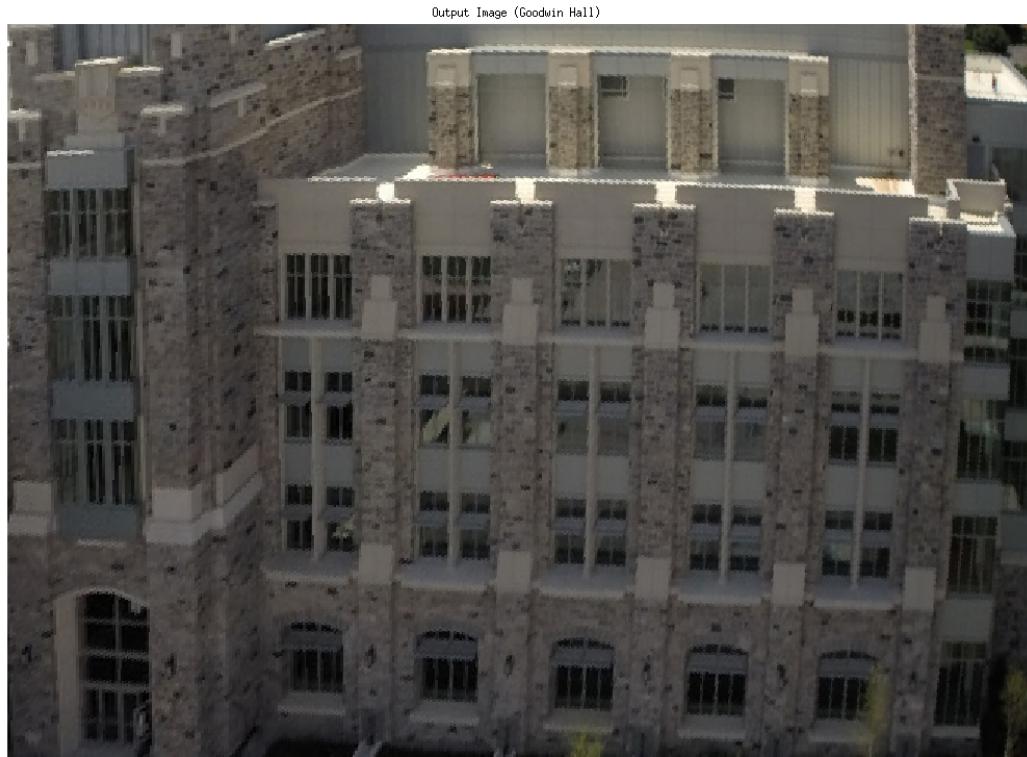


Figure 18: Output Image: Obtained Planar View of Goodwin Hall

- Homography Matrix (obtained with the given input points):

$$\mathcal{H} : \begin{bmatrix} 0.0023 & -0.0001 & -0.9980 \\ -0.0002 & 0.0019 & -0.0637 \\ 0.0000 & -0.0000 & 0.0006 \end{bmatrix}$$