Assignment_3_Q5

April 21, 2024

1 Box Image

“‘boxImage = imread(‘/Users/Harsh/Documents/GSU_Spring/ComputerVision/Harsh_Assignment_3/elephant
boxImage = im2gray(boxImage); figure; imshow(boxImage);

[4]:
```
from IPython.display import Image
```

[6]:
```
Image(filename="/Users/Harsh/Documents/GSU_Spring/ComputerVision/
↪Harsh_Assignment_3/Q5/elephant.jpg")
```

[6]:

2 Scene Image

“‘sceneImage = imread(‘/Users/Harsh/Documents/GSU_Spring/ComputerVision/Harsh_Assignment_3/clutter.
sceneImage = im2gray(sceneImage); figure; imshow(sceneImage);

[7]:
```
Image(filename="/Users/Harsh/Documents/GSU_Spring/ComputerVision/
↪Harsh_Assignment_3/Q5/clutter.jpg")
```

[7]:

3 SURFFeatures

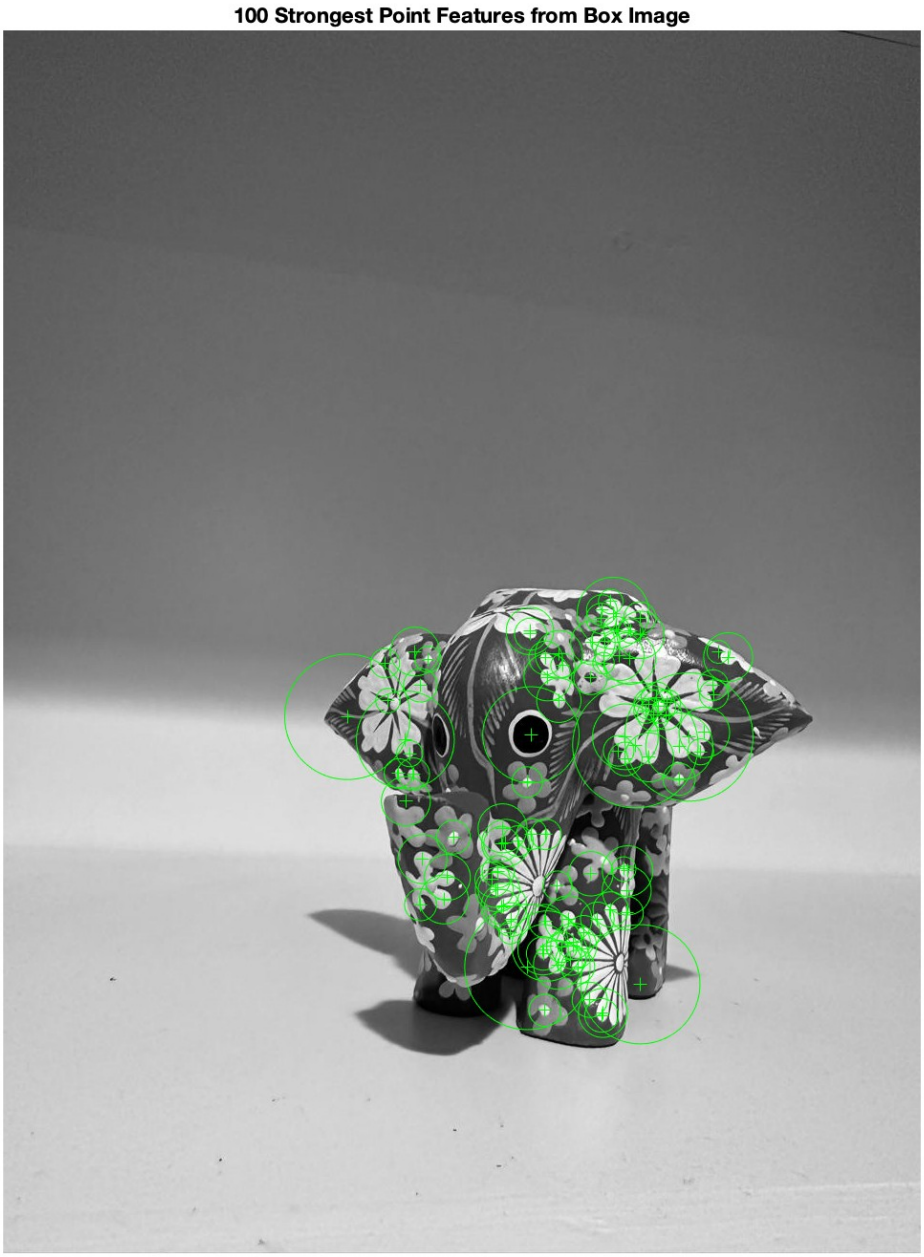
"'boxPoints = detectSURFFeatures(boxImage); scenePoints = detectSURFFeatures(sceneImage);

4 100 Strongest points

"'imshow(boxImage); title('100 Strongest Point Features from Box Image'); hold on; plot(selectStrongest(boxPoints, 100));

[8]:
```
Image(filename="/Users/Harsh/Documents/GSU_Spring/ComputerVision/
↪Harsh_Assignment_3/Q5/100points.jpg")
```

[8]:

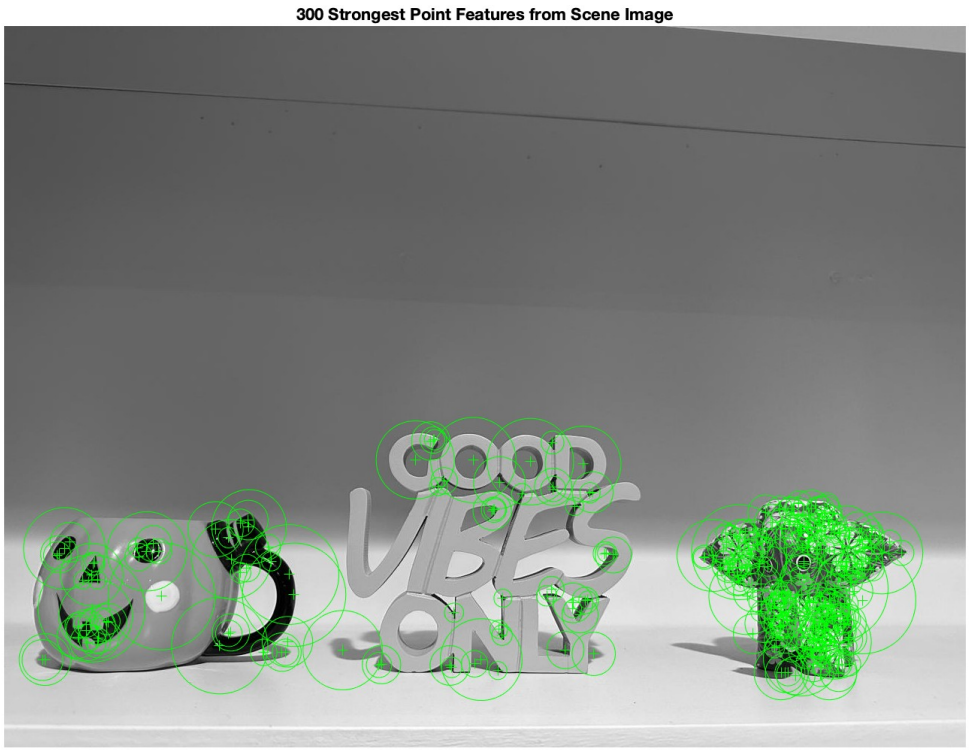


5 300 Strongest points

“‘figure; imshow(sceneImage); title(‘300 Strongest Point Features from Scene Image’); hold on; plot(selectStrongest(scenePoints, 300));

[9]:
```
Image(filename="/Users/Harsh/Documents/GSU_Spring/ComputerVision/
↪Harsh_Assignment_3/Q5/300points.jpg")
```

[9]:



6 extract Features

“‘[boxFeatures, boxPoints] = extractFeatures(boxImage, boxPoints); [sceneFeatures, scenePoints] = extractFeatures(sceneImage, scenePoints);

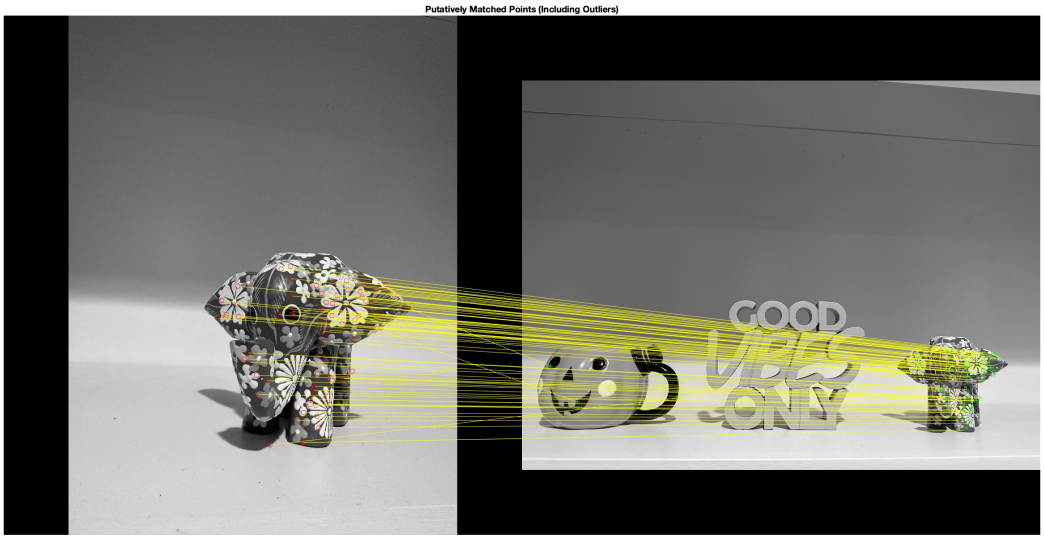
boxPairs = matchFeatures(boxFeatures, sceneFeatures);

7 Including Outliers

“‘matchedBoxPoints = boxPoints(boxPairs(:, 1), :); matchedScenePoints = scenePoints(boxPairs(:, 2), :); figure; showMatchedFeatures(boxImage, sceneImage, matchedBoxPoints, … matchedScenePoints, ‘montage’); title(‘Putatively Matched Points (Including Outliers)’);

[10]:
```
Image(filename="/Users/Harsh/Documents/GSU_Spring/ComputerVision/
↪Harsh_Assignment_3/Q5/includingoutliers.jpg")
```

[10]:



8 estimation

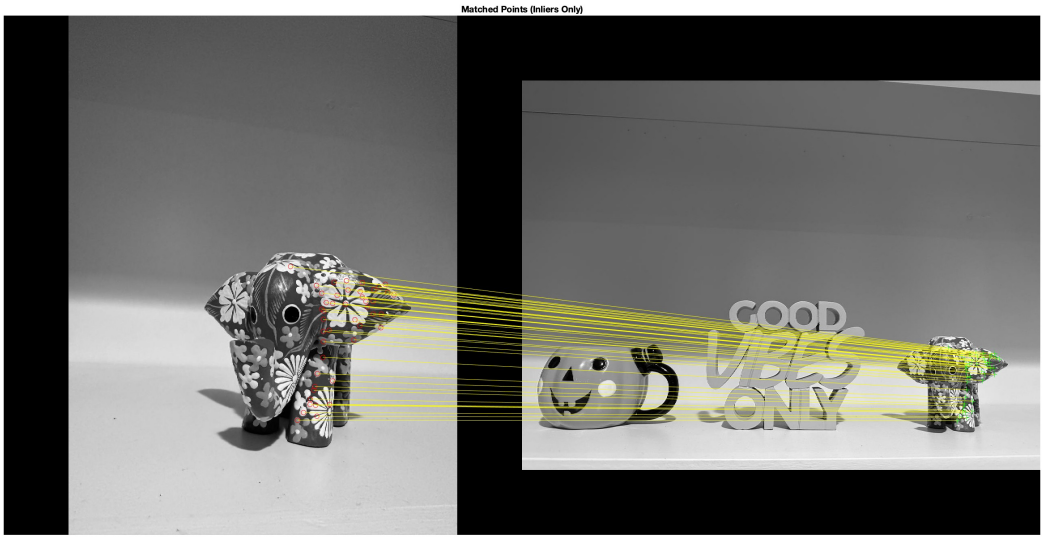
“‘[tform, inlierIdx] = estimateGeometricTransform2D(matchedBoxPoints, matchedScenePoints, ‘affine’); inlierBoxPoints = matchedBoxPoints(inlierIdx, :); inlierScenePoints = matchedScenePoints(inlierIdx, :);

9 inliers

“‘figure; showMatchedFeatures(boxImage, sceneImage, inlierBoxPoints, … inlierScenePoints, ‘montage’); title(‘Matched Points (Inliers Only)’);

[11]:
```
Image(filename="/Users/Harsh/Documents/GSU_Spring/ComputerVision/
↪Harsh_Assignment_3/Q5/inliers.jpg")
```

[11]:



10 size

“‘boxPolygon = [1, 1;…
size(boxImage, 2), 1;…
size(boxImage, 2), size(boxImage, 1);… 1, size(boxImage, 1);…
1, 1];

newBoxPolygon = transformPointsForward(tform, boxPolygon);

11 Detected Box

“‘figure; imshow(sceneImage); hold on; line(newBoxPolygon(:, 1), newBoxPolygon(:, 2), Color=‘y’); title(‘Detected Box’);

[12]:
```
Image(filename="/Users/Harsh/Documents/GSU_Spring/ComputerVision/
↪Harsh_Assignment_3/Q5/detectedbox.jpg")
```

[12]:

Detected Box